SPECIFICATIONS

Newport Harbor High School
SIM Building
HVAC MODERNIZATION PROJECT

DIVISION 0 – INTRODUCTORY PAGES

SECTION 00 00 02 - PROJECT DIRECTORY

PART 1 - GENERAL

School Site:
949-515-6300 PHONE
949-515-6370 FAX

Newport Harbor High School
600 Irvine Avenue,
Newport Beach, CA 92663

Owner:
714-424-7527 PHONE
azareczny@nmusd.us

Newport Mesa Unified School District
2985 Bear Street
Costa Mesa, CA 92630
Director of Facilities: *Ara K. Zareczny*

Structural Engineering:
714-693-2277 PHONE
None FAX
matte@stbse.com

STB Structural Engineers, INC.
21084 Bake Parkway, Suite 100,
Lake Forest, CA 92630
Principal-in-Charge: *Matt Exley*

Mechanical Engineering:
714-693-2277 PHONE
None FAX
abanerjee@oed-inc.com

Optimum Energy Design
5200 E. La Palma
Anaheim, CA 92807
Principal-in-Charge: *Abby Banerjee*

Electrical Engineering:
909-941-3008 PHONE
909-941-8211 FAX

A&F Engineering
9320 Baseline Road, Suite C
Rancho Cucamonga, CA 91701
Principal-in-Charge: *Rolando E. Sotelo*
Contact: *Luis E. Flores*

PART 2 - PRODUCTS…… …….Not applicable—this section

PART 3 – EXECUTION……Not applicable –this section

-END OF SECTION-

DIVISION 0 – INTRODUCTORY PAGES

SECTION 00 00 03 – ARCHITECT AND ENGINEERS PROFESSIONAL STAMPS

Newport Harbor High School – HVAC Modernization Project

600 Irvine Avenue, Newport Beach, CA 92663

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1. **Structural Engineer:** Matt Exley
   STB Structural Engineers
   21084 Bake Parkway
   Lake Forest, CA 92630
   (949) 599-0320

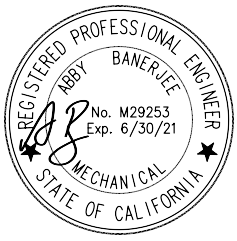
   Seal:

2. **Electrical Engineer:** Rolando E. Sotelo
   A & F Engineering Group, INC
   9320 Baseline Road Suite C
   Rancho Cucamonga, CA 91701
   (909)941-3008

   Seal:

3. **Mechanical Engineer:** Abby Banerjee
   Optimum Energy Design
   5200 E. La Palma Ave
   Anaheim, CA 92807
   (714)693-2277

   Seal:



Division of State Architect:

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-119155 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☐
DATE: 06/23/2020

DIVISION 0 – INTRODUCTORY PAGES

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PART 1 - GENERAL

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 26 00 - REQUESTS FOR INFORMATION

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes: Procedures for requesting clarification or information about the intent of the contract documents.

1.02 DEFINITIONS

A. Request for information: A request for information, clarification or interpretation is a formal means for the Contractor to verify or clarify the intent of the documents. Requests are presented in writing on a pre-approved form and answered in writing on the same form. Request is prepared by the Contractor, and submitted to the Engineer, to request clarifications or interpretations of the intent of the Contract Documents, or to notify the Engineer of potential conflicts in Contract Documents or between the Contract Documents and field conditions.

1.03 PROCEDURES FOR REQUESTING INFORMATION

A. The Engineer's response is an interpretation or clarification of the Contract Documents. Such request does not authorize changes in the work that impact Contract Sum or Contract Time.

B. When possible, request such clarification either verbally or in writing at the next scheduled Project meeting. When the information request is answered at the project meeting, number the request and enter the response into the meeting minutes. When the urgency or complexity require more timely communication between meetings, prepare and submit a formal written information request to the Engineer, without delay.

C. Submit information requests within 3 days so as not to impede the progress of the work.

1. When an answer to an information request has an effect on cost or time, notify the Engineer in accordance with the Contract Documents. Do not perform such work until a Change Order has been reviewed by the Engineer and approved by the District.

2. When submitting an information request, indicate the time available for the Engineer to respond without causing an impact to the Contract Time.

D. When a request for information involves clarification of coordination issues, lay out Contractors' suggested solutions using scaled sketches, and submit with the request. If the request is such that choices of several logical solutions are apparent to the Contractor, include the logical solutions on the form.

E. Information requests may be returned with a stamp or notation "Not Reviewed", if, in the opinion of the Engineer:

1. The interpretation requested is ambiguous or unclear to the Engineer.

2. The answer is obvious and clear by researching the Contract Documents.

3. The Contractor has not reviewed the request prior to submittal to the Engineer.

4. The Contractor has not offered potential solutions to answer coordination issues or offered logical solutions.

F. Allow a minimum of 4 days for review and response time, after receipt by the Engineer. It is the responsibility of the Contractor to verify receipt by the Engineer. The response time may be increased if:

1. More information is required.

2. The information request is submitted out of sequence.

3. In the opinion of the Engineer, more time is needed to answer the information requests.

G. Do not use information requests for:

1. Submitting substitutions for consideration.

2. Requesting changes or additions of scope to the work.

3. Requesting “value engineering” cost-saving or time-saving changes.

H. If the Contractor believes that a clarification by the Engineer may result in a change, Contractor shall not proceed with the work indicated by the request until a change is approved by the District.

1. If the Contractor believes that a clarification by the Engineer results in additional cost, identify the basis of the Contractor’s bid in the information requests.

2. Answered information requests shall not be construed as an authorization to perform extra work.

I. Form: Submit requests in writing on a form approved by District.

PART 2 – PRODUCTS – NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 33 00 - SUBMITTALS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes:

1. Procedures for submitting, to the District, items such as schedules, shop drawings, product data, samples, material lists, manuals, warranties and certificates, required by this section and individual specification sections, finish hardware schedule and segregation of contract costs.

2. Wherever possible, throughout the Contract Documents, the minimum acceptable quality of workmanship and materials has been defined by the name and catalog number of a manufacturer and by reference of recognized industry standards.

3. To ensure that specified products are furnished and installed in accordance with the design intent, procedures have been established for advance submittal of design data and for its review by the District.

C. Related Sections:

1. Section 01 32 13: Construction Schedule.

2. Section 01 78 39: Project Record Documents.

3. Other sections requiring submittals, as indicated in specification sections.

1.02 DEFINITIONS

A. Shop Drawings: Shop drawings are original drawings prepared by Contractor, subcontractor, supplier, or distributor which illustrate some portion of work by showing fabrication, layout, setting, or erection details.

1.03 SUBMITTAL PROCEDURES

A. After award of contract, Contractor will receive the documentation checklist for project completion forms provided by the District. Forms will indicate documentation requested by the District, such as shop drawings, manufacturer's catalogs, samples, warranties, operating and instruction manuals.

B. Upon receipt of checklist, Contractor shall, during course of project, secure and submit the required documentation to the District for review and approval.

C. After the District has date-stamped, signed and reviewed submittals, with corrections noted, if any, the District will transmit submittals to Contractor. Final inspection shall not be held until documentation checklist has been completed.

D. Timing of Submittals:

1. Within 7 days after award of contract, Contractor shall submit to the District shop and diagram drawings, materials lists and other submittals required by the specifications, prior to the establishment of a job start date. (Exception - Finish Hardware Schedule and Segregation of Contract Costs). Contractor shall submit a single, complete submittal package – multiple submittal packages will not be accepted unless otherwise agreed upon by the District and Engineer. Should Contractor submit multiple submittal packages without the approval of the District and Engineer, Contractor may be subject to fee charges for additional review time spent by District and/or Engineer.

2. Provide a schedule of submittals in conformance with construction schedule. Refer to Section 01 32 13: Construction Schedule - CPM.

    a. Submit and review with the District, a schedule for shop drawing submittal dates and date of return required by Contractor in order to maintain construction schedule. Schedule of submittals shall indicate adequate time between submittals in order to allow adequate time for review without impact to construction schedule.

3. Schedule of submittals shall be related to work progress, and shall be organized to allow sufficient time for mailing, reviewing, corrections, resubmission and re-reviewing.

4. Coordinate submittal of related items.

5. Revise, update and submit schedule of submittals to the District, on first of each month, or as required.

6. Allow at least 5 days for the District's review following receipt of submittal. For Divisions 23 and 26 submittals, allow a minimum of 7 days following receipt of submittal.

E. Make submittals in accordance with the construction schedule, and shop drawing submission schedule, in sequence that avoids delaying work and progress of related work.

F. Each submittal shall be accompanied by a letter of transmittal containing an itemized and numbered list of submitted materials. Separate letters of transmittal shall accompany each submittal from different subcontractors.

G. Resubmission: If requested, resubmit submittals within 3 days. Resubmit as specified for initial submittal but identify as such. Indicate changes which have been made other than those requested by the District.

PART 2 - PRODUCTS

2.01 CONSTRUCTION SCHEDULE

A. Provide in accordance with Section 01 32 13 Construction Schedule – CPM.

2.02 SHOP DRAWINGS

A. Draw shop drawings to an accurate scale that is large enough to indicate all pertinent features and methods.

B. Copies Required and Distribution: Unless otherwise indicated in individual specification sections, submit 7 sets of blueline prints of which four sets will be retained by the District, and 2 copies will be returned to Contractor.

C. Contractor MUST prepare shop drawings for all aspects of work, including but not limited to:

a. Chilled and hot water piping – 1/16” (min.) site plan indicating all work

b. Air handling equipment rooms – ¼” (min.) plan indicating new equipment layout, ductwork, hydronic piping and piping appurtenances

c. Building Unit piping – 1/8” (min.) plan indicating pipe routing inside of building and on roof. Indicate building and roof opening locations and sizes.

d. Controls wiring, schematics and sequences

D. All shop drawings must be approved by Engineer prior to the ordering, fabrication, and/or installation or equipment and/or contracted work.

E. See Section 23 30 00, paragraph 1.6 for additional requirements.

2.03 PRODUCT DATA

A. Manufacturer's Standard Schematic Drawings:

1. Delete information that is not applicable to project.

2. Supplement standard drawings to provide additional information applicable to Project.

B. Manufacturer's catalog sheets, brochures, diagrams, schedules, performance charts, illustrations, and other standard descriptive data:

1. Clearly mark each copy to identify pertinent materials, products, or models.

2. Indicate dimensions and clearances required.

3. Indicate performance characteristics and capacities.

4. Indicate wiring diagrams and controls.

C. Copies required and Distribution: Submit 6 copies. The District will retain four copies, and 2 will be returned to Contractor.

2.04 SEGREGATION OF CONTRACT COSTS

A. Provide a Segregation of Contract Costs as required by the general condition requirements of the District.

2.05 MANUALS

A. Where manuals are required to be submitted covering items included in work, prepare manuals in durable binders, approximately 8-1/2" by 11" in size, and provide following information:

1. Identification on, or readable through, front cover stating general nature of manual.

2. Neatly typewritten index at front of manual, furnishing immediate information as to location in manual of data or equipment involved.

3. Complete instructions regarding operation and maintenance of equipment involved.

4. Complete nomenclature of replaceable parts, their part numbers, current cost, and name and address of nearest vendor of parts.

5. Copy of all guarantees and warranties issued.

6. Copy of approved shop drawings with data concerning changes made during construction.

B. Extraneous Data: Where contents of manuals include manufacturers' catalog pages, clearly indicate precise items included in this installation and delete, or otherwise clearly indicate, manufacturers' data which is not part of this installation.

C. Number of Copies Required: Deliver 7 copies to the District for review, approval and distribution. The District will return 3 copies to Contractor.

2.06 CERTIFICATES

A. Submit in triplicate, in accordance with requirements of each specification section.

2.07 MATERIAL LIST SUBMITTALS

A. Provide material lists on following:

1. Electrical.

2. Heating, ventilating and air conditioning.

3. Plumbing.

4. Controls.

B. Copies Required: 8 copies; 2 copies will be returned to Contractor.

C. Provide supplementary submittals for materials omitted or not approved.

D. Substitutions proposed by Contractor shall be made in accordance with the General Conditions of the Contract.

PART 3 - EXECUTION

3.01 SUBMITTAL REVIEW BY CONTRACTOR

A. Review submittals prior to submission to the District. Review and stamp submittals prior to review by District.

B. Clearly identify deviations from the Contract drawings and specifications on submittals. Prior approval of deviations by the District or their representative is required. Contractor shall not use the submittal process for substitution requests.

C. Deliver submittals to the District. Identify project name and address, telephone number of Contractor, subcontractor and supplier. Identify, as appropriate, pertinent drawing sheets, detail numbers and specification section numbers. Clearly identify deviations from contract documents.

3.02 SUBMITTAL REVIEW BY DISTRICT

A. District will not review submittals that have not been stamped and reviewed by Contractor. Such submittals will be returned, without review, to Contractor.

B. District will review submittals required, according to the submittal schedule, and make corrections, notes or modifications as appropriate. Submittals will be stamped, to indicate the action required, and returned to Contractor.

1. Submittals not required by the contract documents will be returned without review.

2. District's approval stamp is for design and quality only, and is not an approval for deviations or quantities.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 51 00- CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes Description of temporary utilities and protection of construction facilities that are to be provided and maintained by Contractor.

1.02 TEMPORARY UTILITIES

A. Water:

1. Water used on work will be furnished and paid for by the District. Contractor shall provide necessary temporary piping from distribution point to points on site where water is necessary to carry on work, and upon completion of work shall remove temporary piping.

2. Provide suitable drainage system, subject to approval of the District Inspector, to carry construction wastewater from site to an approved disposal location.

B. Electricity:

1. The District will furnish and pay for electrical power necessary for construction purposes at site. Contractor shall provide necessary temporary wiring and lighting and shall remove all temporary wiring and lighting at the completion of the work. Temporary wiring and lighting shall comply with requirements of the Los Angeles Electrical Code. Contractor shall be responsible for all damage caused by overloading or other causes and the installation shall be satisfactory to the District Inspector.

2. Furnish and install area distribution boxes, so located that individual trades may use 100 feet maximum length extension cords to obtain adequate power and artificial lighting, at points where required for work, for inspection and for safety.

3. Provide electricity needed for construction including connections for construction equipment requiring power.

C. Gas: Contractor shall provide and install gas equipment and piping necessary to perform his work, and shall remove same upon completion of work. Contractor shall pay for the gas used in work.

D. Heating and Ventilation:

1. Provide, maintain, and pay for heat needed for proper installation of work and to protect materials and finishes from damage due to weather.

2. Provide ventilation of enclosed areas to cure materials, to disperse humidity, and to prevent accumulation of dust, fumes, or gases.

E. Temporary Telephone: Contractor shall provide and pay all costs for one cellular telephone or business telephone line at site for his use. Use of District telephones will not be permitted.

F. Temporary FAX: Make necessary arrangements and pay costs for installation and operation of telephone service to Contractor's office at site, suitable for sending and receiving FAX

transmissions. Install a plain-paper FAX machine connected to this line and available 24 hours a day during construction operations.

G. Use means necessary to maintain temporary facilities and controls in proper and safe condition throughout progress of work.

H. Make required connections to existing utility systems with minimum disruption to services in existing utility systems. When disruption of existing service is required, do not proceed without the District Inspector's approval and, when required, provide alternate temporary service.

1.03 TEMPORARY HEATING AND COOLING

A. Equipment:

1. Contractor shall provide heating and/or cooling equipment as required to provide heated and/or cooled conditioned air to occupied spaces for which construction has temporarily disabled air conditioning equipment serving that space. All equipment must be sized properly to meet cooling and/or heating load requirements.

2. All temporary equipment must be secured with provisions stated in Section 1.04 of this specification.

3. Contractor shall be responsible for furnishing and installing all equipment and/or items required to properly mount or secure temporary equipment.

4. Upon completion of this project, Contractor shall remove all temporary equipment and appurtenances from the site. All areas and material finishes must be restored to their original state.

1.04 CONTRACTOR'S FACILITIES

A. Storage Units:

1. Provide secure and waterproof storage units where required for the temporary storage of furniture, equipment and other items. Storage unit must be located within the confines of a safety barricade (see below) and shall remain inaccessible to facility occupants.

2. Storage Unit Construction: Walls, roof and doors minimum 16 gage steel; floors 1 inch tongue and groove hardwood or 3/4 inch minimum exterior type plywood, with undercarriage designed to accommodate forklift blades 42 inch to 60 inch long; doors at one end of storage unit, double wide swing out with waterproof gaskets and lockable steel bars.

3. Pay all delivery charges and set the storage unit where directed by the District Inspector.

4. Remove storage unit from the site after removal of all the items that were

B. Contractor's Safety Barricade:

1. Contractor shall erect safety barricade as required by the District Inspector for the protection and safety of staff and the public. New or pre-used material can be utilized.

2. Unless otherwise indicated or specified, barricade shall be constructed of 8 feet high chain link fencing and shall be properly secured to the ground and/or structure. Space posts not to exceed 10 feet on centers.

3. Chain link fencing shall be free from barbs, icicles or other projections resulting from galvanizing process. Fence fabric having such defects will be rejected even though it has been erected.

4. Gates shall be fabricated of steel pipe with welded corners, and bracing as required. Fabric to be attached to frame at 12 inch centers. Provide all gate hardware of a strength and quality to perform satisfactorily until barricade is removed upon completion of work.

5. At completion of work, remove barricade and concrete post footings from site; backfill and compact fence footing holes. Existing surface paving that is cut into or removed shall be patched and sealed to match surrounding areas.

6. The Inspector may allow the use of panelized chain link fence or properly supported orange plastic fence.

7. Edge Protection Guardrails for roof work per OSHA and District Requirements. Cones and caution tape are not acceptable.

C. Other Enclosures:

1. Provide lockable, temporary weather-tight enclosures at openings in exterior walls to facilitate temporary cooling or heating and security.

2. Provide protective barriers around trees, plants and other improvements designated to remain.

D. Storage Yards and Sheds:

1. Contractor shall fence and maintain storage yards in an orderly manner.

2. Storage for materials that cannot be stored outside may be stored within building.

3. District Inspector shall approve exact location, size and access of storage yards.

4. Remove storage yards and sheds as rapidly as progress of work will permit.

E. Contractor's Parking:

Location and number of spaces for Contractor's parking as directed by the District Inspector, temporarily stored and when directed by the District Inspector.

1.05 GENERAL ITEMS

A. Staging areas for delivery of materials and equipment will be at locations designated by the District Inspector.

B. Safety and Security Lighting: Provide 20-foot candles minimum inside building(s) and 5 foot candles outside.

C. Noise Control: Muffle all equipment. All noise levels shall comply with OSHA and CAL/OSHA requirements. Excessive noise tasks such as coring etc. shall be performed after hours or weekends.

D. Dust and Odor Control: Dust and odor barriers shall be in place dividing areas of work and remainder of building to provide a safe and clean environment for building occupants. Provide adequate ventilation if required. Comply with all OSHA and CAL/OSHA requirements.

E. Where temporary noise/duct partitions are required, Contractor shall build a dividing partition, which will extend from finished floor up tight to the underside of existing ceiling. (Upon removing partition, Contractor shall repair floor and/or ceiling as required to match existing conditions.) Contractor shall construct partition in accordance with local building codes. Under no circumstances shall temporary partition block any means of egress or impede the regular flow of occupant traffic. Contractor shall provide District with a scaled drawing indicating the exact location of the temporary partition relative to its' surroundings. Contractor must have approval from District prior to the erection of such partition.

1.06 TRENCHES

A. Open trenches for installation of utility lines (water, gas, electrical and similar utilities) and open pits outside barricaded working areas shall be cordoned at all times. Barricades, shall be as identified in another part of this section. Walk Plates shall be installed at all pedestrians and vehicle traffic cross-area (see below). Trenches shall be backfilled and patch-paved within 72 hours after approval of installation by the District Inspector.

B. Open trenches deeper than 42 inches, and not located within a parking area or public street access, shall be enclosed within an 8-foot high chain-link fence.

C. Trenches or excavations which cannot be properly back-filled and patched prior to the end of each work day shall be bridged to permit an unobstructed flow of traffic. Trench walls and adjacent soils shall be sufficiently stabilized prior to the use of steel plates for bridging.

a. Bridging must be secured against displacement by using adjustable cleats, angles, bolts, or other devices to prevent movement by traffic.

b. The trench must be adequately shored to support the bridging and traffic.

c. Steel plates used for bridging must extend 1 foot beyond the edges of the trench. Temporary paving materials (premix) should be used to feather the edges of the plate to minimize wheel impact.

D. All excavations in public rights-of-way shall be in compliance with all current Occupational Safety and Health Act (CAL/O.S.H.A.) requirements. Any persons in an excavation not in compliance with CAL/O.S.H.A. regulations will be ordered out of the excavation until it is brought into compliance.

E. All excavations or trenches made in the parking area or sidewalk shall be backfilled and patched in accordance with the current CDOT and/or NCDOT specifications. District inspector shall be notified prior to making an excavation or cutting a trench in any pavement or sidewalk.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes:

1. Quality assurance.

2. Delivery, storage and handling.

3. Equipment furnished by District for coordination and installation by Contractor.

4. Installation requirements.

1.02 QUALITY ASSURANCE

A. Standard References: Material or procedure specified by reference to number, symbol, or title of a specific standard, such as a commercial standard, a Federal Specification, a trade association standard, or other similar standard document shall comply with requirements in latest version, revision, amendment or supplement of document in effect on date of executed contract, except as limited to type, class or grade, or modified in such reference.

1.03 DELIVERY, STORAGE AND HANDLING

A. All materials and products for the project shall be delivered in manufacturer's original, undamaged, factory sealed containers, with factory applied labels intact and legible.

B. The labels shall contain the following information as applicable: Manufacturer's name and address; brand name; product designation; type, class or grade; size or weight; batch number; testing lab certification and color.

1.04 EQUIPMENT FURNISHED BY THE DISTRICT

A. Equipment may be provided by the District, where indicated, and will be delivered to the site by the District.

B. Store, uncrate, assemble, install and connect the District-furnished equipment, under this contract.

C. Delivery: Within 15 days after the Contract is awarded, Contractor shall notify the District, in writing, of date scheduled for installation of equipment. Upon delivery to site, Contractor shall store equipment inside rooms or protected spaces. The District Inspector will sign receipt, or bill of lading, as required.

D. Uncrating and Inspection: Within 3 days after delivery, uncrate in the presence of the District Inspector, who will assist Contractor in inspection of items delivered. A report showing damaged or missing parts shall be prepared and signed by both. One copy will be given to Contractor and the other retained by the District Inspector. The District will repair damage and provide missing parts listed in report. After District repairs damage and provides missing parts listed in report, any further damage shall be repaired and missing parts replaced by Contractor.

E. Connection and Setting Drawings: The District will furnish setting and connection drawings if required.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION

3.01 INSTALLATION REQUIREMENTS

A. Install equipment in location and orientation indicated on drawings, or in locations provided by District Inspector.

B. Equipment shall be installed plumb and level, by means of shims or spacers, in a manner that with all mounting bolts fully tightened, no distortion nor undue stresses will be set up within equipment. Furnish other accessories and components necessary to properly install equipment, such as bolts, washers, fittings or blocking.

C. Floor Mounted Equipment:

1. Equipment designed or specified to be attached to substrates such as concrete or steel shall be secured with anchor bolts and tampins, cinch anchors or fastite bolts and shells of size recommended by manufacturer of equipment, or as required for secure mounting.

2. Equipment designed or specified to be attached to wood construction shall be secured with machine bolts or lag screws, of size recommended by manufacturer of equipment, and as directed by the District Inspector.

D. Bench Mounted Equipment: Secure to bench or table by machine bolts.

E. Equipment shall be connected only to outlets with correct electrical characteristics. Contractor shall ascertain that the electrical characteristics of the equipment are for outlets indicated. Report discrepancies immediately to the District Inspector.

END OF SECTION

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 73 00 - EXECUTION

PART 1 - GENERAL

1.01 SUMMARY

A. Provisions of the General and Supplementary Conditions and Division One apply to this section.

B. Section Includes:

1. Cutting, patching, and alteration procedures:

a. Removals, cutting, alterations and repairs to existing facilities as required to complete work.

b. Relocation and reinstallation of existing construction and finish.

c. Salvage, storage and protection of existing items to be reinstalled.

d. Salvage and delivery to the District of items so designated for removal and salvaged by Contractor.

2. Examination by Contractor.

3. Final inspection.

1.02 SUBMITTALS

A. Shop Drawings: Submit details of cutting and patching, including transition to existing items being patched. Provide details of all piping and ductwork routing, elevations and sizes. Also provide equipment locations and dimensions relative to equipment pads and all equipment support and pad locations.

B. Schedules: Contractor must submit proposed work schedules, including dates and hours proposed. Schedule must be approved by District prior to starting any work. Where special work conditions apply, Contractor must provide a detailed work schedule which must include all duties, work dates and times, completion dates, and an explanation stating means and methods for executing such work.

C. All work executed within the building shall be done on Monday through Friday during the hours of 7:00 a.m. to 6:30 p.m. Any deviations from the said days and/or times must be approved with the District prior to executing such work. Any work to be done before and/or after stated times (except on Saturday or Sunday) shall be scheduled as required and done without additional cost to the District.

1.03 WARRANTIES

A. Existing Warranties: Repair materials and systems that have been cut, modified or damaged as a result of cutting, patching or alteration procedures, using methods and materials that will not void existing warranties. It shall be the responsibility of the Contractor to contact the District and/or Contractor backing an existing warranty – coordinate and consult as required to ensure that all materials are restored to their original condition and warranties are not voided. Any damage to existing systems under warranty shall be repaired by Contractor at no additional cost to the District.

1.04 REMOVAL, ALTERATIONS AND REPAIRS

A. Restore and refinish new and existing construction and improvements that are cut into, damaged, relocated, or reinstalled. Workmanship and materials shall conform to applicable provisions of other sections.

B. Provide new fasteners, connectors, adhesives, and other accessory materials or components as required to complete the work.

C. Perform removals and alterations only to the extent required to complete the work. Carefully remove work to be salvaged or reinstalled. Protect and store for reuse.

1. Walls, Partitions, and Ceilings: Remove by accurately cutting and carefully removing.

2. Concrete: Saw with powered concrete saw, or chip where sawing is not feasible, to prevent spalling of concrete to remain. Cut off reinforcing bars, except where bonded into new concrete or masonry, and paint ends with bituminous paint before enclosing.

3. Woodwork: Cut or remove to a joint or panel line. Undamaged removed material may be reused.

4. Sheet Metal: Remove back to joint, lap, or connection. Secure loose or unfastened ends or edges and make watertight.

5. Glass: Remove broken or damaged glass and clean rebates and stops of setting materials.

6. Plaster: Cut back to sound plaster on straight lines, and back-bevel edges of remaining plaster. Trim existing lath and prepare for new lath.

7. Gypsum Wallboard: Cut back on straight lines to undamaged surfaces, with at least two opposite cut edges centered on supports.

8. Acoustical Ceilings: Remove hanger wires where ceilings are not reinstalled.

9. Tile: Cut back to sound tile and backing on joint lines if portions are to remain.

10. Flooring: Completely remove flooring and clean backing of old cement or adhesive. Carefully remove wood flooring for patching and repairing of existing wood flooring to remain.

11. Miscellaneous Items: Grind items not mentioned but required to be removed in such manner as minimizes damage to Work to remain.

1.05 CUTTING AND PATCHING

A. Cutting, boring, saw cutting or drilling through new or existing structural elements to be done only when so detailed in drawings or accepted by the Structural Engineer, with approval from the District and DSA.

B. Patching, Repairing and Finishing:

1. Concrete: Keep the cut edges damp for 24 hours and scrub with a neat portland cement mortar just before new concrete is placed; epoxy adhesive may be used in lieu of cement mortar. Finish new concrete to match existing. Provide 3,000 psi

concrete for repairs. At cut concrete edges to remain exposed, apply adhesive and restore with minimum 3/4" thick cement mortar finished to match adjoining surfaces.

2. Metal Items: Grind cut edges to remain exposed smooth and rounded.

3. Woodwork: Trim back to joint lines or splices, re-trim cut surfaces, and patch new matching or undamaged remove materials.

4. Sheet Metal: Restore removed or damaged sheet metal items as required or directed.

5. Glass: Install new matching glass and re-seal existing exterior windows, airtight.

6. Lath and Plaster:

   a. Lath: Lath surfaces to be patched with matching lath as required, secured to supports at 6" centers. Lap new lath 6" over existing and wire-tie new and existing lath edges together at 6" intervals. Restore paper backings as required, shingled into existing.

   b. Plaster: Apply a bonding agent on cut edges of existing plaster. Apply 3-coat plaster patching of type, thickness, finish, color, and texture to match existing plaster.

7. Gypsum Wallboard: Refasten cut edges of existing wallboard. Apply patches with at least two opposite edges centered on supports and secure at 6" centers. Tape and finish joints and fastener heads. Make patching non apparent when painted.

8. Acoustical Ceilings: Conform to requirements specified herein as necessary to match the existing conditions.

9. Resilient Flooring: Completely remove damaged flooring and clean off all old cement as specified. Install new flooring of color, pattern, and type as specified.

10. Painted Surfaces: Prepare patched areas and refinish as specified in Section 09 90 00: Painting.

1.06 PREPARATION OF EXISTING WORK

A. Holes: Drill holes through existing concrete or masonry for new conduit and/or piping, and do not jack-hammer.

B. Sandblasting: Work includes sandblasting of existing surfaces to receive materials secured by cementitious, adhesive, or chemical bond (such as concrete, toppings, elastomeric coatings, plaster, mortar, etc.), and the sandblasting of other surfaces as shown, specified, directed, or required for proper preparation of surfaces. Completely remove existing finishes, stains, oil, grease, bitumen, penetrated mastics and adhesives including primers, and substances deleterious to bond or connection of new materials, and expose clean sound surfaces. Employ wet sandblasting for interior surfaces, and for exterior surfaces where directed or necessary to prevent creation of a dust nuisance or required by Code.

C. Salvage: Existing removed items not indicated or specified to be reused or reinstalled the District intends to retain will be designated by District prior to start of removals in pertaining area. Carefully remove, salvage, box or bundle as approved, and deliver such items to storage at the site as the District Inspector directs.

D. Disposal: Conform to General Conditions. Dispose of removed material off the District's property except existing items to be salvaged or reinstalled. Promptly remove waste and debris and do not allow to accumulate within facilities or on site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. New Materials: Use materials identical in appearance and performance characteristics to existing materials, so that patch or alterations will visually match and blend seamlessly into adjacent existing surfaces.

B. New ceiling tile to replace the obsolete existing tile – Armstrong 741. See specification 09 51 23.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify compatibility and suitability of existing before starting the work. Perform a detailed survey of existing site and building conditions before starting work. Report unsatisfactory conditions to the District Inspector, such as discrepancies or conflicts between Drawings and actual conditions.

3.02 FINAL INSPECTION

A. A final examination shall be made when work is substantially complete, except for minor corrective items, in accordance with District regulations.

B. Before final examination, completed documentation checklist shall have been received and project record documents shall be completed.

END OF SECTION

DIVISION 02 – EXISTING CONDITIONS

SECTION 02 41 19 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and re-installed.

1.02 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Items of interest or value to Owner that may be uncovered during demolition remain the property of Owner. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.03 FIELD CONDITIONS

A. Owner may occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Hazardous Materials: If suspected hazardous materials are encountered, do not disturb; immediately notify Owner. Hazardous materials will be removed by Owner under a separate contract.

D. Storage or sale of removed items or materials on-site is not permitted.

E. Utility Service: Maintain existing utilities noted to remain in service and protect them against damage.

G. Maintain fire-protection facilities in service during selective demolition operations.

PART 2 - PRODUCTS

2.01 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

-END OF SECTION-

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 07 01 50 - ROOF MAINTENANCE AND REPAIR

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Repairs to and maintenance of existing -roofing.

B. Repairs to roof flashing and trim, penetrations, rainwater drainage components and' other roof-related components

1.02 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry

B. Section 07 62 00 - Sheet Metal Flashing and Trim.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements: Materials and 'installation shall meet or exceed applicable minimum requirements of California Building Code (CBC), Section 9 and Section.15

B. Industry Standards: 'Work specified in this Section shall comply to manufacturer's product data and application instructions. Work shall also conform to recommended practices and details published in NRCA Roofing and Waterproofing Manual and the recommended practices and details of Western States Roofing Contractors Association (WSRCA); where such practices and details are more stringent

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery, Storage and Handling, General: Deliver, store and handle roofing sheet materials in a manner ensures that no significant quantity of moisture is absorbed.

B. Storage: Dry, well ventilated, weathertight locations. Unless protected from weather or other moisture sources, do not leave unused felts on roof overnight or when roofing Work is not in progress. Store rolls of felt and other sheet materials on end on pallets or other raised surfaces.

C. Temporary Placement on Structure: Distribute weight of packaged roofing materials over roof deck area to prevent substantial deflection of roof deck and overloading of the structure.

1.05 WARRANTY/MAINTENANCE AGREEMENT

A. Contractor Maintenance Agreement

1. For a two- (2) year period from the date of completion and owner acceptance, Contractor shall agree to inspect, maintain, and make necessary repairs to leaks in the roof and flashings. Emergency leaks will be attended to within twenty-four (24) hours from receipt of notice from the Owner. This Agreement shall be submitted to the Owner, in writing, before final payment is released for the Contract.

2. If, Twenty four (24) hours after notification of roof leakage Contractor has not responded, Owner shall have the right, without invalidating his agreement, and at the expense of the Contractor, to make any emergency temporary repairs in order to protect the building and its contents from damage due to roof leakage.

PART 2 – PRODUCTS

2.01 MANUFACTURER

C. Manufacturer: This specification is based upon Johns Manville roof materials and components to establish intended material, performance and quality standards. Requests for substitutions may be submitted for review and consideration in accordance with Division's requirements and/or contract general conditions.

2.02 MATERIALS

A. Roofing Materials, General: Furnish roofing materials and systems to match existing roofing materials and preserve the existing Class 'B" minimum roof covering fire classification per CBC Chapter 15 requirements. All materials to be American made and asbestos free, and shall comply with the following standards.

B. Base Sheet

1. Material: Heavyweight' glass mat, bound together with a resinous binder and completely coated with weathering grade asphalt.

2. Manufacturer/Brand: Johns Manville GlasBase or GlasBase Plus

3. Manufacturing Standards: SS-R-620B, Type II; ASTM D4601; Type II.

4. Nominal Weight: 28 lbs. per 100 square feet.

C. Ply Sheet

1. Material: Heavy glass mat bound together with a resinous binder, and completely coated with asphalt. Surface with opaque, inert, non-combustible colored granules.

2. Manufacturer/Brand: Johns Manville Glasply IV.

3. Manufacturing Standards: ASTM D2178, Type IV.

4. Nominal Weight: .8 lbs. per 100 square feet.

D. Surfacing/Flashing Sheet

1. Material: Heavy glass mat bonded together with resinous binder and completely coated with asphalt. Surfaced with opaque, inert, non-combustible colored granules.

2. Manufacturer/Brand: Johns Manville GlaSKap

3. Manufacturing Standards: ASTM D3909;

4. Nominal Weight 75 lbs. per 100 square feet.

5. Color: White.

E. Bitumen:

1. Material: Air blown 'roofing grade asphalt.

2. Manufacturing Standards: ASTM D312 Type III.

F. Cold process Adhesive

1. Material: One part, elastomeric interply adhesive for use with SBS. or built-up roofing' base sheets.

2. Manufacturer/Brand: Johns Manville MBR .Cold: Application Adhesive

G. Fasteners for Base Sheet to Wood Deck:

1. Type: Annular or spiral thread ring shank, square head, one (1) piece nails. For other deck types, use NRCA recommended fastener appropriate for deck type.

2. Size: 12 gauge minimum with minimum 7/8" diameter head, of sufficient' length to penetrate at 3/4" into or through wood deck.

H. Roof/Flashing Cement

1. Material: Asphalt cutback flashing cement compound fortified with fibers, filler, and solvents, non-asbestos. Use Modified cement for modified bitumen Products'.

2. Manufacturing Standards: Federal Spec SS-C—153B, Type I ASTM D4586 Type II.

I. Asphalt primer:

1. Material: Black, medium consistency asphalt cutback primer compound of select asphalt and penetrating petroleum solvents.

2. Manufacturing Standards: ASTM.D41.

J. Elastomeric Sealant:

1. Material: One part moisture curing polyurethane sealant

2. Manufacturer/Brand: Tremor Vulkem 911.

3. Manufacturing Standards: Fed Spec TTS-00230C, Type 11,, Class A; ASTM C-920, Type S, Class 25.

K. Elastomeric Roof Coating:

1. Material: Two-part water-based white acrylic elastomeric roof coating system, comprised of a base coat component and a surface coat component

2. Manufacturer/Brand: Firestone Acrylitop PC-100.and Acrylic Base Coat.

L. Aluminum Coating:

1. Material: Asphalt emulsion based, non-asbestos, fiber reinforced reflective aluminum coating.

2. Manufacturer/Brand: Johns Manville Topgard Type A

M. Asphalt Emulsion:

1. Material: Clay stabilized; water based emulsified asphalt coating with non-asbestos reinforcing fibers.

2. Manufacturer/Brand: Johns Manville Topgard Type B

3. Manufacturing Standards: ASTM D1227, Type IV.

N. Protection Material/Walk Pad (obtain final approval from district):

1. Material: Asphalt and reinforced fibers compressed and molded under heat between inorganic fiberglass membranes, top and bottom. Surfaced with skid-resistant surfacing.

2. Manufacturing Standard: ASTM D517.

3. Size: 1/2" thick.

O. Fasteners for Base Flashing:

1. Type: Wood nails shall be minimum 11 gauge, barbed, galvanized with minimum 3/8 head. Masonry nails shall be case hardened. One (1) inch diameter tin caps or integral heads must be used for base flashing securement.

2. Size: Sufficient length to penetrate one-inch (1") minimum.

P. Cant Strips:

1. .Material: Triangular wood fiber, perlite, or soft wood lumber.

2. Manufacturing Standard: ASTM C208 or ASTM C728.

3. Minimum size on Horizontal and Vertical Sides: Four (4") inches.

PART 3- EXECUTION

3.01 PREPARATION AND GENERAL REQUIREMENTS

A. Contractor shall be responsible not only to perform all applicable repairs as outlined, but also to inspect the roof(s) and perform any other - necessary repairs as needed to ensure a watertight condition for the duration of his maintenance agreement.

B. Contractor shall be responsible to verify the roof void prior to bidding. Due to several layers of existing roofing being applied over the years, depression will be created when the new roofing is applied. It is recommended that DensDeck roof board (or approved equal method) be applied to fill these voids. Contractor to include this scope of work in roof repair work.

C. Where roofs receiving repairs maintenance are covered' by manufacturer guarantee, ensure that repair methods/procedures and all other applicable requirements are complied with.

D. Where, applicable, comply with-Section 06 10 00 – Rough Carpentry; for related wood product requirements, and Section 07 62 00 - Sheet Metal Flashing and Trim, for sheet metal requirements.

E. Metal wall coping, counterflashing, etc. shall be removed or lifted, as needed to accommodate repairs.

F. Clean and prepare surfaces prior to sealant application, to ensure proper long-term adhesion.

G. Thoroughly dean and re-seal all exposed metal joints and, penetrations to result in a long-term watertight seal. .

H. All exposed metal fasteners shall be driven through, steel/neoprene washers or caulked with elastomeric sealant. Any loose or missing fasteners shall be replaced with new.

I. Clean and prime portions of existing membrane to receive new materials prior to application of repairs. Prime any sheet metal or masonry surfaces to which asphaltic materials are to be applied. Allow all primer to dry thoroughly.

J. At aggregate roof areas; remove all loose and embedded aggregate from repair area, 'prior to repair application.

K. Upon completion of repair, re-apply appropriate surfacing to match existing. Coat all exposed roof cement or. Modified bitumen with embedded gravel; granules or aluminum emulsion, as applicable.

L. Remove all debris from roofs, gutters, etc. and dispose of property.

M. Take precautions to keep materials dean, dry, and free of damage.

N. Use only materials and procedures that are proper and suitable for the slopes and for the underlying materials to which they are attached.

O. Provide approved and operable fire extinguishers on hand at all times on the roof and near any asphalt kettle. During all hot application work, including kettle loading, have all roofers wear protective clothing (i.e., long-sleeved shirts, gloves, and face shield for kettle operator). During any torch work, provide and additional fire extinguisher for each torch. Follow all additional requirements of OSHA Safety Regulations.

P. Do not use any wet or damaged materials.

Q. Bitumen Heating Equipment must .be thermostatically controlled. Equipment must be dean and in sufficiently good operating condition to perform specified work.

R. Asphalt

1. Apply asphalt per EVT at the point of application. Discontinue operations if asphalt' temperatures at point of application cannot be maintained at the EVT.

2. Equip asphalt heating equipment with an accurate thermostat and thermometer.

3. Do not overheat. asphalt Kettle temperature generally may not exceed 500F

4. Do not heat asphalt to the minimum flash point. The minimum finished blowing temperature may not be exceeded for more than a total of four (4) hours, for any asphalt batch or portion thereof. Remove from the projected any asphalt heated above these limits.

5. Cold weather application requires the use of insulated supply lines and equipment to minimize temperature drop from the kettle or tanker-to the point of application.

6. Do not apply materials when foaming; blistering; or bubbling of the hot bitumen occurs. Remove any materials emitted when such activity occurs.

S. Primer

1. Material may be applied by brush, spray, or roller.

2. Materials may not be diluted or adulterated.

3. Apply primer to any masonry or metal surfaces to receive bituminous products at the nominal rate-of one (1) gallon per 103 square feet Allow to dry thoroughly-prior to-application of roofing materials.

T. Roof Cement

1. Material may be applied either by trowel or by hand.

2. Material may not be diluted or adulterated.

3. Maintain materials at the working temperatures recommended by the Manufacturer.

3.02 GENERAL REPAIR METHODS/MATERIALS

1. The following options are acceptable for built-up or modified bitumen membrane repairs:

2. Base, plies and surfacing sheet set into continuous moppings of hot, steep asphalt.

3. Torch-applied APP modified bitumen. Coated base sheet must first be mechanically fastened over any exposed combustible surfaces (i.e. plywood deck).

4. Coated base sheets and/or cap Sheet set into continuous applications of gold process adhesive. Coated base sheet must first be mechanically fastened over any exposed deck surface.

B. The following options are acceptable for built-rip or modified bitumen base flashing and wall covering repairs/replacement

1. Base, plies and surfacing sheet set into continuous moppings of hot, steep asphalt.

2. Torch-applied APP modified bitumen. Coated base sheet must first be mechanically fastened over any exposed combustible surfaces (i.e. plywood deck).

3. Coated base sheets and/or cap sheet set into Continuous applications of flashing grade roof cement Base sheet must first be mechanically fastened for wall covering over exposed wood surfaces.

C. Repairs or replacement of various single-ply, shingle, tile, sprayed foam and metal roof types and components shall utilize like materials installed in accordance with manufacturer recommendations in conjunction with any requirements stated herein.

D. References to "elastomeric 3-course" application below refer to the following procedures:

1. Thoroughly clean surfaces to receive new materials. Apply appropriate primer if recommended by manufacturer of elastomeric sealant

2. Trowel-apply a thin layer of elastomeric sealant over surfaces to be treated. Embed a layer of woven polyester fabric into the sealant and work fabric into the sealant to ensure embedment. Except where stated otherwise, width of fabric shall be 4" minimum or as needed to accommodate condition; providing at least 2" Overlap of fabric onto adjacent surfaces.

3. Apply a second layer of elastomeric sealant over the first and work into the first to ensure adequate bond between layers. Ensure that the fabric is completely embedded within the two sealant layers.

E. References to "asphaltic 3-course" application below refer to the following procedures:

1. Thoroughly dean surfaces to receive new materials. Apply asphaltic primer and allow to dry thoroughly.

2. Trowel-apply a thin layer of roof cement over surfaces to be treated. Embed a layer of woven glass or polyester fabric into the roof cement and work fabric into the roof cement to ensure embedment. Width of fabric shall be 4" minimum or, as needed to accommodate condition, providing at least 2" overlap of fabric onto adjacent surfaces.

3. Apply a second layer of roof cement over the first and work into the first to ensure adequate bond between layers. Ensure that the fabric is completely embedded within the two layers of roof cement.

4. Cover exposed mastic with embedded granules or aluminum coating.

3.03 BUR/MODIFIED BITUMEN MEMBRANE REPAIRS:

A. General the following requirements apply to all BUR/Modified Bitumen membrane repairs:

1. Prior to application of new asphaltic components, apply primer to areas receiving repairs as described above. Allow to dry thoroughly.

2. It may be necessary "build up" repair areas using layers of embedded felt or other approved method in order to create a flush condition and eliminate indentations in the membrane prior to application of membrane repairs.

3. Membrane repairs shall be made with each subsequent ply extending at least six inches beyond the edge of the defect or the previous ply.

4. Membrane tie-in plies shall be installed as needed to extend cut portions of the membrane to the top of cant strips at the base of walls, supports, etc. prior to application of new base flashing materials. These tie-in plies shall be feathered onto the existing primed roof surface as described above.

B. Repair damaged, broken or split blisters or ridging conditions as follows:

1. No repairs are required unless blisters or ridging conditions are damaged, broken or split.

2. Remove all delaminated layers at broken areas.

3. Repair ply for ply using-hot or cold applied repair components including cap sheet surfacing, or torch-apply a single layer of APP modified bitumen,

C. Repair membrane splitting as follows:

1. Cut membrane at ends of splits perpendicular to splits.

2. Nail each side of split with cap nails at 5" o.c.

3. Repair over split using a 4" wide dry base sheet centered over the split and nailed at 6" o.c. Cover with 2 plies and cap sheet: set in asphalt, 2 base sheets and cap sheet Set in cold adhesive, or a layer torch-applied APP modified bitumen.

D. Repair holes, gouges, fastener back-out, exposed fasteners or similar small men-brat* damage or deterioration as follows:

1. Where necessary, remove object.

2. Repair ply for ply using hot or cold applied repair components including cap sheet surfacing, or torch-apply a single layer of APP modified bitumen over the repair area in accordance with general requirements stated above.

E. Repair loose/open laps or fishmouths as follows:

1. Cut fishmouths.

2. Clean between open areas. If wet, cut open and dry completely.

3. If built-up roofing, seal between open areas with roof cement.

4. If torch-applied APP or SBS, heat between lap and re-seal

5. Provide asphaltic 3-course or torch-applied APP over repair areas:

F. Repair significant membrane damage/deterioration due to ponding conditions or other significant membrane repair or-replacement needs, in accordance with the following:

1. Remove any damaged membrane.

2. Clean surrounding roof areas and, prime and slow to dry.

3. Install membrane ply for ply as removed within cut out area with hot asphalt or cold adhesive. Use all base sheets when using cold adhesive.

4. Over patch, install two additional layers of felt into hot or cold asphalt.

5. Install new cap sheet on cap sheet roofs. Spread new aggregate in asphalt, adhesive on aggregate roofs.

6. Feather the two plies and cap sheet 4" past underlying edge or layer.

7. If repair is adjacent to flashing condition(s), provide proper flashing tie=in based on condition.

G. Repair areas of bare asphalt, exposed felts or alligatoring as follows:

1. On aggregate roofs, apply cold: adhesive or emulsion at the equivalent rate of three (3) gallons/100 square feet Additional adhesive or emulsion may be needed on alligatored surfaces. Broadcast new, proper aggregate, completely covering exposed areas.

2. On cap sheet/granule roofs, install new cap sheet into hot asphalt-or cold asphalt adhesive, or embed loose granules into roof cement or cold adhesive over bare areas:

H. Perform replacement/repairs to roof coating on smooth surface 'roofs, and/or at areas where surfacing is peeling, flaking, separating or alligatoring, using appropriate compatible elastomeric coating in accordance with, the following:

1. Prepare surfaces in accordance with instructions of elastomeric coating manufacturer. Ensure that surfaces are .dean and free of dirt, debris, dust and contaminants. Use wire, brush or other method to ensure removal of any loose or flaking coating. Complete all required membrane repairs prior to re-coating.

2. If recommended or required, provide prime coat to ensure positive adhesion to underlying surfaces.

3. Apply new elastomeric coating components in accordance with manufacturer's instructions: Provide detail coats and/or reinforcing fabric at transitions, Junctures, etc. as required.

4. Install new coating at a minimum rate of one. (1) gallon per 100 square feet for base coat and one (1) gallon per 100 square feet' for surface coat, or as otherwise recommended by the coating manufacturer.

5. Precautions should- be exercised to minimize the amount of exposed asphalt at laps, etc. in order to limit the potential for displacement or “alligatoring” the surface coating when re-coating is required.

I. Remove debris and membrane contamination as follows:

1. Remove all debris from roof surfaces and dispose of properly. This Includes accumulation of leaves, granules, fasteners, scraps, trash, abandoned equipment, supplies, etc. Place any stored materials/supplies onto roof protection material.

2. Water wash, as needed, to thoroughly dean any contaminated roof, surfaces, including significant 'tobacco-juicing". Use mild detergent or other product or method, if needed, In compliance with manufacturer recommendations.

J. Treat low areas where -surface cracking/degradation is evident in granule-surfaced membranes' using the following methods:

1. Thoroughly dean and lightly prime membrane surfaces in affected area.

2. Surfaces to be coated shall be free from foreign material, oil, grease, dirt and other debris. Any surface defects shall be repaired as required prior to application of Coating. Surface May be damp. Power washing may be needed to clean some areas.

3. Coat the entire surface: with fibrated emulsion applied at a minimum rate of three (3) gallons per 100 square feet of roof area. Emulsion may be diluted 10% with cool, clear water when rolled or brushed on.

4. Material may be applied by spray or soft fibered brush or roller.

5. While emulsion is still, wet embed ceramic granules at a minimum rate of 50 lbs. per 100 square feet to roof area Granules shall be property broadcast to ensure a smooth, uniform appearance.

3.04 BUR/MODIFIED BITUMEN BASE, WALL AND EDGE FLASHING

A. Repair any significantly blistered or loose base/wall membrane flashings as follows:

1. Sagging, buckled, blistered or wrinkled flashings to be cut and mechanically secured with cap fasteners.

2. Install new base/wall flashings to match existing with hot asphalt or torch applied.

3. Mechanically fasten top edges of flashings with cap fasteners at 6" o.c.

4. Conceal top of flashings with wall coping, wall flashing, or metal skirt.

5. All exposed fasteners at built-up flashings to be sealed with roof cement. Seal exposed fasteners on APP flashings with modified asphalt from heated materials. Coat all with aluminum emulsion or embedded granules.

B. Where required to remove and replace base/wall flashings, comply with the following:

1. Completely remove all affected base/wall flashings.

2. Install new base flashings consisting of two plies felt and cap sheet set into hot asphalt, or a single layer of torch-applied APP, depending on roof system.

3. Install new wall flashing consisting of base sheet, ply sheet, and cap sheet, all set into hot

4. asphalt, or a single layer' of torch-applied APP (over nailed base sheet at combustible surfaces). On walls over 24" high; install wall flashing separate from base flashing. Blind nail laps with 1" head cap nails.

5. Mechanically fasten top edges of flashings with cap nails at 6" on center. . .

6. Conceal top of wall flashings with wall coping or metal skirts:

7. All exposed fasteners at flashings to be sealed with roof cement and coated with aluminum emulsion.

C. Repair areas of improperly secured or mussing membrane wall flashings as follows:

1. Install new wall flashing components to tie into and match existing. Secure with appropriate cap fasteners at 6" o.c. along the top edge.

2. Any exposed fasteners to be sealed with roof cement (BUR) or modified asphalt from heated scrip material (APP).

3. Coat fastener repairs with aluminum emulsion.

D. Address all exposed fasteners at base/wall flashing as follows:

1. On built-up flashings, seal all exposed fasteners with roof cement:

2. On modified flashings, seal fasteners with asphalt from heated scrap flashing materials or compatible modified roof cement

3. Coat all with aluminum emulsion.

4. At HVAC, skylights, or other curbed units where base flashing fasteners are exposed, or where counter flashing width is less than 1.5", install 24-gauge metal skirt flashing with hemmed drips. Mechanically fasten with screws through steel/ neoprene washers.

E. Repair open base and/or wall flashing seams and comers, as well as scupper openings and other transitions, as follows:

1. Clean out any debris from open seam.

2. Fill void or opening with flashing cement (SSS/BUR) or heat between lap and reseal (APP).

3. Secure seam with appropriate fasteners as necessary.

4. Provide asphaltic 3-course application or torch-applied APP over affected seam or corner.

5. Coat over finished repair with aluminum emulsion or embedded granules.

F. Repair small base flashing defects, such as gouges, holes, breaks, tears, etc. using asphaltic 3-course application or torch-applied APP modified bitumen applied in accordance with general requirements stated above.

G. At areas of "mud-cracking' or granule displacement at SBS flashings, resulting, in areas of exposed membrane, prepare and coat areas with embedded granules aluminum emulsion or elastomeric coating.

H. Repair splitting and other membrane damage at gravel-stop joints and edges as follows:

1. Remove loose materials at both sides of lap joints, or elsewhere as needed.

2. Double nail both sides of laps.

3. Clean and prime repair area and' metal and allow to dry.

4. Apply asphaltic 3-course application or torch-applied APP patch over defect area.

5. Check for poor adhesion of membrane to flange along edges and repair as needed by removing un-adhered material, re-securing and priming flange as needed, and providing new roof seal. If delamination extends less than 4" in from the roof edge, asphaltic 3-course may be used. If greater theme, extend new tie-in membrane (hot, cold or torch-applied) onto the flange, solidly adhered.

3.05 ROOF PENETRATIONS AND FLANGED METAL FLASHING

A. Perform the following repairs, as needed, to address improper sheet metal penetration flashings:

1. Remove any foam insulation extending into flashing to at least one inch above top of flashing.

2. Remove and replace any damaged flashings with new. Solder all seams and laps of new components.

3. Clean and re-seal top of pipe flashings, as needed, with one part urethane sealant

4. Where contaminated with asphalt clean tops: of flashings and prime/allow to dry. Seal with asphaltic 3-course application: centered overtop edge of flashing sleeve.

5. A heat vent seams, seal with a high 'temperature sealant such as Red High Temperature Silicone Form-A-Gasket:

6. Cap any open unused penetrations, Replace any significantly rusted, damaged or missing vent caps.

7. Where applicable crimp lead flashing properly down into vent pipe.

B. Where metal flanges are not property integrated in to the roof membrane system, comply with the following:

1. Extend penetrations vertically as needed to accommodate proper flashing.

2. Clean membrane surface around flanges. Provide new flanged pipe flashing where none exist, with minimum 4" flange on all sides.

3. Prime exposed flanges and roof area and allow to dry: Set each flange into roof cement and secure flange at 4" o.c. with appropriate fasteners (securement not required for lead).

4. BUR Option - Install two layers ply. sheet set into asphalt or two layers base sheet set into cold asphalt adhesive. Feather each layer'4"beyond underlying layers. Install one layer cap sheet in cold asphalt adhesive on cap sheet roofs. '

5. APP Option - Install one layer torch-applied APP modified bitumen material, feathering past flanges by at least 6" onto roof.

6. For tile and shingle roofs, ensure that flanges are, properly sealed and-integrated (shingled) with tiles/shingles.

C. Where multiple penetrations occur without proper flashing (i.e. properly filled pitch pan or, better), perform one oof.the-following:

1. Relocate existing pipes and. other roof projections as needed to provide at least twelve inches of clearance between projections, in order to accommodate: proper flashing application. Provide proper flashing as described above.

2. Fabricate and install new curbed pipe enclosure'assembly (i.e. "pelican head") to, provide a long-term, low maintenance, watertight condition.

3. At existing multi-pipe enclosures, fill with foam and seal opening with elastomeric.sealant.

D. Maintain any pitch pans as follows:

1. Remove any dirt, debris, and contaminants.

2. Top off all pitch pans with roof cement or elastomeric sealant, as applicable, 'sloping to Outside edges-to prevent standing water.

E. Ensure that any, abandoned penetrations are either.renioved and property pitched, or permanently tapped and. sealed against waterentry.

F. Any penetrations into or through walls, or penetrating components (ie: electrical boxes mounted on walls, wall vents etc.), shall be sealed with elastomeric sealant or asphaltic 3-course application; as applicable. Use backer rod/foam if needed.

G. Seal all conduit penetrations through fan unit base components.

H. Where cables penetrate roofing, ensure that penetration complies with code. Provide new weatherhead assembly or similar detail to ensure a long-term watertight seal at the penetration. Where existing antenna(e) are secured through root re-secure to nearby vent pipe, equipment screen, mechanical unit or other approved sedurement base/method.

I. Seal hese of penetrations and flanged components, as needed using materials appropriate for roof type (i.e. roof cement at BURISBS/APP systems).

3.06 DRAINAGE AND DRAINAGE COMPONENTS

A. Repair drainage components, including gutters/downspouts; scuppers and roof drains, as needed, in accordance with the following:

1. Seal outside edges of scuppers to walls and metal gutter joints with one part urethane sealant.

2. Remove any excess or loose roofing materials around scupper openings and drain bowls.

3. Prime and apply asphaltic three- (3) course application. On APP roofs, seal with heated bitumen from scrap pieces of APP.

4. Check all drain bolts and tighten as needed. Install additional washers as needed where bolt are too long.

5. Remove all debris in and around drains, gutters, downspouts and scuppers. All roof draing shall be inspected and tested to assure that no dogging of the drainage system is present. If necessary, use professional plumber or "rooter service to ensure that no blockage exists.

6. Replace significantly rusted or damaged gutter components with new to match existing.

7. Ensure adequate overlap of edge flashing overtop inside gutter flange, or provide necessary adjustment (i.e. reposition gUtter or provide flashing extension).

B. Where indicated, correct any ponding conditions which persist beyond 48 hours using one or both of the following methods, as needed to correct the condition:

1. Add new cast iron roof drains and.all related components, including all necessary flashing and tie-ins.

2. Lower existing roof drains/scuppers into recessed sumps.

C. All new and/or existing roof drains are to be cast iron with clamping rings and cast iron strainer dome. Remove and replace all plastic or stamped metal roof drains or drain components. Replace or repair any missing, broken or damaged drain components: to result in a functioning assembly.

D. Install new concrete splash blocks where none exist at the base of downspouts that drain onto roof surfaces secure all splash blocks overprotection material using an appropriate adhesive.

E. Where existing primary scuppers provide less than 24 square inch opening (i.e. less than about 4" high by 6" wide), enlarge scupper openings to"4" by 6" minimum. Provide new metat flashing and membrane tie-in as required:

3.07 COPING, COUNTERFLASHING AND MISCELIANEOUS SHEET METAL

A. Reseal or re-secure existing metal coping, counterflashing, cap flashing, etc., and replace any missing, significantly rusted or damaged components as follows:

1. Lift, clean lap areas with wire brush, and reset

2. Seal between overlapping components with one part urethane sealant

3. Secure vertical faces with metal screws through steel/neoprene washers at maximum 30" o.c.

4. Install new components to match, as needed to replace any significantly rusted, damaged or missing coping, counterflashing, cap flashing, etc.

5. Seal junctures/terminations of metal fleshings at wall junctures, corners, etc.

6. Check for seams or penetrations through metal fleshings. Seal as needed, with one part urethane Sealant. Any penetrations through top, horizontal' metal flashing Surface:ellen. sealed. Use 1/4" solid (non-grooved) neoprene gasket to seal any penetrations through horizontal surface of metal flashing at equipment support platforms, capped sleepers, wall copings, etc.

B. Where necessary to replace entire coping or add new coping, comply with the following:

1. Secure new taper strip over top of nallers to provide slope to inside.

2. Provide and install new pre-finished metal coping, cover plates and transition pieces in accordance with Section 07 62 00 - Sheet Metal Flashing and Trim. Secure the inside lace of new coping using appropriate strews placed at 30" o.c.. Secure the outside face using a continuous 22'gauge metal hook strip fastened to the wood 'nailer at 16" o.c..

C. Seal any existing counterflashing (including Surface-mounted counterflashing) as follows:

1. Remove (if practical), clean, and reset fleshings in one part urethane sealant.

2. Caulk sealant receiver or wall juncture with one part urethane sealant.

3. Re-secure counterfiashing using appropriate fasteners and secure lap joints.

D. Wherever coping, wall counterflashing, unit counterflashing or other existing counterflashing provides less than 1.5" overlap over underlying flashing components, where base flashing top fasteners are exposed, where otherwise requirements comply with the following:

1. Ensure that top surface of base/well flashing is adequately sealed and secured.

2. Install 4" skirts with hemmed drip edget at equipment Curbs, roof hatcties, etc., where counterflashing is non-existent or provides insufficient (i.e. less than 1.5") overlap over base flashing/wall covering.

3. Secure with minimum #10 size screws through steel/neoprene washers at 24" o.c.

4. Any exposed edges shall be fabricated with a flared sealant receiver (i.e. surface-mounted) and sealed with 1-part urethane sealant.

E. Repair/replace any rusted metal flashing components, including gutters, coping, cap flashing, vent caps, etc., as follows:

1. Wire brush all rusted flashing components or accessories.

2. Paint with rust inhibitor paint. Finish paint to match existing color.

3. Any sheet metal components with complete rust-through shall be replaced with new to match existing shape, gauge and finish.

F. Address any exposed or missing sheet metal fasteners, or holes through sheet metal flashing, etc., as follows:

1. Reset any displaced metal flashing back in place.

2. Replace any loose or missing fasteners with appropriate screws through steel/neoprene washers.

3. Any existing exposed fasteners without steel/neoprene or neoprene washers are to be sealed with one part urethane sealant

4. Replace any nails with appropriate screws through steel/neoprene washers.

5. Add any additional appropriate fasteners as needed. .

6. Seal any holes through sheet metal flashing with one-part urethane sealant.

G. Prepare, prime and paint metal flashing components exposed to view (i.e. coping, edge flashing, scupper exterior, gutters/downspouts, etc), in accordance with the following:

1. Flashing shall be cleaned, prepared and painted with a color to be determined. It is recommended that drip edge “undersides" be painted prior to re-installation.

2. Clean and remove any contaminants, including, asphalt residue. Use wire brush to remove any loose or flaking paint.

3. After dry, apply primer at a rate indicated to achieve a five (5) mil finish and allow to dry.

4. Apply paint in two (2) coats, allowing drying in accordance with manufacturer recommendations for method and finished coverage of ten (10) mils.

5. Painted surfaces shall be free of defects such as brush marks, heavy spots, peeling, curling, and cracking.

6. Where replaced with full new assembly, use pre-finished (such as Kynar) metal.

3.08 ELECTRICAL, MECHANICAL AND EQUIPMENT-SUPPORTS

A. Repair broken condensate lines, duct seals, etc. as follows:

1. Replace any broken condensate lines and connections.

2. Seal any exposed, open duct joints, punctures or holes using .Glencoat and fabric.

3. Any unit or duct repairs are to be performed by licensed mechanical contractor.

4. No repairs to equipment are to be made with roof cement.

B. Perform the following repairs to membrane and pipe supports, as applicable, and, install protection material as follows:

1. Separate adhered blocks from membrane: Remove any fasteners from supports secured through the roof membrane. Provide appropriate membrane repair at fastener holes, or any other membrane damage.

2. Replace any dry rotted or termite damaged pipe supports.

3. Provide additional pipe, supports if needed for 8 feet maximum spacing. Ensure that pipelines are clamped to blocks at that any stacked blocks are secured together.

4. Reposition pipe supports, if needed, at angles for better watertlow.

5. Install protection material under blocks, support legs, etc. set directly on roof. Adhere protection, material to blocks, not to roof.

6. Install new traffic pads in front of roof hatches, ladder access, and equipment and wall access panels, where none exist. Adhere over membrane per manufacturer’s recommendations, according to type of membrane.

7. Install new traffic pads, as needed, under base supports, support, legs, etc. set directly on roof.

C. Where mechanical equipment is supported by unflashed sleepers; metal framed supports or other unlashed support placed directly onto the roof membrane, lift and .provide now roof protection material (i.e.: traffic pads) directly under sleeper support, extending at least four inches beyond the sleeper on all sides.

D. Where existingcurbs are less than 6" above the roof surface, extend curbs to 8" minimum height, including extension of flashing components.

E. Provide and install new flashed and capped curb or platform to elevate and support equipment or supports secured through the membrane (i.e. secured equipment support sleepers, guy wires, light support legs, tri-pod supports, etc.) in accordance with the following:

1. Use treated wood components necessary to provide adequate structural support for component being supported. Secure to underlying structure. Ensure-a minimum 8" flashing height above the finished roof surface.

2. Provide new cant strips on all sides, along with appropriate tie-in plies extending from the top of the cant strip, feathering out over the existing roof surface; prior to base flashing application.

3. Install new membrane and base fleshing to extend up and over support with complete encapsulation.

4. Provide and install new minimum 24 gauge metal flashing pan, fabricated with minimum 3" counterflashing on all sides, over the flashed support assembly.

5. Any metal seams to be "double flat lock' per SMACNA details.

6. Any brackets/supports on platforms/sleepers to be set over solid, flat (i.e. non-grooved) neoprene. Screws or lags to havezteel/neoprend washers.

F. Where existing conditions do not comply, with current code requirements modify condition to comply with applicable codes. This includes repair of disconnected conduit lines and open junction boxes.

G. Ensure that any abandoned supports are either removed, and properly patched, or permanently capped and sealed against water entry. Prior to removing, coordinate with Owner's Representative to confirm that supports are no longer required on the roof. Replace resultant holes or openings with new materials as required. Provide membrane repair in accordance withitem 1E above.

3.09 MISCELLANEOUS REPAIRS

A. Coat any exposed asphalt/mastic (existing or new) with aluminum emulsion' or embedded granules.

B. At areas of algae, moss, lichen or similar vegetation growth on membranes, consult with membrane manufacturer for compatible treatment to eliminate such growth.

C. Clean and seal joints, transitions, cracks, etc. (wail transitions, expansion joints, stucco: cracks, concrete cracks, etc.) using 1-part urethane sealant. Fill any significant open gaps or openings using expandable polyurethane foam.

D. Repair/replace missing/damaged/displaced components (i.e. broken roof hatch, missing vent caps, displaced condensate lines, etc.)

3.10 QUALITY ASSURANCE

A. Roofing Inspector Qualifications: A technical representative provided by the District, not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project. The Roofing Inspector shall be one of the following:

1. An authorized full-time technical employee of the manufacturer

2. An independent party retained by the District

DIVISION 22 – PLUMBING

SECTION 22 00 00 - PLUMBING

1. PART 1 – GENERAL

1.1 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.2 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:
   1. C.C.R., Title 24, Part 5 (2019 CPC).
   2. 2019 California Plumbing Code.
   3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
   4. National Fire Protection Association.
   5. California Division of the State Architect.
   6. California State Division of Industrial Safety.
   7. County Health Department.
   8. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.3 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the

responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.4 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.5 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.6 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.7 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.8 SUBMITTAL DATA (Also see General Conditions)

A. Submittal Requirements:
1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.

2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.

3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.

4. To be valid, all submittals must:

   (a) Be delivered to the Prime contractor's office within seven (7) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.

   (b) Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.

   (c) Include all pertinent construction, installation, performance and technical data.

   (d) Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

      (1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.

      (2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

   (e) Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within seven (7) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

   (a) For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

      (1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

   (b) Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.

3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.

4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.

5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.9 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.10 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. where applicable. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.11 GUARANTEES (Also see General Conditions)

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

2. PART 2 – PRODUCTS

2.1 MATERIALS AND EQUIPMENT (See Schedules on Drawings)

A. General: All materials, as specified or required in the work, shall be new, free from defects and imperfections. All manufactured shall comply with California Assembly Bill 1953.

B. Pipe and Fittings:
1. Soil and Waste Piping:

(a) Soil and waste piping within the building itself and outside within five feet (5') of the foundation, shall be no-hub cast iron pipe and fittings, asphaltum coated, free from defects, and shall comply with CISPI. Standard 301, ASTM A-888 or ASTM A-74. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute. Fittings shall be made up with "Husky" SD 4000 series or “Clamp All” HI-TORQ 125 series stainless steel type 304 couplings and shall conform to ASTM C1540 & ASTM C564 except all above ground vent

pipe fittings may be made with "Anaco" or "Tyler" stainless steel two band couplings conforming to CISPI Standard 310.

2. Vent Piping:

   (a) Concealed or underground vent piping shall be cast iron pipe and fittings as specified for soil and waste piping.

   (b) Exposed vent piping shall be Schedule 40 galvanized steel pipe, ASTM A53, with black cast iron recessed drainage fittings.

   (c) Vent piping within and passing through fire rated partions shall be no-hub cast iron service weight pipe and fittings, asphaltum coated, free from defects, and shall comply with C.I.S.P.I. Standard 301-00 or ASTM A-888-98. Fittings shall be made up with "Anaco" or "Tyler" stainless steel two band couplings and shall comply with ASTM C564.

      (1) All vents through roof shall terminate with vandal proof caps (Refer to “Roof Flashing” herein).

3. Domestic Water Piping:

   (a) Piping within the building and above grade shall be Type "L" ASTM B88, hard drawn copper tubing with wrought copper sweat fittings ANSI B16.18 and B16.22.

   (b) Outdoor underground piping in sizes 2-1/2" and 3" shall be Type "L" ASTM B88, hard drawn copper as specified for water piping within the building. Piping 2" and smaller shall be Type "K" ASTM B88, hard drawn copper with wrought copper sweat fittings ANSI B16.18 and B16.22. Piping below the building floor shall be Type "K" soft annealed copper tubing with no fittings below the slab.

C.

4. Air Conditioning Condensate Drain Piping.

   (a) Shall be Type "M" copper below roof and indoor.

   (b) Shall be Schedule 80 CPVC on roof.

5. All exposed piping at plumbing fixtures shall be chrome plated yellow brass except exposed pipes in shop or utility areas.

6. Unions or flanges shall be furnished and installed at each threaded connection to all equipment or valves. The unions or flanges shall be located so that the piping can be easily disconnected for removal of the equipment, tank, or valve, and shall be of the type specified in the following schedule.

   (a) Unions:

      (1) Copper or Brass Tubing: 150 pound cast bronze or copper, ground joint, nonferrous seat with ends, by Walseal, Nibco or Mueller.

   (b) Flanges: Tube Turn or approved equal, raised face 150 pound class forged steel, weld, neck or slip-on type conforming to ASA B16.5 and ASTM A181. For copper piping systems, provide flanges conforming to ANSI B16.24. The faces of the flanges being connected to be alike in all cases. Locate flanges so that the piping can be easily disconnected for removal of the equipment or valve. Gasket material shall be of material suiting the service of the opening system in which installed and which conforms to its respective ANSI Standard (A21.11. B16.21). Provide materials that will not be detrimentally affected by the chemical and thermal conditions of the fluid being carried.

7. All piping on roof shall be supported by Dura Block DB-10 support, unit strut P1001 pipe support, ½” traffic pad, minimum 4” around Dara Block.

8. All underground non-metallic piping shall have 14 gauge copper "Tracer Wire" continuous for entire length.

D. Traps, Strainers and Tailpieces: Every sanitary fixture, unless otherwise specified, shall be provided with a seventeen (17) gauge chromium tailpiece, a Los Angeles pattern chrome plated cast-brass trap and galvanized nipple trap arm and wall flanges. Trap arm shall be provided with chromium plated brass casing between the trap and wall flanges at each fixture. All sanitary waste system floor drains and floor sinks shall

have cast iron "P" traps.

E. Cleanouts: Shall be Jay R. Smith and Zurn.
   1. General: Provide cast-iron ferrule and countersunk brass clean-out plug with round cast iron access frame and heavy duty secured top cover.
   2. Wall Cleanouts: Jay R. Smith No. 4472 for steel pipe and Jay R. Smith No. 4532 for cast iron pipe.
   3. Floor Cleanouts: Jay R. Smith No. 4023 or 4028, bronze plug and non-skid nickel bronze top.
   4. Cleanouts to Grade: Jay R. Smith No. 4258 or Jay R. Smith No. 4253 with X-H bronze plug and X-X-H non-skid cover with lifting device set flush with surface for concrete areas. Asphalt or nonsurfaced areas shall be installed with ring of concrete poured around the bottom flange six inches (6") below surface. Use cast iron soil pipe on cleanout risers. For cleanouts in non-traffic areas, terminate cleanout plug in concrete yard box.

F. Access Panels: Wall access panels shall be minimum 12" x 12" for concealed valves and other equipment unless otherwise specified or indicated. Ceiling access panels shall be 18" x 18" minimum. Access panels shall be located and positioned for ready access and service of equipment housed within. Where access panels are specified with keyed cylinder locks, all such locks shall be identically keyed.
   1. Wall, Non-Fire Rated: Elmdor/Stoneman DW-SS-CL, drywall, stainless steel finish, cylinder lock.
   2. Ceiling, Non-fire Rated: Elmdor/Stoneman DW, drywall, prime coated finish, screwdriver latch.
   3. Wall, Fire Rated: Elmdor/Stoneman FR-SS-CL, fire rated, stainless steel finish, cylinder lock.
   4. Ceiling, Fire rated: Elmdor/Stoneman FRC, Fire rated, prime coated finish, return latch.

G. Yard Boxes & Vaults: For service shut-off valves on gas and domestic water; for pressure regulator assemblies and for cleanouts, shall be Brooks Products or Fraser Cement Products Co., rectangular concrete type with vandal-proof cast iron cover and name of service clearly marked on cover. Box shall be of size to permit full range of valve operation and to permit easy removal of valve assembly. Vaults shall be sectional type.

H. Roof Flashing:
   1. Sanitary vents thru roof and grease vents thru roof: Stoneman No. 1100-5, one (1) piece, seamless, four (4) pound, series with reinforcing steel boot counterflashed with cast iron flashing sleeve and equipped with vandal-proof hood for all vent piping. Seal joint between flashing and pipe with waterproofing compound per flashing manufacturer's recommendations.
   2. Water, gas, condensate drainage and other metallic piping thru roof: Stoneman No. 1100-4, one (1) piece, seamless, four (4) pound, series with reinforcing steel boot counterflashed with cast iron flashing sleeve. Seal joint between flashing and pipe with waterproofing compound per flashing manufacturer's recommendations

I. Escutcheons: Shall be chrome plated cast brass with setscrew locking device.

J. Dielectric Union Isolators: Connection between incompatible materials above grade and inside building shall be made with two (2) dielectric unions separated by a twelve inch (12") section of red brass pipe. Dielectric union isolator for connection piping or non-compatible materials shall be of standard commercial design with threaded connections.

K. Pipe Supports: Unless otherwise indicated on the drawings, shall be as follows:
   1. The Contractor shall furnish and install all miscellaneous iron work including angles, channels, etc., required to appropriately support the various piping systems. Hanger spacing and location shall conform to 2019 California Plumbing Code Table 313.1.
   2. All horizontal runs of piping within the building to be supported from the structural framing with steel rods and split ring hangers, B-Line, Grinnell Company, Tolco, or approved equal. Steel rods shall be secured to overhead framing with side beam connectors. Where necessary, install angle iron between framing to accommodate hanger rods. Where several pipes are running together, Unistrut, B-Line or Powerstrut channels with clamps may be used in lieu of individual pipe hangers, and supported from structure as herein specified. Submit test data for type of hanger supports to be

provided. For support conditions other than specified herein, the Contractor shall submit method of support for approval prior to any installation.

3. Horizontal Piping Hangers and Supports:

   (a) General: Provide factory fabricated horizontal hangers and supports complying with one of the following MSS types listed to suit horizontal-piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.

      (1) Adjustable Steel Clevis Hangers: (MSS Type 1.) B-Line B 3100

      (2) Adjustable Swivel Pipe Rings: (MSS Type 5) B-Line B3690

4. Vertical-Piping Clamps:

   (a) General: Provide factory fabricated vertical-piping clamps complying with the following types listed, to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.

   (b) Two-Bolt Riser Clamps: (MSS Type 8) B-Line B3373

5. Hanger-Rod Attachments:

   (a) General: Provide factory fabricated hanger-rod attachments B-Line, Tolco or approved equal, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-58 and manufacturer's published product information. Select size of hanger-rod attachment to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.

   (b) Side beam eye socket, Tolco Fig. #57 for rod sizes 3/8" dia. and Tolco Fig. #25-30-251 for rod sizes 1/2" dia.

6. Building Attachments:

   (a) General: Provide factory fabricated building attachments, selected by Installer to suit building structural framing conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.

7. Hanger Rods and Spacing shall conform to the following table:

Pipe Sizes	Spacing	Rods
2 Inch and Smaller	6 Feet	3/8 Inch

8. Hangers and Supports shall be adequate to maintain alignment and prevent sagging and shall be placed within 18 inches of joint. Support shall be provided at each horizontal branch connection.

9. Miscellaneous Supports, Wall Brackets, Etc.: Provide where required in accordance with the best standard practices of the trade. Submit shop drawings for all fabricated supports.

10. Isolators. All piping which is not isolated from contact with the building by its insulation shall be installed with a manufactured type isolator. Isolators shall be B-Line vibra clamp and cushion, Super Strut, Stoneman "Trisolator", or approved equal. Piping shall be installed and supported in a manner to provide for expansion without strains. Guides shall be properly installed to ensure this requirement.

11. Shields:

   (a) General: Provide shields at piping hangers and supports, factory-fabricated, for all insulated piping as manufactured by Pipe shields Incorporated or approved equal. Size shields for exact fit to mate with pipe insulation.

   (b) Protection Shields: MSS Type 40; provide high density insert of same thickness of insulation or equal 100-psi average compressive strength, waterproofed calcium silicate, encased with a sheet metal shield. Insert and shield shall cover entire circumference of the pipe and shall be of length indicated by manufacturer for pipe size and thickness of insulation.

L. Insulation:
1. All condensate drain piping building shall be insulated.

(a) Owens Corning fiberglass SSL 11 with ASJ Max with wrap or equal. All condensate drain piping on roof shall have aluminum jacketing.

3. PART 3 – EXECUTION

3.1 INSTALLATION - GENERAL

A. Locations and Accessibility: Install equipment for ease of maintenance and repair. If changes in the indicated locations or arrangements are made by the Contractor, they shall be made without additional charges.

B. Openings: Furnish information to the other trades on size and location of openings which are required in walls, slabs, roof, for piping and equipment at the proper times.

C. Closing-In of Uninspected Work: Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Any work enclosed or covered prior to such inspection and test shall be uncovered and, after it has been inspected, tested, and approved, make all repairs with such materials as may be necessary to restore all work, including that of other trades, to its original and proper condition.

D. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact locations and depth of existing utility and service lines to which he is going to connect. In event depth of existing sewer main or storm drain is not sufficient to permit installation of piping as detailed on drawings or to make connection in manner indicated, Contractor shall confer with the Architect, Owner's representative and Engineer for Direction.

E. Excavation, Trenching and Backfill: Perform all necessary trench excavation, shoring, backfilling and compaction required for the proper laying of the pipe lines.
1. The Contractor shall coordinate the layout of all below grade piping and components with the General Contractor prior to bid to determine the extent of required sawcutting, excavation, alterations, and subsequent repair/restoration of all affected hardscape and softscape surfaces. All such items shall be included in bid.

2. Backfill shall be clean soil free from rocks and debris. Compact to ninety percent (90%) of surrounding soil. All piping shall be installed in a minimum 6" sand bed and covered with 6" of sand prior to backfill. Continue backfill with materials free of rocks and debris, properly moistened and mechanically tapered and compacted to 90% of surrounding soil.

3. Water, soil and waste piping shall have twenty-four (24") of cover minimum, except all PVC pipe material and all gas piping shall have eighteen (18") of cover minimum. All other pipe shall have not less than eighteen inches (18") of cover, unless otherwise noted on the drawings. Offset gas and water piping as required to permit crossover of underground piping systems, and electrical conduit systems.

4. Bottoms of Trenches: Cut to grade and excavate bell holes to ensure the pipes bearing for their entire length upon the outside periphery of the lower third of the pipe.

5. Water piping shall not be run in the same trench with sewer or drainage piping unless separated as required by the CPC.

6. All horizontal soil and waste piping 3” and smaller shall be installed to a uniform grade of not less than one-fourth inch (1/4") per foot. All horizontal soil and waste piping 4” and larger shall be installed to a uniform grade of not less than one-eighth inch (1/8") per foot, unless otherwise indicated or directed.

F. Piping Installation:
1. All piping shall be concealed in finished portion of the building except where otherwise indicated or directed at the time the work is done. All piping shall be installed to clear all framing members and beams, even if drawings do not indicate same. Contractor shall constantly check the work of other

trades so as to prevent any interference with the installation of this work.

2. All piping into stem walls and footings shall be double half lap wrapped with 1/8" thick "Armaflex" insulation. The Contractor shall also provide blocked out areas in stem wall and footing as required for the installation of the piping. All piping shall avoid the lower 9" of the footing and the Contractor shall coordinate and provide dropped footings as required for the installation of the underground piping.

3. Unions shall be installed on one side of all screwed shut-off valves, at both sides of screwed automatic valves and on all by-passes, at all equipment connections and elsewhere as indicated or required for ease of installation and dismantling.

4. Connections between copper tubing and equipment shall be with Mueller Brass Company, or approved equal, brass stream line copper to P.P.S. ground joint unions.

5. Cleanouts shall be installed on all condensate drain piping at each aggregate horizontal and vertical change in direction exceeding 135 degrees.

6. All condensate drain piping shall be installed with a minimum slope of 1/8”/FT.

7. All condensate piping on roof shall be painted with UV protection paint.

8. Corrosion Protection:

(a) General.

(1) Corrosion protection shall be provided for all below grade cast iron and copper piping and associated valves and fittings. Such piping shall be protected from corrosion by encasement in a polyethylene protective wrapping, referred to hereafter as polywrap. Although not intended to be a completely air and water tight enclosure, the polywrap shall provide a continuous barrier between the pipe and surrounding bedding and backfill.

(b) Materials.

(1) Cast iron piping encasement.

a) The polywrap shall be minimum 8 mil. in thickness, group 2, linear low density, flat tube, natural (clear) virgin polyethylene film formed into tubes or sheets as required. Material shall meet or exceed the requirements of AWWA C105, ANSI A21.5 and ASTM A674.

b) The polywrap shall be as manufactured by Northtown Company or approved equal.

(2) Copper piping encasement.

a) The polywrap shall be minimum 6 mil. in thickness, group 2, linear low density, flat tube, natural (clear) virgin polyethylene film formed into tubes or sheets as required. Material shall conform to the requirements of ASTM D1248.

b) The polywrap shall be as manufactured by Northtown Company or approved equal.

(3) The minimum Polywrap flat tube width for each pipe diameter shall be as follows:

Pipe Size / Type	Polywrap Flat Tube Width
½” to ¾” copper	2”
1” to 1-½ copper	3”
4” cast iron	16”

(4) The polywrap shall be secured as specified with 2 inch wide pressure sensitive plastic tape not less than 10 mils thick.

a) Tape shall be Scotchwrap No. 50, Polyken No. 900, Tapecoat CT, Johns-Manville No. V-10 Trantex or approved equal.

b) Piping through exterior walls shall be sealed using Link Seal modular seal with nitrile seal elements and stainless steel bolts.

(c) Installation.

(1) For all initial connection from HVAC equipment to ridged CPVC 80 or Type M Copper pipe. The polyethylene tubing shall be cut into lengths approximately 2 feet longer than the pipe sections. Slip the tube around the pipe, centering it to provide a 1-ft overlap on each adjacent pipe section, and bunching it accordion fashion lengthwise until it clears the pipe ends. Lower the pipe into the trench and make up the pipe joint with the preceding section of pipe. . A shallow bell hole must be made at each joint to facilitate installation of the polywrap. The bunched-up polywrap shall be pulled from the preceding length of pipe, slipped over the end of the new length of pipe, and secured in place with one circumferential turn of tape plus enough overlap to assure firm adhesion. The end of the polywrap shall be slipped from the new pipe section over the end of the first wrap until it overlaps the joint at the end of the preceding length of pipe and tape it in place. The loose wrapping on the barrel of the pipe shall be pulled snugly around the barrel of the pipe and excess material folded over the top of the pipe and the folds held in place by means of short strips of adhesive tape, at about 3 foot intervals along the pipe.

(2) Rips, punctures or other damage to the tube shall be repaired with the adhesive tape or pieces of tube material secured with tape. Bends and reducers in the line shall be covered with polyethylene in the same manner as pipe.

(3) Valves, tees, crosses and outlets shall be wrapped with flat sheets of the same material. The sheets shall be passed under valves and brought up around the body to the stem. Edges shall be brought together, folded twice and secured with the adhesive tape.

M. Sleeves: Shall be plastic or galvanized steel where pipes pass through concrete walls or floor slabs.
1. Isolate pipes through ground floor slabs with Kraft paper, plastic tape or similar materials unless conduit is specified or indicated.

2. Sleeves for pipes through exterior walls shall be non-metallic with minimum 2” weep ring as manufactured by Link Seal. Pipe shall be sealed with Link Seal modular seal with EPDM seal elements.

3. Sleeves in or through fire rated walls shall be per U.L. Fire Resistance System No. WL1146 for drywall construction, and U.L. Fire Resistance System No. CAJ1044 for concrete construction. See architectural plans for all locations of rated walls.

4. Below-grade piping through exterior walls shall be sealed using Link Seal modular seal with nitrile seal elements and stainless steel bolts and sleeves as manufactured by Century Line.

N. Contraction and Expansion: Install all work in such a manner that its contraction and expansion will not do any damage to the pipes, the connected equipment, or the building. Install offsets, swing joints, expansion joints, seismic joints, anchors, etc., as required to prevent excessive strains in the pipe work. All supports shall be installed to permit the materials to contract and expand freely without putting any strain or stress on any part of the system. Provide anchors as necessary.

O. Pipe Joints and Connections:
1. Copper Tubing and Brass Pipe with Threadless Fittings:

(a) Solder joints for copper shall be made with 95/5 lead free solder in accordance with manufacturer's recommendations for the service intended.

(b) Use threaded adapters on copper tubing where threaded connections are required.

P. All closet bends shall be adequately blocked and secured. Trap arms and similar connections installed below the floor level or under concrete slabs shall be adequately supported and anchored to prevent motion in any direction. All piping installed above grade within buildings shall be secured to structural framing with Unistrut or pipe clamps to provide a rigid installation. Piping utilizing gaskets as a seal shall be given prime consideration to providing adequate stability through proper supports and anchors because of its flexible nature.

Q. Each pipe penetration of the roof shall be separated from other piping and any roof equipment by a minimum of 18" to insure a proper pipe flashing installation.

R. Floor, Wall and Ceiling Plates: Where pipes pierce finished surfaces, C.P. brass split flanges with setscrew lock shall be provided.

S. Completion of Installation:
1. Cleaning and Flushing: Clean all equipment and materials thoroughly. Leave surface to be painted smooth and clean, ready for painting.

2. Flush each unit of water supply and distribution system thoroughly with clean water at the highest velocities attainable.

3. Clean all piping, valves, traps, water heaters, fixtures and other devices thoroughly and flush or blow out until free of scale, oil silt, sand, sediment, pipe dope and foreign matter of any kind.

1.12 OPERATION INSTRUCTION

A. Prior to occupancy or prior to the date of final inspection, whichever may occur first, the Contractor shall prepare two (2) sets of typewritten instructions for the operation of all equipment, valves, etc., specified and furnished as a part of the work under this section, and shall assign a competent person, thoroughly familiar with the job, to demonstrate and instruct a representative of the Owner in the operation of the equipment. The time of said demonstration and instructions shall be arranged with the Owner's representative approximately one (1) week in advance. Verbal instructions shall include shut-off location of gas and water. The Contractor shall assemble all operation and maintenance data supplied by the manufacturers of the various pieces of equipment, all keys and special wrenches required to operate and service the equipment (including keys for yard boxes, gas stops and fixture stops), and all equipment warranties and deliver same to the representative of the Owner on date of said instructions.

1.13 PIPE AND EQUIPMENT IDENTIFICATION

A. Each operating and service line shut-off valve shall be identified by a 19 ga. brass tag with stamped, engraved type of service identified and area served, complete with hole and brass chain mounted on valve stem or handle. Tag shall be a minimum of one and one-half inch (1-1/2") in diameter.

B. All piping systems shall be readily identifiable by appropriate labeling with the name of the piping contained. Such labeling shall be by means of metal tags, stenciling, stamping, or with adhesive markers, in a manner that is not readily removable. Labeling shall appear on the piping at intervals of not more than 20 ft and at least once in each room and each story traversed by the piping system.

C. Provide on exterior wall of each building opposite the building's main gas service a sign reading "Gas Shut Off". Sign shall be metal with minimum 1-1/2" high-embossed letters.

D. All equipment shall be provided with name plate indicating all pertinent information on it.

END OF SECTION

DIVISION 23 – HEATING, VENTILATING & AIR CONDITIONING

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Balancing Air Systems:

a. Constant-volume air systems.
b. Multizone systems.
c. Induction-unit systems.

2. Duct leakage tests.

1.3 DEFINITIONS

A. AABC: Associated Air Balance Council.

B. BAS: Building automation systems.

C. NEBB: National Environmental Balancing Bureau.

D. TAB: Testing, adjusting, and balancing.

E. TABB: Testing, Adjusting, and Balancing Bureau.

F. TAB Specialist: An independent entity meeting qualifications to perform TAB work.

G. TDH: Total dynamic head.

1.4 PREINSTALLATION MEETINGS

A. TAB Conference: If requested by the Owner, conduct a TAB conference at Project site. Insert after approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Provide a minimum of 14 days' advance notice of scheduled meeting time and location.

1. Minimum Agenda Items:

a. The Contract Documents examination report.
b. The TAB plan.
c. Needs for coordination and cooperation of trades and subcontractors.
d. Proposed procedures for documentation and communication flow.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB specialist and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.

B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.

C. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.

D. System Readiness Checklists: Within 30 days of Contractor's Notice to Proceed, submit system readiness checklists as specified in "Preparation" Article.

E. Examination Report: Submit a summary report of the examination review required in "Examination" Article.

F. Certified TAB reports.

G. Sample report forms.

H. Instrument calibration reports, to include the following:

1. Instrument type and make.
2. Serial number.
3. Application.
4. Dates of use.
5. Dates of calibration.

1.6 QUALITY ASSURANCE

A. TAB Specialists Qualifications: Certified by AABC.

1. TAB Field Supervisor: Employee of the TAB specialist and certified by AABC.
2. TAB Technician: Employee of the TAB specialist and certified by AABC as a TAB technician.

B. Instrumentation Type, Quantity, Accuracy, and Calibration: Comply with requirements in ASHRAE 111, Section 4, "Instrumentation."

C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.7 FIELD CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

B. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems designs that may preclude proper TAB of systems and equipment.

B. Examine installed systems for balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are applicable for intended purpose and are accessible.

C. Examine the approved submittals for HVAC systems and equipment.

D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems output, and statements of philosophies and assumptions about HVAC system and equipment controls.

E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.

F. Examine equipment performance data including fan and pump curves.

1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.

H. Examine test reports specified in individual system and equipment Sections.

I. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, filters are clean, and equipment with functioning controls is ready for operation.

J. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected and functioning.

K. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

L. Examine operating safety interlocks and controls on HVAC equipment.

M. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes the following:

1. Equipment and systems to be tested.
2. Strategies and step-by-step procedures for balancing the systems.
3. Instrumentation to be used.
4. Sample forms with specific identification for all equipment.

B. Perform system-readiness checks of HVAC systems and equipment to verify system readiness for TAB work. Include, at a minimum, the following:

1. Airside:

a. Verify that leakage and pressure tests on air distribution systems have been satisfactorily completed.
b. Duct systems are complete with terminals installed.
c. Volume, smoke, and fire dampers are open and functional.
d. Clean filters are installed.
e. Fans are operating, free of vibration, and rotating in correct direction.
f. Variable-frequency controllers' startup is complete and safeties are verified.
g. Automatic temperature-control systems are operational.
h. Ceilings are installed.
i. Windows and doors are installed.
j. Suitable access to balancing devices and equipment is provided.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance" and in this Section.

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. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 23 30 00.
3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 23 07 13 "Duct Insulation."

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**)** units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Cross-check the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling-unit components.

L. Verify that air duct system is sealed as specified in Section 23 30 00 – 2.4 Ductwork and Accessories.

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

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

1. Measure total airflow.

   a. Set outside-air, return-air, and relief-air dampers for proper position that simulates minimum outdoor-air conditions.
   b. Where duct conditions allow, measure airflow by Pitot-tube traverse. If necessary, perform multiple Pitot-tube traverses to obtain total airflow.
   c. Where duct conditions are not suitable for Pitot-tube traverse measurements, a coil traverse may be acceptable.
   d. If a reliable Pitot-tube traverse or coil traverse is not possible, measure airflow at terminals and calculate the total airflow.

2. Measure fan static pressures as follows:

   a. Measure static pressure directly at the fan outlet or through the flexible connection.
   b. Measure static pressure directly at the fan inlet or through the flexible connection.
   c. Measure static pressure across each component that makes up the air-handling system.
   d. Report artificial loading of filters at the time static pressures are measured.

3. 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.
4. Obtain approval from Architect/Engineer of Record for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
5. 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 occurs. 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.

1. Measure airflow of submain and branch ducts.

2. Adjust submain and branch duct volume dampers for specified airflow.
3. Re-measure each submain and branch duct after all have been adjusted.

C. Adjust air inlets and outlets for each space to indicated airflows.

1. Set airflow patterns of adjustable outlets for proper distribution without drafts.
2. Measure inlets and outlets airflow.
3. Adjust each inlet and outlet for specified airflow.
4. Re-measure each inlet and outlet after they have been adjusted.

D. Verify final system conditions.

1. Re-measure and confirm that minimum outdoor, return, and relief airflows are within design. Readjust to design if necessary.
2. Re-measure and confirm that total airflow is within design.
3. Re-measure all final fan operating data, rpms, volts, amps, and static profile.
4. Mark all final settings.
5. Test system in economizer mode. Verify proper operation and adjust if necessary.
6. Measure and record all operating data.
7. Record final fan-performance data.

3.6 PROCEDURES FOR MOTORS

A. Motors 1/2 HP and Larger: Test at final balanced conditions and record the following data:

1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Phase and hertz.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter size and thermal-protection-element rating.
8. Service factor and frame size.

B. Motors Driven by Variable-Frequency Controllers: Test manual bypass of controller to prove proper operation.

3.7 PROCEDURES FOR CONDENSING UNITS

A. Verify proper rotation of fans.

B. Measure entering- and leaving-air temperatures.

C. Record fan and motor operating data.

3.8 PROCEDURES FOR HEAT-TRANSFER COILS

A. Measure, adjust, and record the following data for each refrigerant coil:

1. Dry-bulb temperature of entering and leaving air.
2. Wet-bulb temperature of entering and leaving air.
3. Airflow.

3.9 DUCT LEAKAGE TESTS

A. Witness the duct pressure testing performed by Installer.

B. Verify that proper test methods are used and that leakage rates are within specified tolerances.

C. Report deficiencies observed.

3.10 CONTROLS VERIFICATION

A. In conjunction with system balancing, perform the following:

1. Verify temperature control system is operating within the design limitations.
2. Confirm that the sequences of operation are in compliance with Contract Documents.
3. Verify that controllers are calibrated and function as intended.
4. Verify that controller set points are as indicated.
5. Verify the operation of lockout or interlock systems.
6. Verify the operation of valve and damper actuators.
7. Verify that controlled devices are properly installed and connected to correct controller.
8. Verify that controlled devices travel freely and are in position indicated by controller: open, closed, or modulating.
9. Verify location and installation of sensors to ensure that they sense only intended temperature, humidity, or pressure.

B. Reporting: Include a summary of verifications performed, remaining deficiencies, and variations from indicated conditions.

3.11 TOLERANCES

A. Set HVAC system's airflow rates and water flow rates within the following tolerances:

1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10.
2. Air Outlets and Inlets: Plus or minus 10 percent.
3. Contractor to provide the necessary sheaves, pulleys and other accessories needed to meet the tolerance requirements.

B. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

3.12 PROGRESS REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems balancing devices. Recommend changes and additions to systems balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: Prepare monthly progress reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

3.13 FINAL REPORT

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

1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.
3. Certify validity and accuracy of field data.

B. Final Report Contents: In addition to certified field-report data, include the following:

1. Fan curves.
2. Manufacturers' test data.
3. Field test reports prepared by system and equipment installers.
4. Other information relative to equipment performance; do not include Shop Drawings and Product Data.

C. General Report Data: In addition to form titles and entries, include the following data:

1. Title page.
2. Name and address of the TAB specialist.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:

    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans performance forms including the following:

    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:

1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Duct, outlet, and inlet sizes.
3. Terminal units.
4. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:

1. Unit Data:

a. Unit identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Unit arrangement and class.
g. Discharge arrangement.
h. Sheave make, size in inches (mm), and bore.
i. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).
j. Number, make, and size of belts.
k. Number, type, and size of filters.

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches (mm), and bore.
f. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm (L/s).
b. Total system static pressure in inches wg (Pa).
c. Fan rpm.
d. Discharge static pressure in inches wg (Pa).
e. Filter static-pressure differential in inches wg (Pa).
f. Preheat-coil static-pressure differential in inches wg (Pa).
g. Cooling-coil static-pressure differential in inches wg (Pa).
h. Heating-coil static-pressure differential in inches wg (Pa).
i. Outdoor airflow in cfm (L/s).
j. Return airflow in cfm (L/s).
k. Outdoor-air damper position.
l. Return-air damper position.
m. Vortex damper position.

F. Apparatus-Coil Test Reports:

1. Coil Data:

a. System identification.
b. Location.
c. Coil type.
d. Number of rows.
e. Fin spacing in fins per inch (mm) o.c.
f. Make and model number.
g. Face area in sq. ft. (sq. m).
h. Tube size in NPS (DN).
i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data (Indicated and Actual Values):

   a. Airflow rate in cfm (L/s).
   b. Average face velocity in fpm (m/s).
   c. Air pressure drop in inches wg (Pa).
   d. Outdoor-air, wet- and dry-bulb temperatures in deg F (deg C).
   e. Return-air, wet- and dry-bulb temperatures in deg F (deg C).
   f. Entering-air, wet- and dry-bulb temperatures in deg F (deg C).
   g. Leaving-air, wet- and dry-bulb temperatures in deg F (deg C).
   h. Water flow rate in gpm (L/s).
   i. Water pressure differential in feet of head or psig (kPa).
   j. Entering-water temperature in deg F (deg C).
   k. Leaving-water temperature in deg F (deg C).
   l. Refrigerant expansion valve and refrigerant types.
   m. Refrigerant suction pressure in psig (kPa).
   n. Refrigerant suction temperature in deg F (deg C).
   o. Inlet steam pressure in psig (kPa).

G. Gas- and Oil-Fired Heat Apparatus Test Reports: In addition to manufacturer's factory startup equipment reports, include the following:

1. Unit Data:

   a. System identification.
   b. Location.
   c. Make and type.
   d. Model number and unit size.
   e. Manufacturer's serial number.
   f. Fuel type in input data.
   g. Output capacity in Btu/h (kW).
   h. Ignition type.
   i. Burner-control types.
   j. Motor horsepower and rpm.
   k. Motor volts, phase, and hertz.
   l. Motor full-load amperage and service factor.
   m. Sheave make, size in inches (mm), and bore.
   n. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).

2. Test Data (Indicated and Actual Values):

   a. Total airflow rate in cfm (L/s).
   b. Entering-air temperature in deg F (deg C).
   c. Leaving-air temperature in deg F (deg C).
   d. Air temperature differential in deg F (deg C).
   e. Entering-air static pressure in inches wg (Pa).
   f. Leaving-air static pressure in inches wg (Pa).
   g. Air static-pressure differential in inches wg (Pa).
   h. Low-fire fuel input in Btu/h (kW).
   i. High-fire fuel input in Btu/h (kW).
   j. Manifold pressure in psig (kPa).
   k. High-temperature-limit setting in deg F (deg C).
   l. Operating set point in Btu/h (kW).

m. Motor voltage at each connection.
n. Motor amperage for each phase.
o. Heating value of fuel in Btu/h (kW).

H. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:

a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches (mm), and bore.
h. Center-to-center dimensions of sheave and amount of adjustments in inches (mm).

2. Motor Data:

a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches (mm), and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches (mm).
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):

a. Total airflow rate in cfm (L/s).
b. Total system static pressure in inches wg (Pa).
c. Fan rpm.
d. Discharge static pressure in inches wg (Pa).
e. Suction static pressure in inches wg (Pa).

I. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:

1. Report Data:

a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F (deg C).
d. Duct static pressure in inches wg (Pa).
e. Duct size in inches (mm).
f. Duct area in sq. ft. (sq. m).
g. Indicated airflow rate in cfm (L/s).
h. Indicated velocity in fpm (m/s).
i. Actual airflow rate in cfm (L/s).
j. Actual average velocity in fpm (m/s).
k. Barometric pressure in psig (Pa).

J. Air-Terminal-Device Reports:

1. Unit Data:

    a. System and air-handling unit identification.
    b. Location and zone.
    c. Apparatus used for test.
    d. Area served.
    e. Make.
    f. Number from system diagram.
    g. Type and model number.
    h. Size.
    i. Effective area in sq. ft. (sq. m).

2. Test Data (Indicated and Actual Values):

    a. Airflow rate in cfm (L/s).
    b. Air velocity in fpm (m/s).
    c. Preliminary airflow rate as needed in cfm (L/s).
    d. Preliminary velocity as needed in fpm (m/s).
    e. Final airflow rate in cfm (L/s).
    f. Final velocity in fpm (m/s).
    g. Space temperature in deg F (deg C).

K. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:

1. Unit Data:

    a. System and air-handling-unit identification.
    b. Location and zone.
    c. Room or riser served.
    d. Coil make and size.
    e. Flowmeter type.

2. Test Data (Indicated and Actual Values):

    a. Airflow rate in cfm (L/s).
    b. Entering-water temperature in deg F (deg C).
    c. Leaving-water temperature in deg F (deg C).
    d. Water pressure drop in feet of head or psig (kPa).
    e. Entering-air temperature in deg F (deg C).
    f. Leaving-air temperature in deg F (deg C).

L. Instrument Calibration Reports:

1. Report Data:

    a. Instrument type and make.
    b. Serial number.
    c. Application.
    d. Dates of use.
    e. Dates of calibration.

3.14 VERIFICATION OF TAB REPORT

A. The TAB specialist's test and balance engineer shall conduct the inspection in the presence of Architect.

B. Architect shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.

C. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."

D. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

E. If TAB work fails, proceed as follows:

1. TAB specialists shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
2. If the second final inspection also fails, Owner may contract the services of another TAB specialist to complete TAB work according to the Contract Documents and deduct the cost of the services from the original TAB specialist's final payment.
3. If the second verification also fails, Owner may contact AABC Headquarters regarding the AABC National Performance Guaranty.

F. Prepare test and inspection reports.

3.15 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 23 05 93

DIVISION 23 – HEATING, VENTILATING & AIR CONDITIONING

SECTION 23 30 00 - HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work under this section includes all labor, equipment, material, services, transportation, etc. required for and reasonably incidental to the complete and satisfactory installation of all of the HVAC Systems as indicated on the Drawings or specified herein.

1.2 WORK INCLUDED IN THIS SECTION

A. Air Conditioning Units

B. Ductwork and Accessories

C. Grilles, Registers and Diffusers

D. Insulation Materials

E. Test and Balance

F. Submittals and Shop Drawings

G. Record Drawings

H. Operation and Maintenance Manuals

I. Guarantee

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Related Sections:
1. 01 33 00 Submittal Procedure.

B. Electrical supply to units. See Division 26 and Electrical Drawings.

C. Thermal and Moisture Protection. See Division 1 and 7, and Mechanical Drawings.

D. Equipment Pads and Support. See Structural Drawings.

1.4 GENERAL REQUIREMENTS

A. This section of the specification shall be considered as a part of the entire specification and all applicable portions of General Conditions, Special Conditions, and Division 1 shall apply.

B. Before commencement of work this contractor shall determine the exact location, size, elevation, and availability of all utilities relevant to the mechanical work and immediately notify the District with written notification of any discrepancies. In addition, this Contractor shall contact all involved utility companies, make all necessary arrangements for service, and pay all fees incurred due to connection of services.

C. Erection: The Contractor shall furnish the services of an experienced superintendent, who shall be constantly in charge of the erection of the work, together with all necessary journeymen, helpers, and laborers required to properly unload, erect, connect, adjust, start of operate and test the work involved.

1.5 REFERENCES

A. AABC - National Standards for Field Measurement and Instrumentation, Total System Balance.

B. AMCA 210 - Laboratory Methods of Testing Fans for Rating Purposes.

C. AMCA 300 - Test code for sound rating air-moving devices.

D. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilation System.

E. ARI 270 - Sound rating of Outdoor Unitary Equipment.

F. ASHRAE 52.2-2017 - Method of Testing General Ventilation Air Cleaning Devices for Removal Efficiency By Particle Size

G. ASTM A90 - Weight of Coating on Zinc - Coated (Galvanized) Iron or Steel Articles

H. ASTM A120 - Black and Galvanized Steel Pipe

I. ASTM B88 - Seamless Copper Water Tube

J. ASTM C518 - Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus

K. ASTM C553 - Mineral Fiber Blanket and Felt Insulation

L. ASTM C612 - Mineral Fiber Block and Board Thermal Insulation

M. ASTM E84 - Surface Burning Characteristics of Building Materials

N. ASTM E96 - Water vapor Transmission of Materials

O. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems

P. NFPA 255 - Surface Burning Characteristics of Building Materials

Q. SMACNA - Low Pressure Duct Construction Standards

R. UL 181 - Factory Made Air Ducts and Connectors

S. UL 723 - Surface Burning Characteristics of Building Materials

T. California Mechanical Code - 2019 Edition

U. California Building Code - 2019 Edition

V. CEC Title-24 – 2019 Edition

1.6 SUBMITTALS AND SHOP DRAWINGS

A. Contractor agrees that shop drawings submittals processed by the District do not become Contract Documents and are not Change Orders; that the purpose of the shop drawing review is to establish a reporting procedure and is intended for the Contractor's convenience in organizing his work and to permit the District to monitor the Contractor's progress and understanding of the design. The process of review of the Contractor's submittals is not of testing the District's perception. If deviations, discrepancies or conflicts between shop drawings submittals and the Contract Documents are discovered either prior to or after the shop drawing submittals are processed by the District, the Contractor agrees that the Contract Documents shall control and shall be followed.

B. Prepare and furnish fully coordinated shop drawings showing ductwork and piping on separate drawings.
1) The drawings shall be minimum 1/4" = 1'-0" scale and shall show dimensioning of piping and ductwork from gridlines, bottom of elevation marks for ductwork and piping and fittings, valves, dampers, devices, etc. with labels.
2) In addition, coordinate with related work and reference on the same drawings major plumbing piping, structural steel, fire protection piping, conduit runs and cable trays.
3) Review and sign these drawings to verify coordination of related equipment.
4) Conflicts, which occur, shall be brought to the attention of the District Representative prior to issuance of the drawings.

C. Materials and Equipment:
1) As soon as possible and within 14 days after award of the contract, and before their purchase, the Contractor shall submit to the District electronic format submittals for approval containing a complete list of materials, specialties and equipment he is to furnish for the installation.
2) Literature shall be standard manufacturer's catalog cuts and items to be installed shall be clearly indicated.
3) All submittals shall be made at one time.

D. Each item shall be identified by manufacturer, brand and trade name, number, size, rating and whatever other data is necessary to properly identify and check the materials and equipment. The words: "as specified" will not be considered sufficient identification.

E. Accessories, controls, finish, etc., not submitted or identified with the submitted equipment shall be furnished and installed as specified.

F. 1 Sets of complete electronic format shop drawings shall be submitted for approval indicating all piping, equipment and ductwork. These drawings shall indicate sizes, locations and elevations of ductwork, equipment and equipment pads, piping and controls including transitions, valves etc.

G. Shop drawings shall be approved only to extent of information indicated. Approval of an item of equipment shall not be construed to mean approval for components for that item for which Contractor has provided no information.

H. Approval of shop drawings shall not relieve Contractor of responsibility for providing all controls, wiring, components, etc. which are shown or specified, or all additional controls, wiring, components, etc. required to provide complete and correctly operating mechanical systems.

I. Submit product data for the following manufactured products, assemblies, personnel and testing agencies required for this project.
1) Air Conditioning Units
2) Diffusers, registers and grilles

3) Ductwork and Accessories
4) Insulation Materials
5) Filters
6) Detailed procedures, agenda, sample report forms, and copy of AABC National Project Performance Guarantee)
7) Controls

1.7 SUBSTITUTIONS

A. Should the Contractor desire to substitute any material, equipment or other items for those specified, he shall submit a complete list, including detailed equipment layouts and performance characteristics within 14 calendar days after the scheduled Start of Construction. Said data shall be submitted in 1 electronic format set, assembled in individual brochures.

B. The entire cost of all changes of any type due to substitution for materials specified shall be born by the Contractor at no extra cost to the District.

C. Unsolicited and voluntary deducts, on the part of the Contractor for substituting unapproved systems and/or equipment, shall not be considered for the purpose of awarding the Contract.

D. The contractor shall submit the amount of cost credit to the Contract in the event the proposed substitution is accepted.

E. In all cases where substitutions are proposed after bids are received, the Contractor shall bear the cost of evaluation on the basis of 2-1/2 times technical salaries of engineering personnel involved.

1.8 AVAILABILITY OF SPECIFIED EQUIPMENT

A. Verify prior to bidding that all specified equipment is available and can be obtained in time for installation during orderly and timely progress of the work.

B. In the event that specified items will not be so available, notify the District prior to receipt of bids.

C. Costs of delays because of non-availability of specified items, when such delays could have been avoided by proper investigation on the part of the Contractor, will be back-charged as necessary and shall not be born by the District.

1.9 RECORD DRAWINGS

A. The contractor shall arrange and pay for one set of white prints of the HVAC drawings, which he shall alter in red to show all changes made to the original layout. These drawings shall be kept current.

B. The contractor shall deliver these completed to the District when the job is finished and accepted prior to final payment, and provide copies of approved shop drawings in ACAD format to MEOR.

C. Contractor shall provide 1 complete set of electronic format drawings per District standard on BOX.

1.10 OPERATION AND MAINTENANCE DATA

A. Submit one (1) electronic format set prior to final inspection including cover sheet and table of contents. Prepare submittal with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", and title of

project. Internally subdivide the section contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

B. Contents: Prepare a Table of Contents with each Product or system description identified.
   1) Part 1:
      a. Directory listing names, addresses, and telephone numbers of District, Contractor, Subcontractors, and major equipment suppliers.
   2) Part 2:
      a. Operation and maintenance instructions, arranged by system.
      b. Identify the following:
         1) Significant design criteria
         2) List of equipment
         3) Parts list for each component
         4) Operating instructions
         5) Maintenance instructions for equipment and systems
         6) Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

C. Submit one copy of completed volumes in final form 15 days prior to final inspection. This copy will be returned after final inspection, with District comments. Revise content of documents as required prior to final submittal.

D. Submit final volumes (revised) within ten days after final inspection.

1.11 GUARANTEES

A. The Contractor, in accepting this contract, binds himself to replace or repair at his own expense any defect in workmanship or material which may appear within a period of one year from the date of the final acceptance of the building, and to pay for all resulting damage which shall appear within the said period; provided always that the Contractor shall not be liable for anything attributable to acts of the agents of the District, or for ordinary wear. Also, given date of work performed by the Contractor be accepted as complete, he shall agree to correct any deficiencies or omissions in respect to the plans or specifications which may appear in the afore-mentioned twenty-four month period.

B. The Contractor guarantees that all piping as provided in this specification will be free from all obstructions, and that all piping will be tight and drip free.

C. All refrigerant compressors shall carry a seven-year manufacturer's warranty with additional extended three -year manufacturer's warranty by providing required documents to manufacturer within 90 days from installation date.

1.12 LOCAL CONDITIONS

A. The Contractor and trade submitting tenders on this work shall visit and will be deemed to have visited the site to ensure that they are familiar with all conditions relating to the work. Failure to visit the site will in no way relieve the successful Contractor of the necessity of furnishing any material or performing any work that may be required to complete the work in accordance with the drawings and specifications without additional cost to the District.

1.13 RULES, REGULATIONS AND CODES

A. All work and materials shall be in full accordance with the latest California Mechanical Code, California Plumbing Code, California Building Code and local rules and regulations, State Fire Marshal regulations, the safety orders of the Division of Industrial Safety; the California Electric Code; the standards of the

National Fire Protection Association; American Gas Association; Occupation and Safety Act; American National Standards Institute; American Society of Mechanical Engineers; American Society for Testing and Materials; Installation Standards published by the International Association of Plumbing And Mechanical officials (IAPMO) and other applicable laws, codes, or regulations. Nothing in these specifications shall be construed to permit work not conforming to these codes.

B. Electrical Work: Motors, electrical apparatus and wiring specified in this section shall conform to the National Electrical Manufacturer's Standards and the California Electric Code and bear the Underwriter's label of approval.

C. The Contractor shall furnish, without extra charge, any additional material and labor when and where required to comply with these rules and regulations, though the work be not mentioned in these Specifications or shown on the Drawings. When these Specifications or Drawings call for or describe materials or construction of a better quality or larger sizes than required by the above mentioned rules and regulations, the provisions of these specifications and accompanying drawings shall take precedence.

1.14 FEES AND PERMITS

A. The Contractor must obtain and pay all fees for permits, licenses, inspections, etc., which are required by any legally constituted authority. Coordinate exact requirements with the District prior to bid.

1.15 COORDINATION

A. Following the general arrangement indicated on the Drawings as closely as possible, the Contractor shall coordinate with the architectural, structural, plumbing, electrical and all other trades prior to installation of the materials and equipment to verify adequate space available for installation of the work shown. The District shall be immediately notified if an area of conflict occurs between trades.

B. The Contractor shall bear all costs incurred for work that must be relocated due to conflicts between trades.

C. The Mechanical Contractor shall coordinate all requirements for all points of connection with the General Contractor and other trades prior to bid.

1.16 DRAWINGS

A. The work shall be installed as indicated on Drawings, however, changes to accommodate installation of this work with other work, or in order to meet Architectural or structural conditions, shall be made without additional cost to the District.

B. For the purpose of clarity and legibility, the Drawings are essentially diagrammatic to the extent that many offsets, bonds, unions, special fittings and exact locations are not indicated. The Contractor shall make use of all data in all of the Contract Documents, and shall verify this information at the site.

1.17 INSPECTION

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.18 DELIVERY, STORAGE AND PROTECTION OF PROPERTY

A. Place orders for all equipment in time to prevent any delay in construction schedule or completion of project. If any materials or equipment are not ordered in time, additional charges made by equipment manufacturers to complete their equipment in time to meet construction schedule, together with any special handling charges, shall be borne by the contractor.

B. Materials shall be delivered in ample quantities from time to time as may be necessary for the uninterrupted progress of the work. They shall be stored as to cause the least obstruction to the premises and distributed so as to prevent overloading to any portion of the structure.

C. The Contractor shall provide temporary storage and shop areas that are required at the site for the safe and proper storage of materials, tools, and other items used in the performance of this work. These areas shall be constructed only in approved locations and shall not interfere with the work of any other Contractor.

D. All work, equipment and materials shall be protected at all times. The Contractor shall make good all damage caused either directly or indirectly by his own workmen. The Contractor shall also protect his own work from damage. He shall close all pipe and duct openings with caps or plugs during installation. He shall protect all of his equipment and materials against dirt, water, chemical, and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

1.19 DAMAGE BY LEAKS, ETC.

A. The Contractor shall be responsible for all damage to any part of the premises or work of other Contractors, caused by leaks or breaks in the piping or equipment furnished and/or installed under this section, during the construction and guarantee period.

1.20 ACCESS TO EQUIPMENT FOR MAINTENANCE

A. Install all equipment, piping, etc. to permit access for normal maintenance. Maintain easy access to filters, motors, etc. Install all such equipment and accessories to facilitate maintenance. Perform any relocation of pipes, etc. required to permit access at request of District at no additional cost to District.

B. Furnish and install access doors or panels in walls, floors, and ceilings to permit access to equipment, dampers, and all other items requiring service. Coordinate location of access doors with other trades as required.

C. Size access panels to allow inspection and removal of all items served.

D. Use Milcor style as required for material in which door is installed. Where door is installed in fire rated construction, provide door bearing UL label required for condition.

1.21 QUALITY ASSURANCE

A. Abbreviations:

1) AABC - Associate Air Balance Council
2) ADC - Air Diffusion Council - Test Code
3) AGA - American Gas Association
4) AMCA - Air Moving and Conditioning Association
5) ANSI - American National Standards Institute
6) ARI - Air Conditioning and Refrigeration Institute
7) ASA - American Standards Association
8) ASC - Adhesive and Sealant Council
9) ASHRAE - American Society of Heating, Refrigerating and Air Conditioning Engineers
10) ASME - American Society of Mechanical Engineers
11) ASTN - American Society for Nondestructive Testing
12) ASSE - American Society of Sanitary Engineering
13) ASTM - American Society for Testing and Materials
14) AWS - American Welding Society
15) AWWA - American Water Works Association
16) CAC - California Administration Code
17) 2019 CBC - California Building Code
18) 2019 CEC - California Electrical Code
19) 2019 CMC - California Mechanical Code
20) California Fire Code with California Amendments.
21) MSS - Manufacturers' Standardization Society
22) NBS - National Bureau of Standards
23) NCWB - National Certified Piping Welding Bureau
24) NEMA - National Electrical Manufacturer's Association
25) NFPA - National Fire Protection Association
26) PDI - Plumbing and Drainage Institute
27) SMACNA - Sheet Metal and Air Conditioning Contractor's National Association, Inc.
28) UL - Underwriters Laboratories, Inc.

B. Rulings and interpretations of authorities shall be considered a part of the regulations.

C. Nothing in this document is to be construed to permit Work not conforming to these codes and regulations.

D. Should there be any direct conflict between the above rules, the most stringent shall govern.

E. The Contractor shall recognize that the design is based upon the equipment and material specified by name or construction and accept full responsibility for assuring that the quality, utility and performance of a substitution equals or exceeds that of the specified item.

F. Testing: Provide the services of a qualified testing laboratory/agency to perform the specified field tests. Notify the District Representative 48 hours in advance of performance of Work requiring testing. Provide all materials required for testing.

G. Factory and Field Testing:
1) See each Section for the required testing and their procedures.
2) Test reports shall include description of equipment tested, description of test procedures, test results, and names and signatures of witnesses of tests.

PART 2 - PRODUCTS

2.1 GENERAL

A. All materials and equipment shall be new and of the best of their respective grades, free from all defects and of the make, brand or quality herein specified or as accepted by the District.

B. All materials and equipment shall be identified by manufacturer's name or nameplate data. Unidentified material or equipment shall be removed from the site.

C. Equipment specified by manufacturer's number shall include all accessories, controls, etc., listed in the catalog as standard with the equipment. Optional or additional accessories shall be furnished as specified.

D. Where no specific make of material or equipment is mentioned, any first class product of a reputable manufacturer may be used, provided it conforms to the requirements of the system and meets with the approval of the District.

E. Equipment and materials damaged during transportation, installation and operation shall be considered as "totally damaged" and shall be replaced with new. Any variance from this clause shall be made only with written approval of the District.

2.2 MANUFACTURER

A. Air Conditioning Units:
1) Carrier
2) York
3) Approved Equal

B. Air Distribution
1) Titus
2) Krueger
3) Price

2.3 Air Conditioning Units:

A. EQUIPMENT
General:
i. Factory-assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, refrigerant charge (R-410A), operating oil charge, dual refrigerant circuits, microprocessor-based control system and associated hardware, and all special features required prior to field start-up.

B. Unit Cabinet:
i. Non-overloading, backward inclined centrifugal wheel
ii. Constructed of aluminum
iii. Statically and dynamically balanced in accordance to AMCA Standard 204-05
iv. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency
v. Single thickness blades are securely riveted or welded to a heavy gauge back plate and wheel cone.

C. Fans:

i. Indoor Evaporator Fans:

a. Double-width/double-inlet, centrifugal, belt driven, forward-curved type with single outlet discharge.

b. Fan shaft bearings shall be of the pillow-block type with positive locking collar and lubrication provisions.

c. Statically and dynamically balanced.

d. Evaporator fan shaft bearings shall have a life of 200,000 hours at design operating conditions in accordance with ANSI B3.15.

e. Solid fan shaft construction for size 020-050 units and two-piece solid fan shaft construction on the size 060 unit.

ii. Condenser Fans:

a. Fans shall be direct-driven propeller type only, with corrosion-resistant blades riveted to corrosion-resistant steel supports for all size 020-050 units and the size 060 unit with optional condenser coil. Size 060 units with the microchannel condenser coil shall have a direct driven, 9-blade airfoil cross section, reinforced polymer construction, and shrouded-axial type fans with inherent corrosion resistance.

b. Fans discharge air vertically upward and are protected by PVC coated steel wire safety guards.

c. Statically and dynamically balanced.

iii. Supply Fan Drive:

Unit shall be equipped with variable frequency drive (VFD) inverter. The VFD shall be installed inside the unit cabinet and shall be factory mounted, wired, and tested. The VFD shall control motor speed to maintain set point static pressure at the sensor tube location of the supply duct pressure transducer (transducer is factory provided and installed; sensor tube must be field routed). The control system may be field-adjusted to maintain supply duct static pressure set points from 0 in. wg to 3.5 in. wg.

The variable frequency drive shall include the following features:

a. Full digital control with direct control from the unit ComfortLink controls.

b. Insulated Gate Bi-Polar Transistors (IGBT) used to produce the output pulse width modulated (PWM) waveform, allowing for quiet motor operation.

c. Inverters capable of operation at a frequency of 8 kHz, so no acoustic noise shall be produced by the motor.

d. Self diagnostics.

e. Personal lockout code for additional security.

f. Critical frequency avoidance.

g. RS485 capability standard.

h. Electronic thermal overload protection.

i. 5% swinging chokes for harmonic reduction and improved power factor.

j. All printed circuit boards shall be conformal coated.

k. Shall, through ABB, qualify for a 24-month warranty from date of commissioning or 30 months from date of sale, whichever comes first.:

1) AC Induction Motor

D. Compressors:

i. Fully hermetic, scroll type compressors with overload protection and short cycle protection with minimum on and off timers.

ii. Factory rubber-in-shear mounted for vibration isolation.

iii. Reverse rotation protection capability.

iv. Crankcase heaters shall only be activated during compressor off mode.

E. Coils:

i. E-coated coils shall have a flexible epoxy polymer coating uniformly applied to all coil surface areas without material bridging between fins. Coating process shall ensure complete coil encapsulation. Color shall be high gloss black with gloss—60 deg of 65 to 90% per ASTM D523-89. Uniform dry film thickness from 0.8 to 1.2 mil on all surface areas including fin edges. Superior hardness characteristics of 2H per ASTM D3363-92A and cross-hatch adhesion of 4B-5B per ASTM D3359-93. Impact resistance shall be up to 160 in./lb (ASTM D2794-93). Humidity and water immersion resistance shall be up to minimum 1000 and 250 hours respectively (ASTM D2247-92 and ASTM D870-92). Corrosion durability shall be confirmed through testing to be no less than 6000 hours salt spray per ASTM B117-90. Coil construction shall be aluminum fins mechanically bonded to copper tubes

F. Heating Section

i. Induced-draft combustion type with energy-saving direct spark ignition systems and redundant main gas valves.

ii. The heat exchanger shall be of the tubular section type constructed of stainless steel.

iii. Burners shall be of the in-shot type constructed of aluminum coated steel.

iv. All gas piping shall enter the unit cabinet at a single location.

v. Induced Draft Fans:

a. Direct-driven, single inlet, forward-curved centrifugal type.

b. Statically and dynamically balanced.

c. Made from steel with a corrosion-resistant finish.

vi. High-corrosion areas such as flue gas collection and exhaust areas shall be lined with corrosion resistant material.

G. Refrigerant Components:

Unit shall be equipped with dual refrigerant circuits each containing:

i. Solid core filter drier.

ii. Thermostatic expansion valve.

iii. Fusible plug

H. Filter Section:

Standard filter section shall be supplied with 2-in. thick disposable fiberglass filters

I. Controls and Safeties:

i. Unit ComfortLink Controls:

a. Scrolling marquee display.

b. CCN (Carrier Comfort Network®) capable.

c. Unit control with standard suction pressure and condensing pressure transducers.

d. Shall provide a 5°F temperature difference between cooling and heating set points to meet ASHRAE 90.1, energy standard.

e. Shall provide and display a current alarm list and an alarm history list.

f. Automatic compressor redundancy.

g. Service run test capability.

h. Shall accept input from a CO2 sensor (both indoor and outdoor).

i. Configurable alarm light shall be provided which activates when certain types of alarms occur.

j. Compressor minimum run time (3 minutes) and minimum off time (3 minutes) are provided.

k. Service diagnostic mode.

l. Optional integrated economizer control or two-position self-closing adjustable outside-air damper.

m. Minimum of 3 capacity stages of mechanical capacity control (excluding hot gas bypass) controlled with logic to maintain supply air temperature set point.

n. Optional minimum load valve for additional capacity stage.

o. Unit shall be complete with self-contained low voltage control circuit

ii. Safeties:

a. Unit shall incorporate a solid-state compressor lockout which provides optional reset capability at the space thermostat should any of the following safety devices trip and shut off compressor:

1) Compressor lockout protection provided for either internal or external overload.

2) Low-pressure protection.

3) Freeze protection (evaporator coil).

4) High-pressure protection (high pressure switch or internal).

5) Compressor reverse rotation protection.

6) Loss of charge protection.

7) Welded contactor protection

b. Supply-air sensor shall be located in the unit and should be used for economizer control and compressor stage control.

c. Induced draft heating section (48 Series) shall be provided with the following minimum protections:

1) High-temperature limit switch.

2) Induced-draft motor speed sensor.

3) Flame rollout switch.

4) Flame proving controls.

5) Redundant gas valve

J. Operating Characteristics

i. Unit shall be capable of starting and running at 115°F ambient outdoor temperature per maximum load criteria of AHRI Standard 340/360.

ii. Unit with standard controls will operate in cooling down to an outdoor ambient temperature of 32°F.

iii. Unit shall be provided with fan time delay to prevent cold air delivery

K. Electrical Requirements:

All unit power wiring shall enter unit cabinet at a single location

L. Motors:

i. Compressor motors shall be cooled by refrigerant gas passing through motor windings and shall have either internal line break thermal and current overload protection or external current overload modules with compressor temperature sensors.

ii. All condenser-fan motors shall be totally enclosed 3-phase type with permanently lubricated ball bearings, class F insulation and internal, automatic-reset thermal overload protection or manual reset calibrated circuit breakers.

iii. All indoor fan and power exhaust motors 5 hp and larger shall meet the minimum efficiency requirements as established by the Energy Independence and Security Act (EISA) of 2007

M. Special Features:

i. Variable Capacity Compressor:

A variable capacity compressor shall be available for constant volume, staged air volume, and variable air volume configurations. The ComfortLink control system shall be capable of unloading this compressor in an infinite number of steps from 100% of compressor capacity down to 50% of compressor capacity

ii. Ultra Low Leak Economizer:

Dry bulb, differential dry bulb temperature, optional enthalpy, or optional differential enthalpy controlled integrated type consisting of dampers, actuator, and linkages in conjunction with control system to provide primary cooling using outdoor air, conditions permit-ting, supplemented with mechanical cooling when necessary.

a. Economizer shall meet the requirements of the California Energy Commission Title 24

economizer requirements.

b. Dampers shall be a gear-driven ultra low leakage type with blade and edge seals. Dampers shall exhibit a maximum leakage rate of 3 cfm per square foot of area at 1 in. wg pressure differential when tested in accordance with AMCA (Air Movement and Control Association) Standard 500.

iii. Barometric Relief Damper Package:

a. Package shall include damper, seals, hardware, and hoods to relieve excess internal pressure.

b. Damper shall close due to gravity upon unit shutdown.

iv. Control Expansion Module (CEM):

a. Shall provide the following additional optional features:

b. Remote set point.

c. Demand limit control.

d. Remote economizer position.

e. Fire and smoke control override control.

f. Remote sensor monitoring.

g. Fan status switch monitoring.

v. Bypass for Supply Fan VFD (Variable Frequency Drive):

Units may be equipped with an optional manual bypass switch which allows the supply fan VFD to be electrically bypassed.

vi. BACnet Communication:

Shall provide factory-installed communication capability with a BACnet MS/TP network. Allows integration with i-Vu® Open Control System or a BACnet Building Automation System

vii. Low Outdoor Sound Condenser Fans:

Low sound condenser fan system shall be provided to reduce outdoor sound levels.

viii. Low Ambient Greenspeed® Control;

a. This factory-installed option shall regulate outdoor fan motor speeds in response to the saturated condensing temperature of the refrigeration circuits and local ambient conditions.

b. The control shall be capable of operating the rooftop unit with outdoor temperature at –20°F.

c. Fans shall be direct-driven shrouded-axial propeller type fans only, with 9-blade AeroAcoustic™ airfoil cross section, reinforced polymer construction blades bolted to corrosion resistant steel supports for all size 020-050 units and the size 060 unit with optional condenser coil.

d. Fans discharge air vertically upward and are protected by PVC coated steel wire safety guards.

e. Fans are statically and dynamically balanced.

f. The condenser fan motors will be VFD driven.

g. Compressor blankets will be applied to mitigate the level of outdoor sound on all refrigerant compressors. They shall be weather resistant are applied in both single and tandem arrangements.

h. Unit efficiency is maximized by monitoring the refrigerant system and ambient conditions

and controlling condenser fan performance

2.4 DUCTWORK AND ACCESSORIES

A. General:
1) Non-combustible or conforming to requirements for Class 1 air duct materials, or UL 181.

B. Steel Ducts:
1) ASTM A653 galvanized steel sheet, lock-forming quality, having zinc coating of 1.25 oz per sq ft for each side in conformance with ASTM A90.
2) Round duct shall be spiral seam construction.

C. Flexible Ducts:
1) Interlocking spiral of galvanized steel or aluminum construction; rated to (2 inches WG positive and 1.5 inches WG negative for low pressure ducts) (and 15 inches WG positive or negative for medium high pressure ducts.)

D. Insulated Flexible Ducts:
1) Flexible duct wrapped with flexible glass fiber insulation, enclosed by Pressure Ductwork: seamless aluminum pigmented plastic vapor barrier jacket; maximum 0.23 K value at 75 degrees F w/metal connectors.

E. Fasteners:
1) Rivets, bolts, or sheet metal screws.

F. Sealant:
1) Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic.

G. Hanger Rod:
1) Steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

H. Low Pressure Ducts:
1) Fabricate and support in accordance with 2019 CMC, SMACNA Low Pressure Duct Construction Standards and ASHRAE handbooks, except as indicated. Gages for galvanized steel ducts for low pressure systems where velocities do not exceed 2000 FPM shall be as follows:
a.

RECTANGULAR DUCT		ROUND DUCT	
Dimension of Largest Side (L) in Inches	Gage	Diameter (D) in Inches	Ga.
$L \leq 12$	26	$D < 9$	26
$12 \leq L \leq 30$	24	$9 \leq D < 14$	24
$30 < L \leq 54$	22	$14 \leq D < 23$	22
$54 < L \leq 84$	20	$23 \leq D < 37$	20
$84 < L$	18	$37 \leq D < 51$	18
		$51 \leq D < 61$	16
		$61 \leq D < 84$	14

b. All joints and seams as indicated in the 2019 CMC are acceptable.

2) Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission.
3) Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide turning vanes.
4) Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.
5) Use double nuts and lock washers on threaded rod supports.

I. I. Volume Control Dampers:
1) Fabricate in accordance with SMACNA Low Pressure Duct Construction Standards, and as indicated.
2) Opposed blade dampers shall have factory-fabricated blades, with factory assembled linkages, mounted in frames.
a. Blades shall have interlocking edges and ends.
b. Rectangular dampers 6" or more wide shall be the multi-blade type.
c. Blades on multi-blade type dampers must not be over 6" wide.
d. Dampers shall be of the opposed blade type.
e. Dampers shall have bar or channel frames and corner bracing.
f. All blade and linkage bearings shall be self-lubricating plastic.
g. Damper assembly leakage not to exceed 1% with 4.0 W.C. static pressure.
3) Provide locking, indicating quadrant regulators on single and multi-blade dampers.
4) On insulated ducts mount quadrant regulators on stand-off mounting brackets, bases, or adapters.

J. Duct Test Holes:
1) Cut or drill temporary test holes in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

K. Ceiling Diffusers & Supply Registers and, Return Registers:
1) Fabricate of steel with steel or aluminum frame and baked enamel off-white finish..

2.5 INSULATION

A. General:
1) All insulation shall have composite (insulation, jacket or facing, and adhesive used to adhere the facing or jacket to the insulation) fire smoke hazard ratings as tested by procedure ASTM E84, NFPA 255 and UL 723 not exceeding:
a. Flame Spread: 25
b. Smoke Developed: 50
2) All products or their shipping cartons shall bear a label indicating that flame and smoke ratings do not exceed above requirements. Any treatment of jackets or facings to impart flame and smoke safety shall meet the above requirements.
3) The Contractor shall certify that all products used have met the above criteria.
4) The insulation values shown are a minimum. If the requirements of Title 24 exceed these values, the amount of and/or type must be increased to meet the Title 24 requirements.

B. Duct Insulation:
1) Fiberglass Duct Wrap:
a. Insulation: ASTM C553; flexible, noncombustible blanket.
1) 'K' value: ASTM C518, 0.48 at 75 degrees F.
2) Maximum service temperature: 250 degrees F.
3) Density: 0.75 lb/ ft3.
b. Vapor Barrier Jacket:
1) Kraft paper reinforced with glass fiber yarn and bonded to aluminized film vinyl.
2) Moisture vapor transmission: ASTM E96; 0.5 perm.
3) Secure with pressure sensitive tape.

c. Vapor Barrier Tape: Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.
d. Tile Wire: Annealed steel, 16 gage.

2) Glass Fiber Duct Liner, Flexible:
a. Insulation: ASTM C553; flexible, noncombustible blanket.
1) 'K' value: ASTM C518, 0.24 at 75 degrees F.
2) Maximum service temperature: 250 degrees F.
3) Density: 1.5 to 3.0 lb/ft3.
4) Maximum Velocity on Coated Air Side: 4,000 ft/min.
b. Adhesive: Waterproof (fire-retardant) type.
c. Liner Fasteners: Galvanized steel, self-adhesive pad.

3) Glass Fiber Duct Liner, Rigid:
a. Insulation: ASTM C612; semi-rigid, noncombustible.
1) 'K' value: ASTM C518, 0.24 at 75 degrees F.
2) Maximum service temperature: 250 degrees F.
3) Density: 1.5 to 3.0 lb/cu ft.
4) Maximum Velocity on Coated Air Side: 4,000.

4) Adhesive: Waterproof (fire-retardant) type.

C. Pipe Insulation:
1) See specification 23 07 19 for more details. Should there be any direct conflict between the above rules, the most stringent shall govern.
2) Insulation and covering on pipe and tubing shall have flame spread rating not to exceed 25 and a smoke density not to exceed 50 when tested in accordance with UL 723 and ASTM E84.
a. Aluminum Jacket:
1) All outdoor exposed insulation piping and insulated piping exposed indoors in occupied areas and equipment rooms to be protected by covering with .016 inch thick aluminum weather-proof jacket with vapor barrier liner of laminated asphalt covered kraft paper.
2) Lap jacket at all joints and seams two inches (2"), cinched with staples and straps and finished with two (2) coats of asphalt base aluminum paint in strict accordance with manufacturer's recommendations.

2.6 CONTROLS

A. The Mechanical Contractor shall be responsible for the proper coordination of all control work and electrical work in connection therewith. He shall also be responsible for the proper operation of the entire system.

B. The Electrical Contractor shall furnish and install all line voltage control wiring, and in conduit. Wire sizing and length of run shall be coordinated with the manufacturer and Electrical Engineer. All Energy Management Controls, wiring, and conduit shall be by Controls Contractor.

C. Electrical Work: All electric relays, hand off automatic switches and all electrical wiring and all conduits will be provided under the Electrical Section, except as otherwise specified. Furnish and install additional conduit, wiring, relays, hand off automatic switches made necessary by the use of approved substituted equipment under this Section with no additional cost to the Owner.

D. Refer to drawings for control diagrams and additional requirements.

E. Calibration of Controls: The Controls Contractor shall carefully calibrate and adjust all controls as required to maintain comfort conditions and maximum energy conservation.

F. Thermostats and temperature sensors shall be by EMS on plans or approved equal.

G. Where EMS controls are indicated, mechanical contractor shall be responsible for low voltage controls conduit, wiring, and thermostat.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Equipment Installation:
1) All equipment provided under this section of the specifications shall be installed in strict accordance with the manufacturer's recommendations.
2) Should the drawings or specifications indicate the equipment is to be installed in a manner not in accordance with the manufacturer's recommendations; the Contractor shall obtain direction from the Engineer prior to proceeding with the installation. If the Contractor proceeds with the installation without obtaining direction from the Engineer, the Contractor shall be required to make all required corrections to the installation at no additional cost to the contract.
3) Space Consideration:
   a. Certain equipment and ductwork will have to be installed within the limited space available as indicated on the drawings.
   b. Exact field measurements of existing conditions will be the responsibility of this Contractor to assure that the equipment and ductwork to be installed under this Section of the specifications can be installed as indicated.
   c. Contractor shall submit shop drawings for approval prior to installation.
   d. These field verified dimensions shall be made prior to purchase of equipment or fabrication of ductwork.
4) Line all duct as indicated on mechanical sheets. Line ductwork as per General Notes, including but not limited to all ductwork at Bypass Damper connection locations.

B. Roof and Wall Flashings:
1) Ducts penetrating roof shall have twenty-two (22) gauge sheet metal flashing with a minimum of ten inches (10") of the base extended on to the roof, or roof curb, as indicated on the drawings.
2) Ducts through walls shall be sealed with galvanized angle iron on all sides.
3) Where required or indicated, a weather hood constructed of galvanized sheet metal with galvanized birdscreen shall be provided.
4) Refrigerant piping penetrating roof shall be provided with 4 pound lead flashing and counter flashing.

C. Openings through Walls and Roof:
1) Framed openings in walls and roof for ductwork to be coordinated in advance of the work. Installer shall furnish shop drawings showing the correct dimensions and locations of the required openings.
2) The Contractor shall provide and install "line-seals" where pipes pass through masonry walls or floors.
3) All pipes passing through walls, floors, ceilings, and partitions in finished portions of the buildings shall be provided with chromium plated, cast brass, set screw plates.
4) Where sleeves and plates are installed around insulated pipes, they shall be of sufficient size to allow the insulation to go through them, presenting a neat finish.

D. Sleeves and Seals: (Provide for pipes passing through walls or floor slabs).
1) Sheet-Metal Sleeves (above grade): 10 gauge, galvanized sheet metal, round tube closed with welded longitudinal joint.
2) Steel Sleeves (below grade): 10 gauge, galvanized sheet metal, round tube closed with welded longitudinal joint.
3) Polyethylene Sleeves (above grade): Manufacturer's standard product.
4) Mechanical Sleeve Seals (install where indicated on drawings): Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

5) Isolate pipes through ground floor sleeves with Kraft paper, plastic tape or similar materials.
6) Pack space between pipe and sleeve with ceramic fiber and Dow Fire Stop No. UL827U sealant so as to absolutely fireproof and watertight.

E. Ductwork and Accessories:
1) Provide openings in ductwork where required to accommodate thermometers and controllers. Provide pilot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage. Where openings are provided in insulated ductwork, install insulation material inside a metal ring.
2) Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
3) Install accessories in accordance with manufacturer's instructions and per seismic note on mechanical sheet M-0.1.
4) Provide balancing dampers at points on low-pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing. Use splitter dampers only where indicated.
5) Provide flexible connections immediately adjacent to equipment in ducts associated with fans and motorized equipment.
6) Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers, and elsewhere as indicated. Provide minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and as indicated.
7) Provide duct test holes where indicated and required for testing and balancing purposes.
8) Check location of outlets and inlets and make necessary adjustments in position to conform to Architectural features, symmetry, and lighting arrangement.
9) Install diffusers to ductwork with airtight connection.
10) Provide balancing dampers on duct take-off to diffusers and registers, regardless of whether dampers are specified as part of the diffuser, or register assembly.
11) Paint ductwork visible behind air outlets and inlets matte black.
12) Turning Vanes: All elbows having a centerline radius less than the width of the duct shall be square elbows with turning vanes, or proper radius and spacing. These turning vanes shall be multi-vane type and shall be carefully installed in accordance with the manufacturer's instructions. Provide turning vanes for duct widths of 18 inches or greater. Provide single thickness vanes for ducts of less than 18 inches. Contractor may submit for approval shop fabricated vanes conforming to SMACNA Duct Manual Standard. Where required or indicated on drawings, provide acoustic turning vanes constructed of air foil shaped aluminum extrusion with perforated faces and fiberglass fill.
13) Flexible Duct Connections: Shall be provided where indicated as required and shall be "Ventglass", "Ventbestos", or Duro-Dyne Durolan super metal-fab.
14) Duct Tape and Sealer:
    a. All longitudinal snap lock joints shall be made airtight with high pressure duct sealant TREMCO J.S. 773, GREY A.F., and transverse joints sealed with Hardcast AFG No. 1402 foil grip instant tape sealant for rectangular ducts and round ducts, all U.L. classified. At contractor's option, all round duct transverse joints may be made with MIRACLE D-619 water based, duct sealant U.L. classified 309U as manufactured by MIRACLE ADHESIVES CORP.
    b. Exposed outdoor ductwork shall be sealed as described herein and, in addition, all transverse joints shall be covered with Glenkote "Seal-Flex".

F. Thermostats and over-ride switches:
1) Install at 48" above finished floor unless otherwise stated.
2) Coordinate with other trades.
3) All thermostats and over-ride switches shall be by Siemens.
4) Controls Contractor shall be responsible for verifying, furnishing all controls and wiring for tie-in of thermostats to new building energy management system and shall co-ordinate all requirements with other trades including notifying electrical contractor of necessary conduit and power requirements.
5) All costs for scope of work shall be submitted for final bid.
6) All control conduits shall be by Controls Contractor.

G. Insulation:
   1) Duct Insulation:
      a. Unless specifically indicated on the drawings the Contractor may line or wrap ductwork to meet insulation requirements.
      b. Fiberglass duct wrap:
         1) Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.
         2) Secure insulation without vapor barrier with staples, tape, or wires.
         3) Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
         4) Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.
         5) Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.
      c. Duct (and Plenum) liner Application:
         1) Install as indicated (sound lining) on the drawings.
         2) Adhere insulation with adhesive for 100 percent coverage. Secure insulation with mechanical liner fasteners. Refer to SMACNA Standards for spacing. Seal and smooth joints. Seal liner surface penetrations with adhesive.
         3) Duct dimensions indicated are outside dimensions required for airflow.

3.2 PIPING APPLICATIONS FOR REFRIGERANT R-410A

A. Suction Lines NPS 2 (DN 50) and Smaller for Conventional Air-Conditioning Applications: Copper, Type ACR, straight annealed-temper tubing and wrought-copper fittings with brazed or soldered joints.

B. Hot-Gas and Liquid Lines, and Suction Lines for Heat-Pump Applications: Copper, Type ACR, straight annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

C. Safety-Relief-Valve Discharge Piping: Copper, Type ACR, straight annealed- or drawn-temper tubing and wrought-copper fittings with brazed or soldered joints.

D. No Coiled Temper (Soft Annealed), ACR, shall be used in this project.

3.3 VALVE AND SPECIALTY APPLICATIONS

A. Install diaphragm packless valves in suction and discharge lines of compressor.

B. Install service valves for gage taps at inlet and outlet of hot-gas bypass valves and strainers if they are not an integral part of valves and strainers.

C. Install a check valve at the compressor discharge and a liquid accumulator at the compressor suction connection.

D. Except as otherwise indicated, install diaphragm packless valves on inlet and outlet side of filter dryers.

E. Install a full-size, three-valve bypass around filter dryers.

F. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.

G. Install thermostatic expansion valves as close as possible to distributors on evaporators.
   1) Install valve so diaphragm case is warmer than bulb.

2) Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
3) If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.

H. Install safety relief valves where required by 2017 ASME Boiler and Pressure Vessel Code. Pipe safety-relief-valve discharge line to outside according to ASHRAE 15.

I. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.

J. Install strainers upstream from and adjacent to the following unless they are furnished as an integral assembly for the device being protected:
1) Solenoid valves.
2) Thermostatic expansion valves.
3) Hot-gas bypass valves.
4) Compressor.

K. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor as required by manufacturer.

L. Install receivers sized to accommodate pump-down charge.

M. Install flexible connectors at compressors.

3.4 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

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

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

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

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Select system components with pressure rating equal to or greater than system operating pressure.

J. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

K. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in plans if valves or equipment requiring maintenance is concealed behind finished surfaces.

L. Install refrigerant piping in protective conduit where installed belowground.

M. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

N. Slope refrigerant piping as follows:
1) Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
2) Install horizontal suction lines with a uniform slope downward to compressor.
3) Install traps and double risers to entrain oil in vertical runs.
4) Liquid lines may be installed level.

O. When brazing or soldering, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

P. Before installation of steel refrigerant piping, clean pipe and fittings using the following procedures:
1) Shot blast the interior of piping.
2) Remove coarse particles of dirt and dust by drawing a clean, lintless cloth through tubing by means of a wire or electrician's tape.
3) Draw a clean, lintless cloth saturated with trichloroethylene through the tube or pipe. Continue this procedure until cloth is not discolored by dirt.
4) Draw a clean, lintless cloth, saturated with compressor oil, squeezed dry, through the tube or pipe to remove remaining lint. Inspect tube or pipe visually for remaining dirt and lint.
5) Finally, draw a clean, dry, lintless cloth through the tube or pipe.
6) Safety-relief-valve discharge piping is not required to be cleaned but is required to be open to allow unrestricted flow.
7) Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

3.5 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.

D. Soldered Joints: Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook."

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
1) Use Type BCuP (copper-phosphorus) alloy for joining copper socket fittings with copper pipe.
2) Use Type BAg (cadmium-free silver) alloy for joining copper with bronze or steel.

F. Threaded Joints: Thread steel pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and to restore full ID. Join pipe fittings and valves as follows:
1) Apply appropriate tape or thread compound to external pipe threads unless dry-seal threading is specified.
2) Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Steel pipe can be threaded, but threaded joints must be seal brazed or seal welded.

H. Welded Joints: Construct joints according to AWS D10.12M/D10.12.

I. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.6 HANGERS AND SUPPORTS

A. Install the following pipe attachments:
   1) Adjustable steel clevis hangers for individual horizontal runs less than 20 feet (6 m) long.
   2) Roller hangers and spring hangers for individual horizontal runs 20 feet (6 m) or longer.
   3) Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet (6 m) or longer, supported on a trapeze.
   4) Spring hangers to support vertical runs.
   5) Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.

B. Install hangers for copper tubing with the following maximum spacing and minimum rod diameters:
   1) NPS 1/2 (DN 15): Maximum span, 60 inches (1500 mm); minimum rod, 1/4 inch (6.4 mm).
   2) NPS 5/8 (DN 18): Maximum span, 60 inches (1500 mm); minimum rod, 1/4 inch (6.4 mm).
   3) NPS 1 (DN 25): Maximum span, 72 inches (1800 mm); minimum rod, 1/4 inch (6.4 mm).
   4) NPS 1-1/4 (DN 32): Maximum span, 96 inches (2400 mm); minimum rod, 3/8 inch (9.5 mm).
   5) NPS 1-1/2 (DN 40): Maximum span, 96 inches (2400 mm); minimum rod, 3/8 inch (9.5 mm).
   6) NPS 2 (DN 50): Maximum span, 96 inches (2400 mm); minimum rod, 3/8 inch (9.5 mm).

3.7 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:
   1) Comply with ASME B31.5, Chapter VI.
   2) Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
   3) Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in "Performance Requirements" Article.
      a. Fill system with nitrogen to the required test pressure.
      b. System shall maintain test pressure at the manifold gage throughout duration of test.
      c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
      d. Remake leaking joints using new materials and retest until satisfactory results are achieved.
   4) Comply with bracing details on plans per seismic note on mechanical sheet M-01.

B. Prepare test and inspection reports.

3.8 SYSTEM CHARGING

A. Charge system using the following procedures:
   1) Install core in filter dryers after leak test but before evacuation.
   2) Evacuate entire refrigerant system with a vacuum pump to 500 micrometers (67 Pa). If vacuum holds for 12 hours, system is ready for charging.
   3) Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig (14 kPa).
   4) Charge system with a new filter-dryer core in charging line.

3.9 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.

B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.

C. Adjust set-point temperature of air-conditioning or chilled-water controllers to the system design temperature.

D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
   1) Open shutoff valves in condenser water circuit.
   2) Verify that compressor oil level is correct.
   3) Open compressor suction and discharge valves.
   4) Open refrigerant valves except bypass valves that are used for other purposes.
   5) Check open compressor-motor alignment and verify lubrication for motors and bearings.

E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

3.10 SOUND AND VIBRATION ISOLATION

A. All vibrating equipment shall be sound isolated from the structure.

B. The Contractor shall submit all necessary data for each vibration isolator, including static deflection and weight loading, for equipment in operation.

C. All vibrating equipment shall be provided with flexible pipe connections. Submit for approval prior to installation.

D. Vibration isolators shall have a valid OSHPD approval number.

3.11 JOB COMPLETION

A. Equipment Identification:
   1) All equipment furnished under this section shall be provided with the manufacturer's metal identification labels securely attached and showing all pertinent data, including performance characteristics, size, model, and serial number. Labels shall not be obscured in any manner.
   2) Identification name plates shall be provided on all equipment and control components, including room thermostat numbers coded to their respective automatic zone damper, valve, or air conditioning unit. Name plates shall be constructed of black bakelite with white center engraved letters three-sixteenth inch (3/16") high and shall be cemented to equipment with an epoxy resin. The Contractor shall submit to the Architect, a complete list of name plate titles for approval prior to installation.
   3) Each valve shall be identified by a number brass tag with hole and brass chain mounted on valve stem or handle. Tag shall be a minimum of one and one-half inch (1-1/2") in diameter and numbers shall be at least one-fourth inch (1/4") high stamped into the tag.

B. Identification:
   1) See Specification Section 23 05 53 for requirements.

C. Final Operation: Upon completion of the installation of the equipment and after all systems have been tested, cleaned, the Contractor shall place a competent person in charge who shall operate the equipment

for a period of three eight-hour days. During this period of operation, all safety and operating controls shall be actuated to demonstrate proper operation. During this operating period, the Owner's representative shall be instructed in all details of operation and maintenance. All required instructions from the equipment manufacturer's representative shall be given during the period.

D. Operation Instructions:
1) Prepare a diagram of the entire control system with a full description of the heating, ventilating and air conditioning systems.
2) After approval by the Engineer, the control diagram and complete operating instructions shall be mounted under glass and installed where directed.
3) Prepare two (2) maintenance manuals which shall include all the necessary or pertinent data, such as:
   a. Names, addresses and emergency phone numbers of all suppliers and manufacturers.
   b. Part numbers of all replaceable items.
   c. Oiling and lubrication instructions.
   d. Air balance report.
   e. Control diagram and operation sequence, together with labeling of controls and instruments to match the diagram.
   f. A maintenance schedule which shall list all required maintenance on all equipment furnished under this section of the specifications and the intervals of which the items are to be performed.
4) An identification chart indicating valve operating in the piping system shall be installed as located by the Owner. Identification charts shall be mounted behind glass in a frame.

E. Clean-Up:
1) After all heating, ventilating and air conditioning work has been tested and approved, the Contractor shall thoroughly clean all parts of the equipment installation. Exposed parts which are to be painted are to be thoroughly cleaned of cement plaster and other materials and all greases and oil spots removed with solvent. Exposed rough metal work to be carefully brushed down with steel brushes to remove rust and other spots and left in proper condition to receive painter's finish.
2) Remove all debris from the job site, all cartons, boxes, packing crates, excess materials not used occasioned by the work and to the satisfaction of the Owner.
3) If the above requirements of clean-up are not to the satisfaction of the Owner, the Owner reserves the right to order the work done and the cost of which shall be borne by the Contractor.
4) The Contractor shall remove on a daily basis all debris from the job site, to the satisfaction of the Owner.
5) If the above requirements of clean-up are not to the satisfaction of the Owner, the Owner reserves the right to order the work done by a third party and the cost of which shall be borne by the Contractor.

- END OF SECTION -

DIVISION 26 – ELECTRICAL

SECTION 26 00 00 - GENERAL ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SCOPE

A. Work of this section includes everything necessary for or incidental to completing the electrical work, to provide a complete and operable electrical system, except as herein specifically excluded.

1.2 GENERAL REQUIREMENTS

A. Electrical System Characteristics: 277/480V. 3PH, 4W. & 208/120V. 3PH, 4W.

B. Guarantee: Furnish a written guarantee for a period of one-year from date of acceptance.

C. Codes and Regulations: Work done under this Section shall comply with the latest adopted edition of the following: California Electrical Code, State of California Title 24, State Building Standards, Occupational Safety and Health Administration (CAL / OSHA) requirements, State of California Title 17 and to all local codes having jurisdiction. In the case where the codes have different levels of requirements, the most stringent rule shall apply.

D. Wherever a discrepancy in quantity or size of conduit, wire, equipment, devices, circuit breakers, etc., (all materials), arises on the Drawing and/or Specifications, the Contractor shall be responsible for providing and installing all material and services required by the strictest condition noted on Drawings and/or in Specifications to insure complete and operable systems as required by the Owner and Engineer.

E. The General and Supplementary Conditions, as well as Special Conditions apply in addition to items in the Electrical Section. Special attention is directed to the following sections:

1. Drawings and Specifications at the site.

2. Shop drawings and samples.

3. Record drawings.

4. Cutting and Patching.

5. Cleaning up.

6. Guarantee.

7. Tests.

F. Additional Work: Refer to Mechanical and Plumbing drawings and specifications for additional Electrical requirements.

G. Testing:

1. Scan:
   a. Infrascan test of existing switchboards, distribution and branch circuit panels modified as part of the scope of work shall be required.
   b. Infrascan certified reports shall be submitted on completion to the Owner and Engineer.
   c. Scans shall be performed by an independent testing laboratory with total connected loads in operation.

2. Megger:
   a. New branch circuit - phase, neutral and ground conductors.
   b. New insulated bonding conductors.

3. Current leakage test between the following:
   a. Grounding pole of receptacles and exposed conductive surface of non-electrical equipment.
   b. Grounding pole of receptacles and conductive surface of fixed or portable electrical equipment.

4. All circuits shall be tested for continuity and circuit integrity. Adjustments shall be made for circuits not complying with testing criteria.

5. Grounding System: Shall be tested by an independent testing laboratory to meet resistance specified in Part 3.1, D.3 of these Specifications. It shall be this Contractor's responsibility to make adjustments, as required, to upgrade non-complying systems to proper and safe operation.

6. All certified testing reports shall be submitted to the Owner at completion of project.

H. All Core Cutting, Drilling, and Patching:

1. For the installation of work under this Section, the aforementioned shall be performed under this Section of the Specifications and the Concrete section of the Specifications.

2. No holes will be allowed in any structural members without the written approval of D.S.A. or the Structural Engineer.

3. For penetrations of concrete slabs or concrete footings, the work will be as directed in the Concrete Section of Specifications. See section 03 30 53 Miscellaneous Cast In Place Concrete.

4. The contractor shall be responsible for patching, painting and repairing surfaces where he is required to penetrate for work under this contract. Paint color to match the existing disturbed surface being repaired.

5. Penetrations shall be sealed to meet the rated integrity of the surface required to be patched and repaired. The patched surface shall be painted or finished to match the existing surface.

I. Verifying Drawings and Job Conditions:

1. This Contractor shall examine all Drawings and Specifications in a manner to be fully cognizant of all work required under this Section.

2. This Contractor shall visit the site and verify existing conditions. Where existing conditions differ from Drawings, adjustment shall be made and allowances included for all necessary equipment to complete all parts of the Drawings and Specifications.

J. Shop Drawings:

1. Drawings shall be submitted in six (6) bound sets accompanied by Letter of Transmittal, which shall give a list of the number and dates of the drawings submitted. Drawings shall be complete in every respect and bound in sets.

2. The Drawings submitted shall be marked with the name of the project, numbered consecutively and bear the approval of the Contractor as evidence that the Drawings have been checked by the Contractor. Any Drawings submitted without this approval will be returned to the Contractor for resubmission.

3. If the shop drawings show variations from the requirements of the Contract because of standard shop practice or other reasons, the Contractor shall make specific mention of such variations in his letter of transmittal. If the substitution is accepted, the Contractor shall be responsible for proper

adjustment which may be caused by the substitution. Samples shall be submitted when requested.

4. Shop drawings shall be submitted on the following but not limited to:

    a. Circuit breakers. Submit mounting hardware for new circuit breakers installed in existing panels.

    b. Distribution boards and panels.

    c. Receptacles.

    d. Safety/Disconnect switches.

    e. Fuses.

    f. Pull boxes, junction boxes, outlet boxes, covers and wall plates.

    g. Wire/Cable.

    h. Conduit and fittings.

    i. Conduit supports.

K. Drawings of Record: The Contractor shall provide and keep up-to-date, a complete record set of blueprints. These shall be corrected daily and show every change from the original Drawings. This set of prints shall be kept on the job site and shall be used only as a record set. This shall not be construed as authorization for the Contractor to make changes in the layout without definite instruction in each case. Upon completion of the work, a set of reproducible Contract Drawings shall be obtained from the General Contractor and all changes as noted on the record set of prints shall be incorporated thereon with black ink in a neat, legible, understandable and professional manner. Refer to the Supplementary General Conditions for complete requirements.

1.3 WORK IN COOPERATION WITH OTHER TRADES

A. Examine the Drawings and Specifications and determine the work to be performed by the electrical, mechanical, plumbing, building contractor and other trades. Provide the type and amount of electrical materials and equipment necessary to place this work in proper operation, completely wired, tested and ready for use. This shall include all conduit, wire, disconnects, relays, and other devices for the required operation sequence of all electrical, mechanical and other systems or equipment.

B. Provide power and control circuits, conduit and wire as indicated on the Mechanical and Plumbing drawings as required for complete and operable systems.

1.4 TESTING AND ADJUSTMENT

A. Upon completion of all electrical work, this Contractor shall test all circuits, switches, motors, breakers, motor starter(s) and their auxiliary circuits and any other electrical items to insure perfect operation of all electrical equipment.

B. Equipment and parts in need of correction and discovered during such testing shall be immediately repaired or replaced with all new equipment and that part of the system shall then be retested. All such replacement or repair shall be done at no additional cost to the Owner.

C. All circuit shall be tested for continuity and circuit integrity. Adjustments hall be made for circuits not complying with testing criteria.

D. All certified testing reports shall be submitted to the Engineer at completion of project.

1.5 IDENTIFICATION

A. Identification nameplates shall be Micarta 1/8" thick and of approved size, with bevelled edges and engraved white letters 1/4" high minimum on black background. Nameplates shall be provided for all circuits in the distribution switchboards, and selector switches. Inscriptions on equipment shall be identical to those indicated in panels and/or motor control centers and other similar devices. Each nameplate shall be provided with drillings and suitable mounting screws corresponding to finish of the nameplate. The inscriptions in each nameplate shall be as indicated on the Drawings.

B. Identification of Air Conditioning Equipment: Equipment to be so identified shall include, but shall not be limited to: Pressure and temperature controllers; switches; equipment motors and boxes or cans housing other control items. Mechanical equipment nameplates shall have letters a minimum of 3/8" high.

1.6 MAINTENANCE, SERVICING, INSTRUCTION MANUALS AND WIRINGDIAGRAMS

A. Prior to final acceptance of the job, the Electrical Contractor shall furnish to the Owner at least four (4) copies of operating and maintenance and servicing instructions, as well as four (4) complete wiring diagrams for the following item(s) or equipment:

1. Disconnect switches.
2. Circuit breakers.
3. Distribution boards.
4. Panelboards.

B. All wiring diagrams shall specifically cover the system supplied. Typical drawings will not be accepted. Two (2) copies shall be presented to the Electrical Engineer and four (4) copies to the Owner.

1.7 ELECTRICAL CONTRACTOR'S RESPONSIBILITY

A. It shall be the Electrical Contractor's responsibility to obtain a complete set of Drawings and Specifications. He shall check the Drawings of the other trades and shall carefully read the entire Specifications and determine his responsibilities.

B. The contractor shall be responsible for reviewing the plans and specifications to ensure each room, where electrical line or low voltage equipment is to be installed, has sufficient space to accommodate the system cabinets, equipment and terminations while maintaining code mandated clearances about said equipment. The contractor shall identify problem areas prior to bid, include all costs required for corrective measures in his bid and submit alternate equipment and materials suitable for the installation to the Architect/Engineer for acceptance as part of the product submittal process.

1.8 FINAL INSPECTION AND ACCEPTANCE

A. After all requirements of the Specifications and/or the Drawings have been fully completed, representatives of the Owner will inspect the work. Contractor shall provide competent personnel to demonstrate the operation of any item or system to the full satisfaction of each representative.

B. Final acceptance of the work will be made by the Owner after receipt of approval and recommendation of acceptance from each representative.

1.9 RECORD DRAWINGS

A. Contractor shall furnish one set of reproducible record drawings before final payment of retention.

1.10 SUBSTITUTIONS

A. Substitution to specified equipment shall be submitted and received by the Engineer fifteen (15) days

after the bid date for review and approval. Obtain D.S.A. approval for all substitutions.

B. To receive consideration, requests for substitutions must be accompanied by documentary proof of its equality with the specified material. Documentary proof shall be in letter form and identify the specified values/materials alongside proposed equal values/materials. In addition, catalog brochures and samples must be included in the submittal.

C. In the event that authorization is given for a substitute equal to bid, after award of contract the Contractor shall submit to the Engineer certified quotations from suppliers of both the specified and proposed equal material for price comparison and delivery dates.

D. In the event of cost reduction, the Owner will be credited with 100 percent of the reduction, arranged by Change Order.

E. The Contractor warrants that substitutions proposed for specified items will fully perform the functions required.

F. Substitutions or requests for substitution shall not be accepted and rejected for failure to comply with items A-E above.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials and Equipment: All electrical materials and equipment shall be new and shall be listed by Underwriter's Laboratories and bear their label, or listed and certified by a nationally recognized testing authority where UL does not have an approval. Custom made equipment must have complete test data submitted by the manufacturer attesting to its safety. In addition, the materials and equipment shall comply with the requirements of the following:

1. American Society of Testing Materials (ASTM).

2. Insulated Cable Engineers Association (ICEA).

3. National Electrical Manufacturer's Association (NEMA).

4. National Fire Protection Association (NFPA).

5. American National Standard Institute (ANSI).

B. Conduit:

1. Rigid conduit shall be full weight threaded type aluminum or steel, except where specifically required to be steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metallizing or sherardizing process.

2. Galvanized Rigid Conduit (GRC), shall be full weight threaded type aluminum or steel, except where specifically required to be steel. Steel conduit shall be protected by overall zinc coating to inside and outside surfaces, applied by the hot dip, metallizing, or sherardizing process.

3. Intermediate Metal Conduit (IMC), shall be hot-dipped galvanized in accordance with UL 1242 and meeting Federal Specification WWC-581 (latest revision).

4. Electrical Metallic Tubing (EMT), shall be zinc-coated steel with baked enamel or plastic finish on inside surfaces.

5. Flexible metal conduit shall be constructed of aluminum or hot-dipped galvanized steel strips wound spirally with interlocking edges to provide greatest flexibility with maximum strength. Interior surfaces shall be smooth and offer minimum drag to pulling in conductors. Used only as

directed by the Engineer.

6. Liquid-tight conduit (Seal-Tite) shall be galvanized steel flexible conduit as above except with moisture and oil-proof jacket, pre-cut lengths and factory installed fittings. For outdoor installations and motor connection.

7. PVC coated rigid steel conduit for exposed aboveground locations.

C. Fittings:

1. Condulet type fittings shall be smooth inside and out, taper threaded with integral insulating bushing and of the shapes, sizes and types required to facilitate installation or removal of wires and cables from the conduit and tubing system. These fitting shall be of metal, smooth inside and out, thoroughly galvanized, and sherardized cadmium plated.

2. Metallic condulet covers shall have the same finish as the fitting and shall be provided for the opening of each fitting where conductor do not pass through the cover.

3. Connector, coupling, locknut, bushings and caps used with rigid conduit shall be steel, threaded and thoroughly galvanized. Bushings shall be insulated.

4. EMT fittings, connectors and couplings, shall be steel, zinc or cadmium plated, raintight, threadless, compression or tap-on multiple point, steel locking ring type with insulated throat.

5. Flexible steel conduit connectors shall be or malleable iron clamp or squeeze type or steel twist-in type with insulated throat. The finish shall be zinc or cadmium plating.

6. Die cast, set screw or indenter type fittings are not acceptable.

7. Conduit unions shall be "Erickson" couplings, or approved equal. The use of running threads will not be permitted.

8. PVC coated rigid steel conduit fitting for aboveground installations.

9. PVC conduit fittings shall match the conduit system (i.e. Schedule 80 fittings used on Schedule 80 conduit).

D. 600 Volt Conductors - Wire and Cable:

1. All conductors shall be copper. Simpull or equal.

2. Type THHN/THWN thermoplastic, 600 volt, UL approved, dry and wet locations, for conductor sizes up to and including #4 AWG.

3. Type XHHW cross-linked synthetic polymer, 600 volt, UL approved, for dry and wet locations, for conductor sizes #2 AWG. and above.

4. Cross-linked synthetic polymer, XHHW, 600 volts, UL approved, for installation underground, in concrete or masonry.

5. Wire and cable shall be new, manufactured not more than six (6) months prior to installation, shall have size, type of insulation, voltage rating and manufacturer's name permanently marked on outer covering at regular intervals.

6. Wire and cable shall be factory color coded by integral pigmentation with a separate color for each phase and neutral. Each system shall be color coded and it shall be maintained throughout.

7. Systems Conductor Color Coding:

a. Power 208/120V, 3PH, 4W:
   (1) Phase A = Black
   (2) Phase B = Red
   (3) Phase C = Blue
   (4) Neutral = White

b. Ground Conductors:
   (1) Green

8. All color coding for #8 conductor and above shall be as identified above, utilizing phase tape at each termination.

9. No conductors carrying 120 volt or more shall be smaller than #12 AWG.

E. Junction and Pullboxes:

1. For outside, damp or interior/exterior surface mounted locations, boxes shall be heavy cast aluminum or cast iron with removable, gasketed, non-ferrous machine screw secured covers.

2. All boxes shall be sized for the number and sizes of conductors and conduits entering the box and equipped with plaster rings where required. Each conductor shall be terminated at an insulated, barriered terminal connector and completely identified with an engraved fiber identification marker, Electrovert or Underwriter's Safety Device Company.

3. PVC coated metal junction/pull boxes for use with PVC coated conduits in aboveground installations.

F. Outlet Boxes:

1. For surface mounting, wet or damp locations, outlet boxes shall be heavy cast aluminum or cast iron with threaded hubs, covers shall be watertight with gaskets and non-ferrous screws.

2. For locations where standard boxes are not suitable due to number and size of conduit to be terminated, special boxes shall be designed to fit space or meet other requirements and submitted for approval.

3. PVC coated metal outlet boxes for use with PVC coated conduits in aboveground installations.

G. Switches:

1. Switches controlling or disconnecting single phase motor loads in excess of 1/3HP shall be horsepower rated and approved or motor control service. Switches shall be complete with overload device of proper motor nameplate rating, where required.

2. Disconnect (safety) switches shall be fused, heavy duty type meeting NEMA Specifications. Switches shall be provided with rejection type fuse blocks. Provide switches with the number of poles, the voltage, current and horsepower ratings as required. Provide externally operable, quickmake, quick-break type mechanism with cover interlock and padlockable in either the open or closed position. Unless indicated otherwise, provide switches indoors in NEMA Type 1 enclosure and in NEMA Type 3R rain-tight enclosure where indicated to be outdoors or weatherproof. Provide nameplate indicating equipment served. Provide unit as manufactured by Challenger or approved equal Siemens or Westinghouse.

3. Disconnect switches located outdoors/aboveground shall be PVC coated steel.

H. Painting:

1. Junction boxes, pull boxes, etc., and conduit installed exposed/surface mounted indoors and in

public view shall be painted with colors selected by the Owner to match the subject surface. Refer to painting section of the specifications for additional requirements.

I. Seismic Design and Anchoring of Electrical Equipment:

1. Seismic anchorage of electrical equipment shall conform to C.C.R. Title 24, 2019 CBC. Anchorage details for roof/floor mounted equipment shall be as shown on plans.

PART 3 - EXECUTION

3.1 PREPARATION AND INSTALLATION

A. Installation of Conduit and Outlet Boxes:

1. All conduit exposed or installed in concrete and masonry, shall be galvanized rigid steel conduit (GRC), or intermediate metal conduit (IMC).

2. Rigid conduit may be installed under floor slabs, under concrete sidewalls an as noted on the Drawings. Rigid conduit installed under slabs shall be 1" trade size minimum and shall be wrapped with 20 mil. polyvinyl chloride plastic tape.

3. All conduit except as hereinafter specified, installed in concrete/masonry, damp locations, hazardous locations, surface mounted up to 8’-0” above finished floor or subject to mechanical injury shall be heavy wall, threaded, galvanized rigid steel conduit (GRC), or intermediate metal conduit (IMC).

4. Flexible steel conduit shall only be permitted to be used at light fixture outlets and connections to vibrating electrical equipment. All flexible steel conduit runs shall be less than 6'-0". All outdoor installation shall be made using liquid-tight flex with approved fittings. Use of flexible conduit shall be as approved by the Engineer.

5. Intermediate metal conduit (IMC), is approved for use in all locations as approved for GRC or EMT and in accordance with Article 345 of CEC and UL Information card #DYBY.

6. All conduit installed in the dry walls or ceilings of the building shall be steel tube (EMT), Galvanized Rigid Steel (GRC), or Intermediate Metal Conduit (IMC).

7. Conduit shall be run so as not to interfere with other piping fixtures or equipment.

8. The ends of all conduit shall be cut square, carefully reamed out to full size and shall be shouldered in fitting.

9. No running threads will be permitted in locations exposed to the weather, in concrete or underground. Special union fittings shall be used in these locations.

10. PVC conduit shall not be run in walls or above grade.

11. Where conductors enter a raceway in a cabinet, pull box, junction box, or auxiliary gutter, the conductors shall be protected by a plastic bushing type fitting providing a smoothly rounded insulating surface.

12. Where conduit extends through roof to equipment on roof area, this Contractor shall provide 24 gauge galvanized sheet metal flashing cones with 4" flanges on roof surface. This flashing shall be delivered to the roofing contractor for installation. The actual location of all such roof penetrations and outlet shall be verified by the Contractor.

13. All conduit shall be supported at intervals not less than 10'-0" and within 12" from any outlet and at each side of bends and elbows. Conduit supports shall be galvanized, heavy stamped, two hole

conduit clamp properly secured to structure.

14. Where conduit racks are used the rack shall consist of two piece conduit clamps attached to galvanized steel slotted channels, properly secured via threaded rods attached directly to the building structure.

15. Nail-in conduit supports will not be allowed. One piece set-screw type conduit clamps or perforated iron for supporting conduit will not be permitted.

16. Seismic Conduit Support:

    a. All conduit shall be supported in such a manner that it is securely attached to the structure of the building. Attachment is to be capable of supporting the tributary weight of conduit and contents in any direction. Maximum spacing of support and braces are to be as follows:

CONDUIT SIZE	MAXIMUM SPACING
EMT, IMC	10'-0"
GRC (3/4" thru 1 ½")	10'-0"
GRC (2" thru 2½")	16'-0"
GRC (3" and larger)	20'-0"

17. All conduit runs shall be installed parallel or perpendicular to walls, structural members, or intersection of vertical planes and ceilings. Field made bends and offset shall be avoided where possible. Crushed or deformed raceway shall not be installed.

18. Open knockouts in outlet boxes only where required for inserting conduit.

19. All boxes shall be covered with outlet box protector, Appleton SB-CK. Keep dirt from entering box or panels. If dirt does get in, it shall be removed prior to pulling wires.

20. All boxes installed outdoors shall be suitable for outdoor installations, gasketed, screw cover and painted as directed by the Architect with weatherproof paint to match building.

21. All conduit entries to outdoor mounted panels, cabinets, boxes, etc., shall be made using Myers "SCRU-TITE" hubs Series ST.

22. All conduit shall have a 200 lb test poly-propylene pull line left in place for future use in all runs tagged with a plastic tag at terminating end indicating the location of the opposite end of the conduit.

23. All rotating electrical equipment shall be supplied with flexible, liquid-tight conduit with appropriate slack and shall not exceed thirty-six (36) inches.

24. All multiple conduit runs within suspended ceilings shall be suspended from building structure by means of unistrut hangers/rack, see note 14. Refer to note 13 for support of single conduit runs within suspended ceilings. Conduit shall not be allowed to lay on ceiling or be supported from ceiling suspension wires or other suspension system.

25. Provide conduit only for routing of HVAC control wiring. Refer to Mechanical drawings for conduit requirements.

B. Installation of 600 Volt Conductors:

1. All line voltage wire, including control circuits, shall be installed in conduit.

2. All circuits and feeder wires for all systems shall be continuous from the service point to terminal or farthest outlet. No joints shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.

3. Thoroughly clean all conduit and wire-ways and see that all parts are perfectly dry before pulling any wires. No joint shall be made except in pull, junction or outlet boxes, or in panel or switchboard gutters.

4. Install UL approved, fixture wire from all lighting fixture lamp sockets into fixture outlet or junction box.

C. Joints in 600 Volt Conductors:

1. Joints in 600 volt conductors smaller than No. 4 AWG shall be made with Scotchlok spring type connectors. Wires No 4 AWG and larger shall be joined together with approved type of pressure connector and taped with #33 3M tape, three (3) layers minimum to provide insulation not less than that of conductor. Connections to switch or busbar shall be made with one-piece copper lugs. Splicing of all 600 volt or less in-line connections #2 AWG through 350 MCM shall be made with 3M brand PST connector.

2. Joints/splices shall be done in junction or pull boxes.

D. Grounding:

1. Provide grounding for entire electric installation as shown on plans and as required by applicable codes. Included as requiring grounding are:

   a. Conduit.
   b. Neutral or identified conductors of interior wiring system.
   c. Non-current carrying metal parts of fixed equipment.
   d. Branch circuit panelboards.

2. Grounding and bonding conductors shall be sized per the latest edition of the California Code of Regulations, Title 24, State of California and CEC.

3. Provide and install an equipment grounding conductor in all feeder and branch circuit conduits.

4. Grounding resistance to ground shall not exceed 25 ohm.

E. Prefabricated Equipment: Installation of all prefabricated items and equipment shall conform to the requirements of the manufacturer's specifications and installation instruction pamphlets. Where code requirements affect installation of materials and equipment, the more stringent requirements, code or manufacturer's instructions and/or specifications, shall govern the work.

END OF SECTION

NEWPORT MESA UNIFIED SCHOOL DISTRICT

2985 BEAR ST, COSTA MESA, CA 92630

NEWPORT HARBOR HIGH SCHOOL

SIMS BUILDING
HVAC MODERNIZATION

600 IRVINE AVENUE, NEWPORT BEACH, CA 92663

ASBESTOS STATEMENT

NON-UTILIZATION OF ASBESTOS MATERIAL

NO ASBESTOS OR ASBESTOS-CONTAINING PRODUCTS SHALL BE USED IN THIS CONSTRUCTION OR IN ANY TOOLS, DEVICES, CLOTHING OR EQUIPMENT USED TO AFFECT THIS CONSTRUCTION.

ASBESTOS AND OR ASBESTOS CONTAINING PRODUCTS SHALL BE DEFINED AS ALL ITEMS CONTAINING BUT NOT LIMITED TO CRYSTALLITE, CROCIDOLITE, AMOSITE, ANTHOPYLLITE, TERMOLITE AND ANTINOLITE.

ANY OR ALL MATERIAL CONTAINING GREATER THAN ONE TENTH OF ONE PERCENT(>.1 %) ASBESTOS SHALL BE DEFINED AS ASBESTOS CONTAINING MATERIAL.

ANY DISPUTES INVOLVING THE QUESTION OF WHETHER OR NOT MATERIAL INSTALLED WITH ASBESTOS-CONTAINING EQUIPMENT WILL BE SETTLED BY ELECTRON MICROSCOPY: THE COST OF ANY SUCH TEST SHALL BE PAID BY THE CONTRACTOR.

ALL WORK OR MATERIALS FOUND TO CONTAIN ASBESTOS OR WORK OR MATERIAL INSTALLED WITH ASBESTOS-CONTAINING EQUIPMENT WILL BE IMMEDIATELY REJECTED AND THIS WORK WILL BE REMOVED AT NO ADDITIONAL COST TO THE DISTRICT.

DECONTAMINATION AND REMOVAL

DECONTAMINATION AND REMOVAL OF WORK FOUND TO CONTAIN ASBESTOS OR WORK INSTALLED WITH ASBESTOS-CONTAINING EQUIPMENT SHALL BE DONE ONLY UNDER SUPERVISION OF A QUALIFIED CONSULTANT, KNOWLEDGEABLE IN THE FIELD OF ASBESTOS ABATEMENT AND ACCREDITED BY THE ENVIRONMENTAL PROTECTION AGENCY.

THE ASBESTOS REMOVAL CONTRACTOR SHALL BE AN EPA ACCREDITED CONTRACTOR QUALIFIED IN THE REMOVAL OF ASBESTOS AND SHALL BE CHOSEN AND APPROVED BY THE ASBESTOS CONSULTANT WHO SHALL HAVE SOLE DISCRETION AND FINAL DETERMINATION IN THIS MATTER.

THE ASBESTOS CONSULTANT SHALL BE CHOSEN AND APPROVED BY THE DISTRICT WHO SHALL HAVE SOLE DISCRETION AND FINAL DETERMINATION IN THIS MATTER.

THE WORK WILL NOT BE ACCEPTED UNTIL ASBESTOS CONTAMINATION IS REDUCED TO LEVELS DEEMED ACCEPTABLE BY THE ASBESTOS CONSULTANTS.

HOLD HARMLESS

INTERFACE OF WORK UNDER THIS CONTRACT WITH WORK CONTAINING ASBESTOS SHALL BE EXECUTED BY THE CONTRACTOR AT HIS RISK AND HIS DISCRETION WITH FULL KNOWLEDGE OF THE CURRENTLY ACCEPTED STANDARDS, HAZARDS RISKS, AND LIABILITIES ASSOCIATED WITH ASBESTOS WORK AND ASBESTOS CONTAINING PRODUCTS.

BY EXECUTION OF THIS CONTRACT THE CONTRACTOR ACKNOWLEDGES THE ABOVE AND AGREES TO HOLD ASSIGNS FOR ALL ASBESTOS LIABILITY WHICH MAY BE ASSOCIATED WITH THIS WORK AND AGREES TO INSTRUCT HIS EMPLOYEES WITH RESPECT TO THE ABOVE MENTIONED STANDARDS, HAZARDS, RISKS AND LIABILITIES.

THE CONTRACTOR SHALL, PRIOR TO COMMENCEMENT OF THIS WORK, PROVIDE A DULY SIGNED AND NOTARIZED AFFIDAVIT THAT HE HAS INSTRUCTED HIS EMPLOYEES WITH RESPECT TO THE ABOVE MENTIONED STANDARDS, HAZARDS, RISKS AND LIABILITIES AND THE CONTENTS AND REQUIREMENTS OF THIS PORTION OF THE CONTRACT DOCUMENTS.

HAZARD MATERIALS

IN THE EVENT THE CONTRACTOR ENCOUNTERS ON THE SITE MATERIALS REASONABLY BELIEVED TO BE ASBESTOS OR POLYCHLORINATED BIPHENYL (PCB) WHICH HAS NOT BEEN RENDERED HARMLESS, THE CONTRACTOR SHALL IMMEDIATELY STOP WORK IN THE AREA AFFECTED AND REPORT THE CONDITION TO THE DISTRICT AND ENGINEER IN WRITING.

THE WORK IN THE AFFECTED AREA SHALL NOT THEREAFTER BE RESUMED EXCEPT BY WRITTEN AGREEMENT OF THE DISTRICT AND CONTRACTOR IF IN FACT THE MATERIAL IS ASBESTOS OR POLYCHLORINATED BIPHENYL (PCB), OR WHEN IT HAS BEEN RENDERED HARMLESS, BY WRITTEN AGREEMENT OF THE DISTRICT AND CONTRACTOR, OR IN ACCORDANCE WITH FINAL DETERMINATION BY THE ENGINEER.

MATERIAL SAFETY DATA SHEETS (MSDS)

CONTRACTOR IS REQUIRED TO ENSURE THAT MATERIAL SAFETY DATA SHEETS ARE AVAILABLE IN A READILY ACCESSIBLE PLACE AT THE WORK SITE; FOR ANY MATERIAL REQUIRING A MATERIAL SAFETY DATA SHEET PER THE FEDERAL "HAZARD COMMUNICATION" STANDARD, OR EMPLOYEES RIGHT TO KNOW LAW.

THE CONTRACTOR IS ALSO REQUIRED TO ENSURE PROPERLY LABELING ANY SUBSTANCE BROUGHT ONTO THE JOB SITE, AND THAT ANY PERSON WORKING WITH THE MATERIAL, IS INFORMED OF THE HAZARDS OF THE SUBSTANCE AND FOLLOWS PROPER HANDLING AND PROTECTION PROCEDURES.

GENERAL NOTES

1. DIMENSIONS ARE TYPICALLY TO STRUCTURAL GRID LINES, THE FACE OF CONCRETE AND THE FACE OF STUD, UNLESS NOTED OTHERWISE. DIMENSIONS AND OTHER INFORMATION INDICATED ON LARGER SCALE DRAWINGS SHALL TAKE PRECEDENCE OVER DIMENSIONS AND OTHER INFORMATION INDICATED ON SMALLER SCALE DRAWINGS. IN NO CASE SHALL DIMENSIONS BE DETERMINED BY SCALING THE DRAWINGS, UNLESS DIRECTED BY THE ENGINEER.
2. OCCUPANTS OF THE EXISTING BUILDING SHALL BE SPARED INCONVENIENCE DUE TO THE CONTRACTOR'S WORK, DEBRIS, ETC. ENTRANCES AND CORR- IDORS SHALL BE PROTECTED AND KEPT FREE OF CONSTRUCTION. SEE SPECIFICATIONS FOR THE CONSTRUCTION OF SEPARATION PARTITION(S).
3. DETAILS MARKED "TYPICAL" SHALL APPLY IN ALL LIKE CASES. WHERE NO SPECIFIC DETAIL IS SHOWN, THE CONSTRUCTION SHALL BE IDENTICAL OR SIMILAR TO THAT DETAILED FOR SIMILAR CASES OF CONSTRUCTION.
4. COORDINATE THE REQUIREMENTS OF ALL DISCIPLINES HEREIN, AND THE REQUIREMENTS OF THEIR SPECIFICATIONS, IN ORDER THAT ALL ITEMS RELATING TO EACH OTHER, BUT INDICATED BY DIFFERENT SOURCES OR DISCIPLINES, COORDINATE, FIT AND WORK PROPERLY.
5. PROVIDE THE LATEST EDITION OF THE GUIDELINES FOR SEISMIC RESTRAINTS AS PUBLISHED BY SMACNA, AND KEEP ON THE JOB SITE AT ALL TIMES.
6. ENACT ALL MEASURES REQUIRED TO PROTECT AND SAFEGUARD ALL WORK AND MATERIALS FROM DAMAGE BY ANY MEANS. ALL AREAS ARE TO BE LEFT CLEAN AND IN GOOD REPAIR. REPLACE OR REPAIR WORK, MATERIALS AND FINISHES DAMAGED DURING THE EXECUTION OF THIS CONTRACT TO EQUAL OR BETTER CONDITION.
7. RUN-OFF FROM PETROLEUM PRODUCTS, LIME AND MORTAR, SOIL STERILANTS, AND THE WASHING OF EQUIPMENT USED TO APPLY THESE MATERIALS, IS PROHIBITED WITHIN PLANTED AREAS.
8. LOCATIONS OF ALL UTILITIES SHOWN ARE APPROXIMATE AND CONTRACTOR SHALL EXERCISE EXTREME CAUTION IN EXCAVATING AND TRENCHING ON THIS SITE TO AVOID INTERCEPTING EXISTING, PIPING, OR CONDUITS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES WHETHER SHOWN HEREON OR NOT AND TO PROTECT THEM FROM DAMAGE. THE ENGINEER IS NOT RESPONSIBLE FOR THE LOCATION OF UNDERGROUND UTILITIES OR STRUCTURES WHETHER OR NOT SHOWN OR DETAILED AND INSTALLED BY ANY OTHER CONTRACT. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE DISTRICT PROJECT MANAGER OF ANY UNIDENTIFIED CONDITIONS AS DISCOVERED. THE CONTRACTOR SHALL BEAR ALL EXPENSE OF REPAIR OR REPLACEMENT OF UTILITIES OR OTHER PROPERTY DAMAGED BY OPERATIONS IN CONJUNCTION WITH THE PROSECUTION OF THIS WORK.
9. NONRESIDENTIAL ENERGY STANDARDS COMPLIANCE STATEMENT (TITLE 24, PART 6):

   THE DESIGN INDICATED HEREIN COMPLIES WITH THE REQUIREMENTS OF THE ENERGY CONSERVATION STANDARDS OF TITLE 24, PART 6, CALIFORNIA CODE OF REGULATIONS. THE PROPOSED BUILDING(S) WILL BE IN COMPLIANCE WITH THE ENERGY CONSERVATION STANDARDS PROVIDED IN (THEY) IS (ARE) BUILT ACCORDING TO THESE DRAWINGS AND SPECIFICATIONS AND PROVIDED ANY FUTURE IMPROVEMENTS ARE COMPLETED ACCORDING TO THE REQUIREMENTS OF TITLE 24, PART 6, CALIFORNIA CODE OF REGULATIONS. THESE PLANS AND SPECIFICATIONS HAVE BEEN PREPARED TO INCLUDE ALL SIGNIFICANT ENERGY CONSERVATION FEATURES REQUIRED FOR COMPLIANCE WITH THE STANDARDS. BUILDING AREAS THAT ARE UNCONDITIONED AND/OR NOT SUBJECT TO THE STANDARDS ARE INDICATED ON THE PLANS.
10. THE DRAWINGS INDICATE THE END RESULT. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VISIT THE JOB SITE PRIOR TO BID SUBMITTAL TO DETERMINE ANY PROBLEMS HE WILL HAVE IN PERFORMING THE WORK. THE BID SHALL INCLUDE THE COST OF THE RESOLUTION OF ALL CHALLENGES.
11. ANY CONDITIONS NOT COVERED BY THESE DRAWINGS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER ON RECORD BY THE CONTRACTOR AND THE DISTRICT PRIOR TO BIDDING.
12. CONTRACTOR SHALL PROVIDE THE ENGINEER AND DISTRICT WITH A CONSTRUCTION SCHEDULE (WHICH SHALL BE APPROVED IN WRITING) PRIOR TO START OF CONSTRUCTION. ALL ASPECTS OF CONSTRUCTION, INCLUDING, BUT NOT LIMITED TO TRENCHING, TEMPORARY WALK AND DRIVE WAYS, UNIT SYSTEM DISABLING, PIPE REMOVAL/INSTALLATION, UNIT START-UP, CONTROLS INSTALLATION, PHASING, ETC. SHALL BE CONSIDERED.
13. THESE PLANS WERE PREPARED IN A MANNER CONSISTENT WITH EXISTING PROFESSIONAL STANDARDS AND WITH THE UNDERSTANDING THAT THESE DRAWINGS WOULD BE USED SOLELY BY QUALIFIED AND EXPERIENCED CONTRACTORS AND/OR DESIGN PROFESSIONALS FOR USE IN THE CONSTRUCTION OF THIS SPECIFIC PROJECT ONLY. THE DETAILS INDICATED ON THESE PLANS REPRESENT GENERAL TYPICAL DETAILS REQUIRED FOR COMMUNICATING THIS PROJECT'S DESIGN INTENT TO SUCH AN MAY NOT INCLUDE ALL THE DETAILS NECESSARY FOR THE FINAL COMPLETION OF THIS PROJECT.
14. FOR NEW WORK ABOVE CEILING, CAREFULLY REMOVE CEILING TILE AND SAVE. CUT AROUND GYPSUM BOARD OR PLASTER CEILING, PREPARE SURFACE TO RECEIVE NEW WORK. AFTER WORK IS DONE, REPAIR, RE- PLASTER OR INSTALL NEW GYPSUM WALLBOARD TO MATCH ADJACENT SURFACE AND REINSTALL ACOUSTICAL TILE. IF TILE IS DAMAGED, REPLACE WITH NEW TILE TO MATCH EXISTING.
15. OCCUPANTS OF THE EXISTING BUILDING SHALL BE SPARED INCONVENIENCE DUE TO THE CONTRACTOR'S WORK, DEBRIS, ETC. ENTRANCES AND CORR- IDORS SHALL BE PROTECTED AND KEPT FREE OF CONSTRUCTION. THE DISTRICT SHALL BE NOTIFIED IN ADVANCE OF TIMES OF DELIVERY OF EQUIPMENT AND/OR MATERIALS.
16. THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OF THE ALTERATION, REHABILITATION OR RECONSTRUCTION IS TO BE IN ACCORDANCE WITH TITLE 24, CALIFORNIA CODE OF REGULATIONS. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NONCOMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CALIFORNIA CODE OF REGULATIONS, A CONSTRUCTION CHANGE DOCUMENT (CCD), OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFYING THE REQUIRED REPAIR WORK SHALL BE SUBMITTED TO AND APPROVED BY DSA BEFORE PROCEEDING WITH THE REPAIR WORK.
17. ALL WORK SHALL BE DONE DURING REGULAR WORK HOURS, MONDAY THROUGH FRIDAY. EXCEPTION: CONTRACTOR SHALL INCLUDE IN HIS BID FEES REQUIRED TO COVER THE FOLLOWING SPECIAL WORKING CONDITIONS:
    - ALL OTHER WORK, INCLUDING BUT NOT LIMITED TO CONTROLS WORK, DUCTWORK, PIPING, ETC. SHALL BE DONE MONDAY THROUGH FRIDAY DURING THE HOURS OF 8:00 A.M. TO 5:00 P.M. ANY DEVIATIONS FROM THE SAID HOURS MUST BE APPROVED BY THE DISTRICT PRIOR TO EXECUTING SUCH WORK. (THIS NOTE APPLIES ONLY TO WORK DONE WITHIN THE BUILDING. ALL OTHER WORK MAY DONE DURING REGULAR WORK HOURS FROM MONDAY THROUGH FRIDAY - SEE NOTES BELOW.) FINAL SCHEDULE SHALL BE PER DISTRICT.
    - ALL DUCT CLEANING MUST BE DONE MONDAY THROUGH FRIDAY DURING THE HOURS OF 8:00 A.M. TO 5:00 P.M. ANY DEVIATIONS FROM THE SAID HOURS MUST BE APPROVED BY THE DISTRICT PRIOR TO EXECUTING SUCH WORK. FINAL SCHEDULE SHALL BE PER DISTRICT.
    - ALL AIR AND WATER BALANCING MUST BE DONE MONDAY THROUGH FRIDAY DURING THE HOURS OF 8:00 A.M. TO 5:00 P.M. ANY DEVIATIONS FROM THE SAID HOURS MUST BE APPROVED BY THE DISTRICT PRIOR TO EXECUTING SUCH WORK.
18. WHERE PROJECT DRAWINGS AND SPECIFICATIONS LIST CONFLICTING REQUIREMENTS, MOST STRINGENT REQUIREMENTS SHALL APPLY.
19. CONTRACTOR MUST COMPLY WITH APPROVED SCHEDULE. ALL FEES REQUIRED FOR THE EXECUTION AND COMPLETION OF WORK INDICATED HEREIN SHALL BE INCLUDED IN THE CONTRACTORS BID.
20. WHERE REMOVAL OF CONCRETE WALKS, MOW STRIPS, CURBS AND GUTTERS IS REQUIRED TO INSTALL UNDERGROUND UTILITIES, REMOVE THE CONCRETE WORK TO THE NEAREST EXISTING EXPANSION OR CONTROL JOINT (SAWCUT IF REQUIRED). MOWSTRIPS, CURBS AND GUTTERS MAY BE REMOVED IN MINIMUM LENGTHS OF 6 FEET IF THE DISTANCE BETWEEN EXISTING JOINTS IS 12 FEET OR MORE. REPLACE REMOVED WORK WITH REINFORCED CONCRETE TO MATCH ADJACENT EXISTING WORK IN PROFILE, JOINT LAYOUT AND FINISH.
21. COORDINATE THE REMOVAL, RELOCATION OR MODIFICATION OF EXISTING IRRIGATION LINES WITH THE PROJECT MANAGER PRIOR TO ANY TRENCHING, CLEARING AND GRUBBING, OR OTHER SITE EXCAVATIONS REQUIRED FOR EXECUTION OF WORK.
22. ANY EXCESS SOIL MATERIALS RESULTING FROM THE EXECUTION OF THIS CONTRACT SHALL BE DELIVERED OFF-SITE AT CONTRACTOR'S EXPENSE.
23. CONTRACTOR SHALL MAINTAIN PLANTING WITHIN THE JOB SITE FENCE ENCLOSURE DURING DEMOLITION AND CONSTRUCTION PHASES. EXISTING IRRIGATION SYSTEMS SHALL EITHER REMAIN OPERATIONAL FOR CONTRACTOR'S USE OR CONTRACTOR SHALL HAND-WATER EXISTING PLANT MATERIALS AT LEAST ONCE A WEEK. TURN SHALL BE MOWED AT LEAST ONCE EVERY TWO WEEKS.
24. WHERE THE REMOVAL OF PLANT LIFE IS REQUIRED FOR THE PURPOSE OF PERFORMING WORK INDICATED HEREIN, CONTRACTOR SHALL RESPONSIBLE FOR REMOVING AND REPLACING PLANTS. CONTRACTOR MAY TEMPORARILY TRANSPLANT PLANTING AND RE-PLANT UPON COMPLETION OF WORK IF SO DESIRED. 'NEW' PLANTS SHALL BE THE SAME TYPE AND SIMILAR IN SIZE AS REMOVED PLANT(S).
25. WHEN ITEMS ARE REMOVED FROM AND/OR INSTALLED ANYWHERE ON SITE, ALL SURFACES SHALL BE FINISHED AS REQUIRED TO GIVE A UNIFORM SURFACE. MATCH EXISTING MATERIALS, COLOR AND TEXTURE.
26. CONTRACTOR SHALL INCLUDE IN HIS BID ALL PREMIUM TIME TO WHICH HE MAY BE SUBJECTED FOR PERFORMING WORK IN SUCH PROCEDURE AND AT SUCH TIME AS MAY BE NECESSARY TO CAUSE THE LEAST INTERFERENCE WITH THE FUNCTION OF THIS FACILITY. ALL WORK MUST BE COORDINATED WITH THE DISTRICT PROJECT MANAGER PRIOR TO START OF WORK AT ANY PARTICULAR LOCATION ON SITE. 72-HOUR ADVANCED NOTICE MUST BE GIVEN FOR ONSITE WORK LOCATION CHANGE AND/OR COMMENCEMENT. SEE PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
27. FURNISH AND INSTALL TEMPORARY HEATING AND/OR COOLING SYSTEMS AS REQUIRED BY THE DISTRICT. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SETUP/TAKE-DOWN AND OPERATION LOGISTICS FOR AS LONG AS SAID SYSTEM IS REQUIRED. CONTRACTOR SHALL OBTAIN IN WRITING, APPROVAL FOR ANY TEMPORARY HVAC SYSTEM TO BE INCLUDED AS A MEANS FOR ABIDING BY THE GENERAL PROVISIONS SET FORTH BY THE DISTRICT.
28. DEMOLITION WORK SHOWN ON THE DRAWINGS IS DIAGRAMMATIC. ALL CONDITIONS MAY NOT BE SHOWN. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REMOVE ALL ITEMS THAT WILL INTERFERE WITH NEW CONSTRUCTION. STRUCTURAL ITEMS THAT ARE TO BE REMOVED SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND THE DISTRICT PROJECT MANAGER PRIOR TO REMOVAL.
29. THE EXISTENCE OR LOCATION OF UNDERGROUND PIPING SHOWN ON THESE PLANS WERE OBTAINED BY SEARCH OF AVAILABLE RECORDS AND CORRESPONDENCE WITH DISTRICT EMPLOYEES. THE CONTRACTOR SHALL ASCERTAIN THE TRUE VERTICAL AND HORIZONTAL LOCATION AND SIZE OF ALL UNDERGROUND UTILITIES AND SHALL BE RESPONSIBLE FOR DAMAGE TO ANY PUBLIC OR PRIVATE UTILITIES, SHOWN OR NOT SHOWN HEREON.
30. WORKERS ARE ONLY ALLOWED IN AREAS THAT ARE APPROPRIATE TO THE REQUIRED WORK AND SHALL MAKE EVERY EFFORT NOT TO DISTURB THE FUNCTION OF THE FACILITY OR IT'S OCCUPANTS. WORK AREAS SHALL BE PRE-DETERMINED AND COORDINATED WITH THE DISTRICT PROJECT MANAGER. CONTRACTOR MUST OBTAIN WRITTEN APPROVAL FROM PROBATION OFFICIALS PRIOR TO STARTING WORK IN ANY PARTICULAR AREA - NO EXCEPTIONS.

LIST OF 2019 CALIFORNIA CODE OF REGULATIONS

2019 BUILDING STANDARDS ADMINISTRATIVE CODE, PART 1, TITLE 24 C.C.R.
2019 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 C.C.R.
(2018 INTERNATIONAL BUILDING CODE VOLUMES 1 & 2 AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 C.C.R.
(2017 NATIONAL ELECTRICAL CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24, C.C.R.
(2018 IAPMO UNIFORM MECHANICAL CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 C.C.R,
(2018 IAPMO UNIFORM PLUMBING CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA FIRE CODE, PART 9, TITLE 24 C.C.R.
2019 CALIFORNIA FIRE CODE, PART 9, CHAPTER 33 FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION
(2018 INTERNATIONAL FIRE CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA REFERENCED STANDARDS, PART 12, TITLE 24 C.C.R.
TITLE 19 C.C.R. PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

PARTIAL LIST OF APPLICABLE STANDARDS

NFPA 13	AUTOMATIC SPRINKLER SYSTEMS	2016 EDITION
NFPA 14	STANDPIPE SYSTEMS (CA AMENDED)	2016 EDITION
NFPA 17	DRY CHEMICAL EXTINGUISHING SYSTEMS	2017 EDITION
NFPA 17A	WET CHEMICAL SYSTEMS	2017 EDITION
NFPA 20	STATIONARY PUMPS	2016 EDITION
NFPA 24	PRIVATE FIRE MAINS (CA AMENDED)	2016 EDITION
NFPA 72	NATIONAL FIRE ALARM CODE (CA AMENDED)	2016 EDITION
(NOTE:	SEE UL STANDARD 1971 FOR "VISUAL DEVICES")	2002 EDITION
NFPA 253	CRITICAL RADIANT FLUX OF FLOOR COVERING SYSTEMS	2015 EDITION
NFPA 2001	CLEAN AGENT FIRE EXTINGUISHING SYSTEMS	2015 EDITION

REFERENCE CODE SECTION FOR NFPA STANDARDS-2019 CBC CHAPTER 35

GENERAL REQUIREMENTS

1. ALL WORK SHALL CONFORM TO 2019 TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
2. CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY AN ADDENDUM OR A CONSTRUCTION CHANGE DOCUMENT (CCD) APPROVED BY THE DIVISION OF THE STATE ARCHITECT, AS REQUIRED BY SECTION 4-338, PART 1, TITLE 24, CCR.
3. A DSA CERTIFIED PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY THE DIVISION OF THE STATE ARCHITECT SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, PART 1, TITLE 24, CCR; CLASS 3.
4. AN INSPECTOR WHO IS SPECIALLY QUALIFIED IN MECHANICAL AND ELECTRICAL WORK WILL BE REQUIRED FOR THIS PROJECT.
5. COMPLY WITH CFC CHAPTER 33 FOR FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION.
6. ENERGY COMPLIANCE REVIEW AND APPROVAL IS REQUIRED PRIOR TO DSA APPROVAL OF THE CONSTRUCTION DOCUMENTS.
7. A DSA-CERTIFIED CLASS 3 PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY DSA SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342. PART 2. TITLE 24, CCR.
8. THE SCOPE OF WORK: CLEARLY INDICATED THE SCOPE OF WORK ON THE COVER SHEET OR GENERAL NOTE SHEET OF THE DRAWINGS.
9. THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS IS THAT THE WORK OF THE ALTERATION, REHABILITATION OR RECONSTRUCTION IS TO BE IN ACCORDANCE WITH TITLE 24, CCR. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE CONTRACT DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CCR, A CONSTRUCTION CHANGE DOCUMENT (CCD), OR A SEPARATE SET OF PLANS AND SPECIFICATIONS, DETAILING AND SPECIFYING THE REQUIRED WORK SHALL BE SUBMITTED TO AND APPROVED BY DSA BEFORE PROCEEDING WITH THE WORK. (SECTION 4-317(c), PART 1, TITLE 24, CCR).
10. A DSA ACCEPTED TESTING LABORATORY DIRECTLY EMPLOYED BY THE DISTRICT (OWNER) SHALL CONDUCT ALL THE REQUIRED TEST AND INSPECTION FOR THE PROJECT.
11. GRADING PLANS, DRAINAGE IMPROVEMENTS, ROAD AND ACCESS REQUIREMENTS, AND ENVIRONMENTAL HEALTH CONSIDERATIONS SHALL COMPLY WITH ALL LOCAL ORDINANCES.
12. CONTRACTOR OPERATIONS SHALL NOT BLOCK, HINDER, IMPEDE OR OTHERWISE INHIBIT THE USE OF REQUIRED EXITS AT ANY TIME. CONTRACTOR SHALL MAINTAIN UNOBSTRUCTED ACCESS TO FIRE EXTINGUISHERS, FIRE HYDRANTS, TEMPORARY FIRE PROTECTION FACILITIES, STAIRWAYS AND OTHER ACCESS ROUTES FOR FIRE-FIGHTING EQUIPMENT AND OR PERSONNEL
13. MAINTAIN THE INTEGRITY OF ALL EXISTING RATED ASSEMBLIES U.O.N.

PROJECT SCOPE(SEE SHEET T-2 FOR MORE DETAILS):

REPLACE (E) MULTI-ZONE GAS HEATING AND ELECTRIC COOLING PACKAGED UNITS FOR BUILDING C ONLY.RECONNECT NEW CONDENSATE AND GAS LINES TO EXISTING RECEPTACLES AND GAS LINE RESPECTIVELY. NO OTHER BUILDINGS ARE IN SCOPE.

SHEET INDEX

GENERAL

1.	T-1	TITLE SHEET
2.	T-2	SITE PLAN

STRUCTURAL

3.	S-1	PARTIAL ROOF FRAMING PLAN
4.	SD-1	GENERAL NOTES & TYPICAL DETAILS

MECHANICAL

5.	M-0.1	MECHANICAL GENERAL NOTES AND LEGEND
6.	M-0.2	MECHANICAL SCHEDULES SIM BLDG
7.	MD-1.1	SIMS BLDG DEMO ROOF PLAN
8.	M-1.1	REMODELLED SIMS BLDG ROOF PLAN
9.	M-1.2	FIRST FLOOR PLAN REMODEL
10.	M-1.3	SECOND FLOOR PLAN REMODEL
11.	M-2.1	MECHANICAL DETAILS
12.	M-2.2	MECHANICAL DETAILS
13.	M-3.1	ALERTON CONTROLS RISER DIAGRAM
14.	M-3.2	ZONE DAMPER BOX DETAILS
15.	M-4.1	TITLE 24 REPORT
16.	M-4.2	TITLE 24 REPORT

ELECTRICAL

17.	E-01	GENERAL NOTES AND SYMBOL LIST
18.	E-02	SINGLE LINE DIAGRAM & LOAD TABLE
19.	E-03	ELECTRICAL DETAILS
20.	E-04	OVERALL SITE PLAN
21.	ED-1.1	SIMS BLDG. DEMOLITION ROOF PLAN
22.	E-1.1	SIMS BLDG. REMODEL ROOF PLAN

22 SHEETS TOTAL

DSA IR A-18

I FIND THAT: ☒ ALL DRAWINGS OR SHEETS LISTED ON THE COVER OR INDEX SHEET
☐ THIS DRAWING OR PAGE

☒ IS/ARE IN GENERAL CONFORMANCE WITH THE PROJECT DESIGN INTENT, AND
☒ HAVE/HAVE BEEN COORDINATED WITH THE PROJECT PLANS AND SPECIFICATIONS.

03/11/2020
SIGNATURE DATE
ARCHITECT OR ENGINEER DESIGNATED TO BE IN GENERAL RESPONSIBLE CHARGE

ABBY BANERJEE
PRINT NAME
M29253 06/30/2021
LICENSE NUMBER EXPIRATION DATE

☐ IS/ARE IN GENERAL CONFORMANCE WITH THE PROJECT DESIGN INTENT, AND
☐ HAVE/HAVE BEEN COORDINATED WITH THE PROJECT PLANS AND SPECIFICATIONS.

SIGNATURE DATE
ARCHITECT OR ENGINEER DESIGNATED TO BE IN GENERAL RESPONSIBLE CHARGE

PRINT NAME

LICENSE NUMBER EXPIRATION DATE

PROJECT CONTACT INFO

MECHANICAL & PLUMBING

OPTIMUM ENERGY DESIGN
5200 E. LA PALMA
ANAHEIM, CALIFORNIA 92807
(714) 693-2277
CONTACT: ABBY BANERJEE, P.E., PRINCIPAL

ELECTRICAL (CONSULTANT)

A&F ENGINEERING
9320 BASELINE ROAD SUITE C
RANCHO CUCAMONGA, CA 91701
(909) 941-3008 (909) 941-8211 FAX
CONTACT: ROLANDO E. SOTELO

STRUCTURAL (CONSULTANT)

STB STRUCTURAL ENGINEERS, INC
21084 BAKE PARKWAY, SUITE 100
LAKE FOREST, CA 92630
(949) 599-0320
CONTACT: MATT EXLEY

ARCHITECT (CONSULTANT)

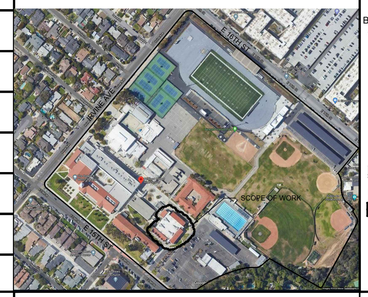
SAUNDERS + WIANT ARCHITECTS, INC.
2700 WEST COAST HIGHWAY, SUITE 200,
NEWPORT BEACH, CA 92663
(949) 721-0730
CONTACT: NIALL F. SAUNDERS

OWNER

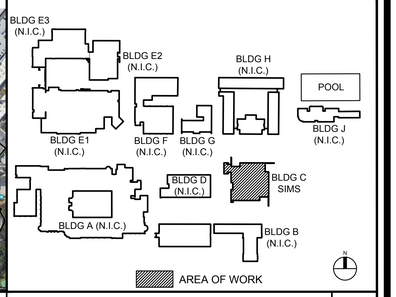
NEWPORT MESA UNIFIED SCHOOL DISTRICT
2985 BEAR ST
COSTA MESA, CA 92630
(714)580-8665
CONTACT: ARA K. ZARECZNY

CODE ANALYSIS

BUILDINGS	A (N.I.C.)	B (N.I.C.)	C (SCOPE OF WORK)	D (N.I.C.)	E1 (N.I.C.)	E2 (N.I.C.)	E3 (N.I.C.)	F (N.I.C.)	G (N.I.C.)	H (N.I.C.)	J (N.I.C.)				
BUILDINGS A NUMBER	19451, 40168, 10036, 10446, 15240, 20088, 22476, 40866, 41508, 34271, 26322, 26956	7386, 10446	33267	14248	37950, 4941, 5525, 6767, 15240, 23907	54009	54009	10446, 35192, 26956, 9471	10446	11626, 15240	54009, 34370, 104932				
BUILDINGS USE(S)	AUTITORIUM, EXT. LUNCH AREA, KITCHEN/SERVING AREA, CLASSROOMS	CLASSROOM	CLASSROOM	CLASSROOM	GYMNASIUM/ LOCKER ROOM	LOCKER ROOM	GYMNASIUM	CLASSROOM	CLASSROOM	CLASSROOM	LOCKER ROOM				
OCCUPANCY GROUP	A2, A3.1, B, E1 (REPECTFULLY)	E1	E1	E1	A2.1	A2.1	A2.1	E1	E1	E1	E1				
NUMBER OF STORIES	2	2	2	2	2	1	1	1	1	1	1				
AUTOMATIC FIRE SPRINKLER	YES	NO	NO	NO	-	-	YES	NO	NO	NO	NO				
CONSTRUCTION TYPE	II-1HR	III-1HR	III-1HR	III-1HR	V	V	II-1HR	V-N	V-N	V-N	V-N				
TOTAL BUILDING AREA	98,290	30,162	29,710	15,992	2,500	8,470	20,800	14,764	4,299	15,989	5,204				



VICINITY MAP



▨ AREA OF WORK

KEY PLAN

NOT TO SCALE

AGENCY APPROVAL

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-119155 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☐
DATE: 06/23/2020

optimum energy design
Consulting Engineers
5200 E. La Palma Ave
Anaheim, CA 92807
Telephone (714) 693-2277

STAMP

ABBY BANERJEE
No. M29253
Exp. 6/30/21
MECHANICAL

PROJECT NAME:

NEWPORT HARBOR
HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
△		
△		
△		
△		

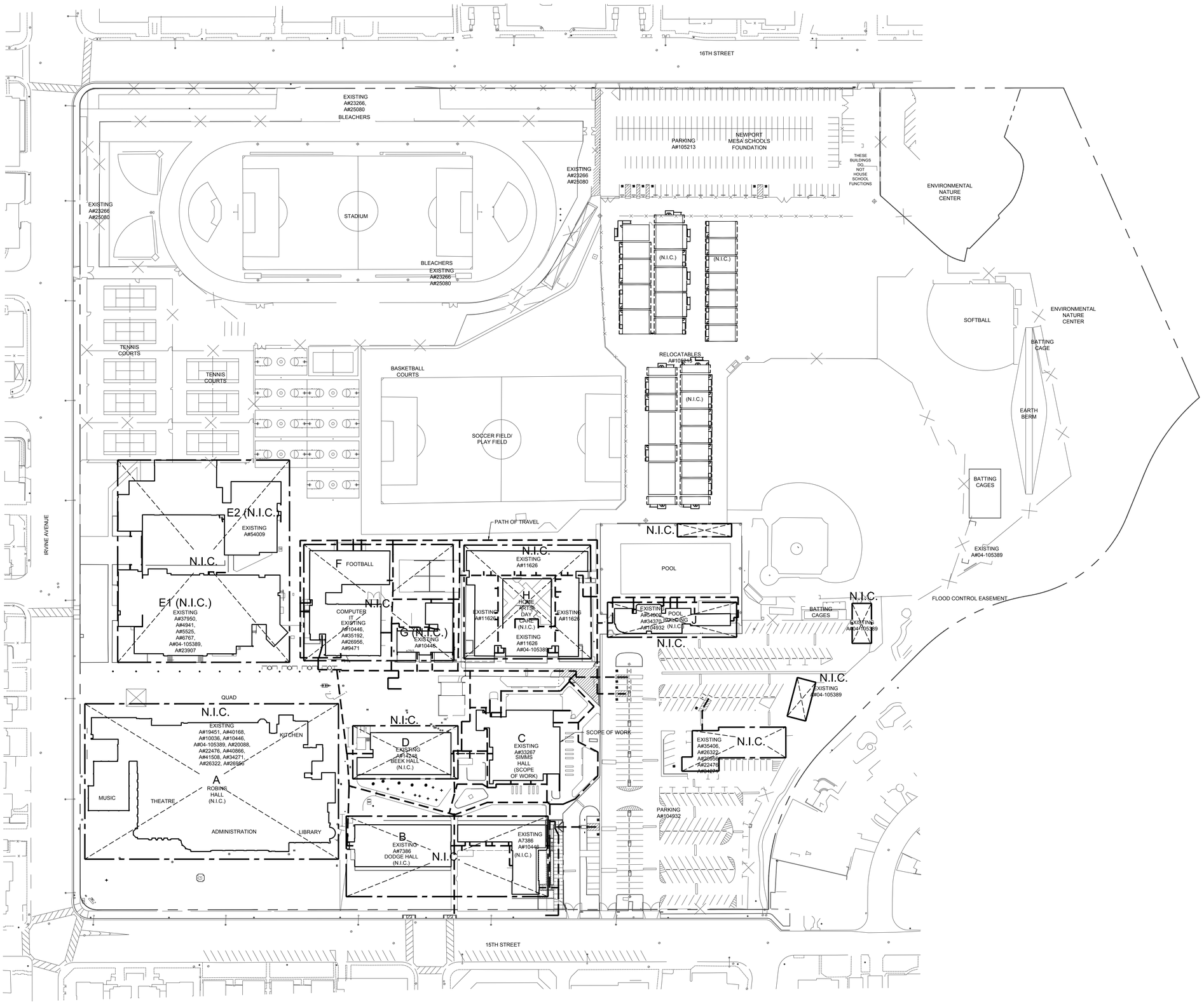
JOB NO: 501-20-0007
DATE: 2020-06-17
DRAWN: -- JG
CHECK: -- HL
ARCHITECT: N/A
ENGINEER: OED
DSA NUMBER: 04-119155

CONSULTANT

STAMP

SHEET DESCRIPTION:
TITLE SHEET

SHEET NO:
T-1



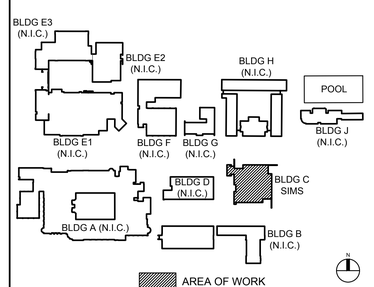
SCOPE OF WORK

1. HVAC:

REMOVE FOUR (4.NO) EXISTING 20TON MULTI-ZONE ROOFTOP AC UNITS AND REPLACE WITH FOUR (4.NO) NEW 20TON MULTI-ZONE ROOFTOP UNITS.

2. PLUMBING:

RECONNECT NEW/REPLACEMENT AC UNITS TO EXISTING GAS LINES W/ GAS COCK AND UNION



SITE PLAN | 1" = 60'-0" | 1 | KEY PLAN | NOT TO SCALE

AGENCY APPROVAL

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-119155 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☐
DATE: 06/23/2020

optimum energy design
Consulting Engineers
5200 E. La Palma Ave
Anaheim, CA 92807
Telephone (714) 693-2277

STAMP

REGISTERED PROFESSIONAL ENGINEER
JEFF BARNES
No. M29253
Exp. 6/30/21
STATE OF CALIFORNIA

PROJECT NAME:

NEWPORT HARBOR
HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
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DRAWN:	JG
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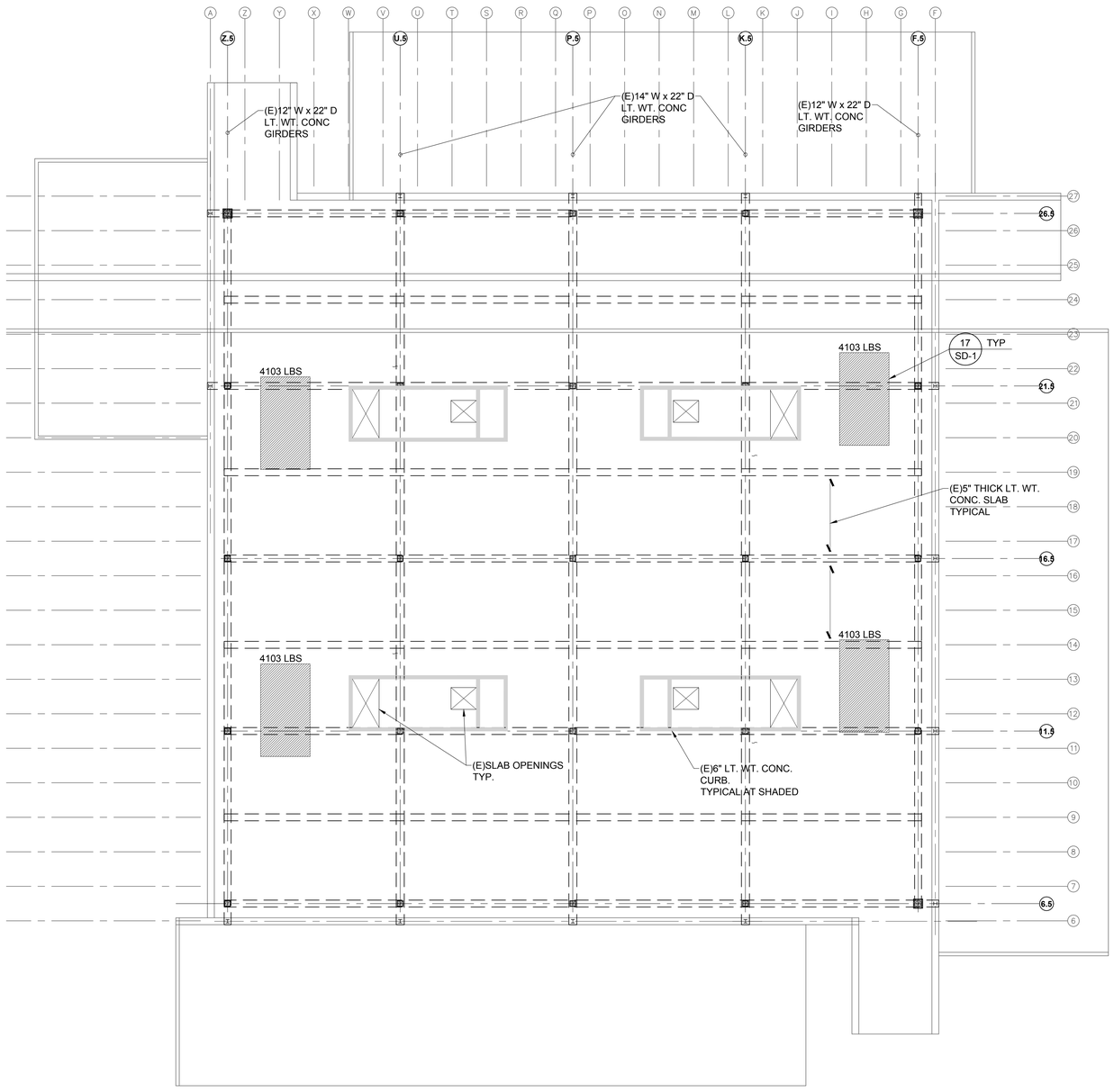
ARCHITECT:	N/A
ENGINEER:	OED
DSA NUMBER:	04-119155

CONSULTANT

STAMP

SHEET DESCRIPTION:
SITE PLAN

SHEET NO:
T-2



NOTES:

1. FOR GENERAL NOTES SEE SHEET SD1

2. DESIGNATES (N)MECHANICAL UNIT. SEE PLAN FOR MAXIMUM WEIGHT REFER TO 17/SD-1 FOR ANCHORAGE

PARTIAL ROOF FRAMING PLAN | 1/8" = 1'-0" | 2

PLOT DATE: 6/16/2020 9:36 AM LAST SAVE BY: MATTE2 H:\2019\19-136\S

AGENCY APPROVAL

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-119155 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☐
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REGISTERED PROFESSIONAL ENGINEER
ROBERT BARNES
No. M29253
Exp. 6/30/21
MECHANICAL
STATE OF CALIFORNIA

PROJECT NAME:

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HIGH SCHOOL SIMS BUILDING

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JOB NO: 501-20-0007
DATE: 2020-06-17
DRAWN: --
CHECK: --
ARCHITECT:
ENGINEER: OED
DSA NUMBER: 04-

CONSULTANT

STB STRUCTURAL ENGINEERS, INC.
21084 Bake Parkway, Suite 100, Lake Forest, CA 92630
(949) 599-0320 Fax: 599-0325 mail@stbse.com

JOB NUMBER: 19-136 PROJECT ENGINEER: MJE

STAMP

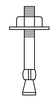
REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. ESLEY
NO. 4748
STRUCTURAL
STATE OF CALIFORNIA
6/16/20

SHEET DESCRIPTION:
PARTIAL
ROOF FRAMING
PLAN

SHEET NO:
S-1

PROOF LOAD TEST FOR EXPANSION TYPE ANCHOR BOLTS:
(BOLT MUST HAVE I.C.C. APPROVAL)
LOAD TEST TO "PULL LOAD" IN TENSION (FOR EA. JOB) PER FOLLOWING FREQUENCY:
NON-STRUCTRURAL APPLICATIONS: TEST 50% OR ALT. BOLTS IN A GROUP. IF ANY ANCHOR FAILS, THEN TEST ALL ANCHORS. PERFORM THE LOAD TEST IN THE PRESENCE OF THE PROJECT INSPECTOR. THE LOAD MAY BE APPLIED BY ANY METHOD THAT WILL EFFECTIVELY MEASURE THE TENSION IN THE ANCHOR, SUCH AS DIRECT PULL WITH A HYDRAULIC JACK, A TORQUE WRENCH CALIBRATED FOR USE WITH THE SPECIFIC ANCHOR, CALIBRATED SPRING-LOADING DEVICES, ETC. ANCHORS IN WHICH THE TORQUE IS USED TO EXPAND THE ANCHOR WITHOUT APPLYING TENSION TO THE BOLT MAY NOT BE VERIFIED WITH A TORQUE WRENCH.

HARDROCK CONCRETE			
ANCHOR DIA. IN:	EXPANSION ANCHOR		
	PULL LOAD LBS.	TORQUE FT. LBS.	EMBED IN.
5/8"	2000	60	3 1/8"



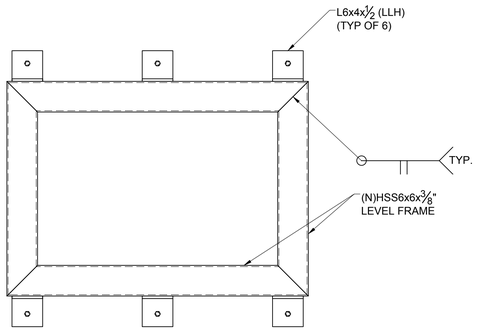
EXPANSION TYPE

TYP. EXPANSION BOLT TESTS

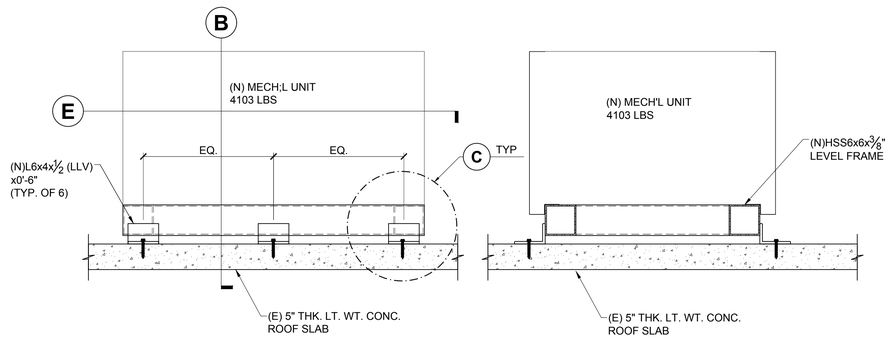
1

2

DSA2-009

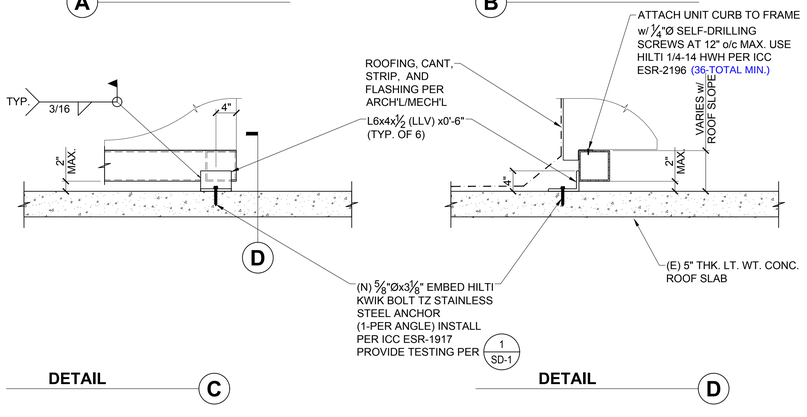


E PLAN VIEW



A TYP. ELEVATION

B SECTION



DETAIL C

DETAIL D

TYPICAL MECHANICAL UNIT ANCHORAGE

17

ABBREVIATIONS

(SEE ARCH'L AND OTHER STANDARDS FOR ADD'L)

ALT.	= ALTERNATE	M.B.	= MACHINE BOLT
B	= BOTTOM	N.T.S	= NOT TO SCALE
B. ℄	= BASE PLATE	N.S.	= NEAR SIDE
BM.	= BEAM BM.	OPP.	= OPPOSITE
C.	= CAMBER	o/c	= ON CENTER
C.J.	= CONSTRUCTION JOINT	OWJ	= OPEN WEB JOIST
℄	= CENTER LINE	℄	= PLATE
CONC.	= CONCRETE	PIL.	= PILASTER
CONT.	= CONTINUOUS	P.J.	= PANEL JOINT
CTSK.	= COUNTER SUNK	PWJ.	= WOOD 'I' JOIST
D.	= DEPTH	PTDF.	= PRESSURE TREATED DOUGLAS FIR
E.F.	= EACH FACE	P/T	= POST-TENSIONED (CONCRETE)
E.W.	= EACH WAY	SDS	= SIMPSON SELF DRILLING SCREW FOR WOOD
EXP.	= EXPOSURE	SIM.	= SIMILAR
E.J.	= EXPANSION JOINT	S.M.S.	= SHEET METAL SCREW (SAME AS SDS)
F.O.C.	= FACE OF CONCRETE	S.P.C.	= STANDARD PIPE COLUMN
F.O.M.	= FACE OF MASONRY	STL.	= STEEL
F.O.S.	= FACE OF STUD	T.O.F.	= TOP OF FOOTING
F.S.	= FAR SIDE	T.O.S.	= TOP OF STEEL
GLB	= GLUE-LAMINATED BEAM	T.O.W.	= TOP OF WALL
GRD. BM.	= GRADE BEAM	TS.	= TUBE STEEL
HDR.	= HEADER	TYP.	= TYPICAL
HGR.	= HANGER	U.N.O	= UNLESS NOTED OTHERWISE
H.R.	= HARDROCK(CONCRETE)	V.I.F.	= VERIFY IN FIELD
HSS	= HOLLOW STRUCTURAL SECTION	W.S.	= WOOD SCREW
K.	= KIPS	(E)	= EXISTIN (CONSTRUCTION)
K.P.	= KING POST	(N)	= NEW (CONSTRUCTION)
LLV.	= LONG LEG VERTICAL		
LLH.	= LONG LEG HORIZONTAL		
LT. WT.	= LIGHT WEIGHT (CONCRETE)		

GENERAL NOTES:

1. THE GENERAL CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SITE CONDITIONS BEFORE STARTING WORK. THE ENGINEER SHALL BE NOTIFIED OF ANY DISCREPANCY.
2. NOTES & DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER THESE GENERAL NOTES.
3. ALL MATERIAL & WORKMANSHIP SHALL CONFORM TO THE 2019 CALIFORNIA BUILDING CODE AND C.C.R. TITLE 24.
4. THE DESIGN, ADEQUACY & SAFETY OF ERECTION BRACING, SHORING, TEMPORARY SUPPORT FORMS ETC., IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR, AND HAS NOT BEEN CONSIDERED BY THE STRUCTURAL ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION TO INSURE THE STABILITY OF THE STRUCTURE PRIOR TO THE APPLICATION OF ALL WALLS, ROOF & FLOOR SHEATHING AND FINISH MATERIALS. HE SHALL PROVIDE THE NECESSARY BRACING TO PROVIDE STABILITY PRIOR TO THE APPLICATION OF THE AFOREMENTIONED MATERIALS. THE CONTRACTOR IS RESPONSIBLE FOR COMPLIANCE WITH OSHA REQUIREMENTS INCLUDING, BUT NOT LIMITED TO, THE ADDITION OF ANCHOR BOLTS AND/OR TEMPORARY BRACING TO INSURE COLUMN STABILITY DURING CONSTRUCTION. OBSERVATION VISITS TO THE SITE BY THE STRUCTURAL ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.
5. THE CONTRACTOR SHALL HAVE SOLE RESPONSIBILITY FOR SITE SAFETY. ANY FABRICATOR AND ERECTOR SHALL REVIEW THE CONTRACT DOCUMENTS AND IF THE STRUCTURE, AS SHOWN ON THOSE DOCUMENTS, IS IN CONFLICT WITH THE REQUIREMENTS OF ANY SAFETY REGULATION, THE FABRICATOR SHALL NOTIFY THE STRUCTURAL ENGINEER (STB) PRIOR TO COMMENCING SHOP DRAWING PRODUCTION. IF THE FABRICATOR AND/OR ERECTOR FAIL TO NOTIFY STB, AS STATED ABOVE, THEY SHALL BECOME RESPONSIBLE FOR ALL COSTS FOR CORRECTING SUCH CONFLICTS WITH THE REQUIREMENTS OF ANY AND ALL SAFETY REGULATIONS.
6. ALL WORKS TO HAVE CONTINUOUS INSPECTION BY PROJECT INSPECTOR PER SEC 1701A, 2019 CBC.
7. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES WHETHER SHOWN HEREON OR NOT AND TO PROTECT THEM FROM DAMAGE. THE CONTRACTOR SHALL BEAR ALL EXPENSE OF REPAIR OR REPLACEMENT IN CONJUNCTION WITH THE EXECUTION OF THIS WORK.
8. DESIGN CRITERIA: (2019 CALIFORNIA BUILDING CODE)
   1. DEAD AND LIVE LOADS
      SEE FRAMING PLANS
   2. SNOW LOADS
      GROUND SNOW LOAD, Pg=0
   3. RISK CATEGORY: = III
   4. WIND LOADS:
      ULTIMATE DESIGN WIND SPEED, V_{ult} = 105 MPH (ULT., 3-SEC. GUST SPEED)
      NOMINAL DESIGN WIND SPEED, V_{asd} = 81 MPH
      WIND EXPOSURE = C
   5. SEISMIC DESIGN CRITERIA:
      SEISMIC IMPORTANCE FACTOR, I_p = 1.0
      SEISMIC DESIGN CATEGORY: D
      SITE CLASS: D - DEFAULT
      ANALYSIS PROCEDURE: ASCE 7-16 CHAPTER 13
      a_p= 2.5 R_p = 6.0
      S_S= 1.376 F_a = 1.2 S_{DS} = 1.101
      S_1= 0.490 F_v = 1.810 S_{D1} = 0.591

EXISTING CONDITIONS

1. INFORMATION FOR EXISTING BUILDINGS HAS BEEN BASED UPON DRAWINGS PREPARED BY:
   ARCHITECTS: PORTER JENSEN - ARCHITECTS & PLANNERS
   AND
   SCHERRER - BAUMANN AND ASSOCIATES
   STRUCTURAL ENGINEERS.
   DATED: 09-01-1970

   CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS.WHERE EXISTING CONDITIONS ARE FOUND TO BE DIFFERENT FROM CONDITIONS SHOWN ON THESE DRAWINGS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER SO THAT A CONSTRUCTION CHANGE DOCUMENT (CCD) CAN BE ISSUED.
2. DO NOT ALTER OR REMOVE ANY EXISTING SHEAR WALL OR BEARING WALLS UNLESS SO IDENTIFIED ON THE DRAWINGS, APPROPRIATE DETAILS ARE PROVIDED, AND APPROVED BY THE STRUCTURAL ENGINEER AND DSA.
3. ADDITIONS TO THE EXISTING STRUCTURE ARE NOT INTENDED TO BRING THE EXISTING BUILDING UP TO NEW CODE OR INCREASE THE SEISMIC OR WIND RESISTANCE OF THE EXISTING BUILDING. STB STRUCTURAL ENGINEERS, INC. HAS NOT REVIEWED NOR ANALYZED THE EXISTING BUILDING STRUCTURE'S LATERAL FORCE RESISTING SYSTEM SINCE IT IS BEYOND THE SCOPE OF WORK FOR THIS CONTRACT.

AGENCY APPROVAL

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-119155 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☐
DATE: 06/23/2020

optimum energy design
Consulting Engineers
5200 E. La Palma Ave
Anaheim, CA 92807
Telephone (714) 693-2277

STAMP

REGISTERED PROFESSIONAL ENGINEER
ROBERT BARNES
No. M29253
Exp. 6/30/21
MECHANICAL
STATE OF CALIFORNIA

PROJECT NAME:

NEWPORT HARBOR
HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
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JOB NO:	501-20-0007
DATE:	2020-06-17
DRAWN:	--
CHECK:	--
ARCHITECT:	
ENGINEER:	OED
DSA NUMBER:	04-

CONSULTANT

STB STRUCTURAL ENGINEERS, INC
21084 Bake Parkway, Suite 100, Lake Forest, CA 92630
(949) 599-0320 Fax: 599-0325 mail@stbse.com

JOB NUMBER: 19-136 PROJECT ENGINEER: MJE

STAMP

REGISTERED PROFESSIONAL ENGINEER
MATTHEW J. EXLEY
NO. 4748
STRUCTURAL
STATE OF CALIFORNIA
6/16/20

SHEET DESCRIPTION:

GENERAL NOTES & TYPICAL DETAILS

SHEET NO:

SD-1

GENERAL NOTES

----- GENERAL NOTES -----

1. ENTIRE INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF THE 2019 CALIFORNIA MECHANICAL CODE, 2019 CALIFORNIA BUILDING CODE, AND ALL OTHER APPLICABLE CODES AND REGULATIONS, INCLUDING 2019 BUILDING ENERGY EFFICIENCY STANDARDS DIVISION T-24.
2. 2019 CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE INCLUDING THE APPLICABLE MANDATORY MEASURES:
   - 5.201.1 CALIFORNIA ENERGY CODE. FOR THE PURPOSES OF MANDATORY ENERGY EFFICIENCY STANDARDS IN THIS CODE, THE CALIFORNIA ENERGY COMMISSION WILL CONTINUE TO ADOPT MANDATORY STANDARDS.
   - 5.504.3: COVERING OF DUCT OPENINGS AND PROTECTION OF MECHANICAL EQUIPMENT DURING CONSTRUCTION. AT THE TIME OF ROUGH INSTALLATION AND DURING STORAGE ON THE CONSTRUCTION SITE UNTIL FINAL STARTUP OF THE HEATING, COOLING AND VENTILATING EQUIPMENT, ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS SHALL BE COVERED WITH TAPE, PLASTIC, SHEET METAL OR OTHER METHODS ACCEPTABLE TO THE ENFORCING AGENCY TO REDUCE THE AMOUNT OF DUST, WATER AND DEBRIS WHICH MAY ENTER THE SYSTEM.
   - 5.504.5.3.1 FILTERS. IN MECHANICALLY VENTILATED BUILDINGS, PROVIDE REGULARLY OCCUPIED AREAS OF THE BUILDING WITH AIR FILTRATION MEDIA FOR OUTSIDE AND RETURN AIR PRIOR TO OCCUPANCY THAT PROVIDES AT LEAST A MINIMUM EFFICIENCY REPORTING VALUE (MERV) OF 8. MERV 8 FILTERS SHALL BE INSTALLED PRIOR TO OCCUPANCY AND RECOMMENDATIONS FOR MAINTENANCE WITH FILTERS OF THE SAME VALUE SHALL BE INCLUDED IN THE OPERATION AND MAINTENANCE MANUAL. EXCEPTIONS:
     - -a. AN ASHRAE 10-PERCENT TO 30-PERCENT EFFICIENCY FILTER SHALL BE PERMITTED FOR AN HVAC UNIT MEETING THE 2019 CALIFORNIA ENERGY CODE HAVING 60,000 BTU/H OR LESS CAPACITY PER FAN COIL, IF THE ENERGY USE OF THE AIR DELIVERY SYSTEM IS 0.4 W/CFM OR LESS AT THE DESIGN AIR FLOW.
     - -b. EXISTING MECHANICAL EQUIPMENT.
   - 5.506.1 OUTSIDE AIR DELIVERY. FOR MECHANICALLY OR NATURALLY VENTILATED SPACES IN BUILDINGS, MEET THE MINIMUM REQUIREMENTS OF SECTION 121 (REQUIREMENTS FOR VENTILATION) OF THE 2019 CALIFORNIA ENERGY CODE, OR THE APPLICABLE LOCAL CODE, WHICHEVER IS MORE STRINGENT, AND DIVISION 1, CHAPTER 4 OF CCR, TITLE 8.
   - 5.508.1 OZONE DEPLETION AND GREENHOUSE GAS REDUCTIONS. INSTALL HVAC AND REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT SHALL COMPLY WITH 5.508.1.1 AND 5.508.1.2.
   - 5.508.1.1 CHLOROFLUOROCARBONS (CFCS). INSTALL HVAC, REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT THAT DO NOT CONTAIN CFCS.
   - 5.508.1.2 HALONS. INSTALL HVAC, REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT THAT DO NOT CONTAIN HALONS.
   - ADHESIVES, SEALANTS AND CAULKS SHALL MEET CALGREEN REQUIREMENTS.
   - INSTALLER AND SPECIAL INSPECTORS SHALL MEET ALL QUALIFICATIONS LISTED IN SECTION 702 OF THE 2019 CALIFORNIA GREEN BUILDING STANDARDS CODE.
3. COORDINATE ENTIRE INSTALLATION OF THE HVAC SYSTEM WITH THE WORK OF ALL OTHER TRADES PRIOR TO ANY FABRICATION OR INSTALLATION. PROVIDE ALL FITTINGS, OFFSETS, AND TRANSITIONS AS REQUIRED FOR A COMPLETE WORKABLE INSTALLATION. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ITEMS TO BE PROVIDED BY OTHER TRADES WHERE MENTIONED IN THE CONTRACT DOCUMENTS PRIOR TO BID - NO EXCEPTIONS.
4. COORDINATE THE LOCATIONS OF ALL CEILING DIFFUSERS, REGISTERS, AND GRILLES WITH THE ARCHITECTURAL REFLECTIVE CEILING PLAN, ELECTRICAL LIGHTING LAYOUT AND ARCHITECTURAL ROOM ELEVATIONS. THE ARCHITECT AND ENGINEER SHALL BE IMMEDIATELY NOTIFIED OF ANY CONFLICTS PRIOR TO FABRICATION AND INSTALLATION.
5. CONTRACTOR SHALL NOTIFY OWNER AND ENGINEER OF CONSTRUCTION PHASING PRIOR TO START OF CONSTRUCTION, REMOVAL, AND/OR REPLACEMENT OF ANY EQUIPMENT. CONTRACTOR SHALL RECEIVE PERMISSION IN WRITING PRIOR TO THE START OF ANY WORK DURING ANY PHASE FOR WORK SHOWN HEREIN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CONDUCT WORK AND ARRANGE HIS WORK IN A MANNER THAT WILL CAUSE MINIMAL INTERFERENCE WITH DAILY FUNCTIONS WITHIN THE FACILITY. ANY EXPECTED DOWNTIME SHALL BE COORDINATED WITH THE OWNER.
6. ALL EQUIPMENT, DUCTS, PIPING, AND OTHER DEVICES AND MATERIALS INSTALLED OUTSIDE OF THE BUILDING OR OTHERWISE EXPOSED TO THE WEATHER SHALL BE COMPLETELY WEATHER-PROOFED AND PAINTED TO MATCH, COORDINATE WITH ARCHITECT PRIOR TO PAINTING.
7. THE OWNER ACKNOWLEDGES THAT THE DESIGN PROFESSIONAL'S PLANS ARE INSTRUMENTS OF PROFESSIONAL SERVICE. NEVERTHELESS, THE PLANS PREPARED UNDER THIS AGREEMENT SHALL BECOME THE PROPERTY OF THE OWNER UPON COMPLETION OF THE WORK. THE OWNER AGREES TO HOLD HARMLESS AND INDEMNIFY THE DESIGN PROFESSIONAL AGAINST ALL DAMAGES, CLAIMS AND LOSSES, INCLUDING DEFENSE COSTS, ARISING OUT OF ANY RESCUE OF THE PLANS WITHOUT THE WRITTEN AUTHORIZATION OF THE DESIGN PROFESSIONAL.
8. ALL DIMENSIONS SHOWN ON THESE PLANS ARE APPROXIMATE AND MUST BE CONFIRMED ON SITE.
9. PRIOR TO OCCUPANCY, THE ENTIRE H.V.A.C. SYSTEMS SHALL BE BALANCED IN ACCORDANCE WITH (AABC) ASSOCIATED AIR BALANCE COUNCIL STANDARDS BY AN INDEPENDENT AIR BALANCE CONTRACTOR. CERTIFICATION SHALL BE PROVIDED BY THE CONTRACTOR FOR AIR AND HYDRONIC AS APPLICABLE. SYSTEMS SHALL BE BALANCED AS INDICATED ON PLANS INCLUDING FRESH AIR VENTILATION. WHERE THERE IS A CONFLICT WITH THE MECHANICAL PLANS, THE AIR BALANCE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO BALANCING OF SYSTEM. IF NOT THE AIR BALANCE CONTRACTOR SHALL BEAR ALL COSTS INCURRED FOR WORK THAT MUST BE RE-BALANCED DUE TO CONFLICTS ON CONTRACT DOCUMENTS. CONTRACTOR SHALL PROVIDE THREE COPIES OF THE AIR BALANCE REPORT TO THE ENGINEER FOR APPROVAL.
10. FOR INACCESSIBLE AREAS THE CONTRACTOR SHALL PROVIDE ACCESS PANELS FOR ALL DAMPERS, EQUIPMENT, SMOKE DETECTORS, AND CONTROL DEVICES. THESE PANELS SHALL MATCH THE RATING OF THE WALL AND/OR CEILING THAT THEY ARE LOCATED IN. MINIMUM ACCESS PANEL SIZES SHALL BE AS FOLLOWS:

    1) HAND ACCESS: 12"x12"

    2) BODY ACCESS: 30"x30" MIN. WHERE A LARGER ACCESS SIZE IS REQUIRED DUE TO INSTALLATION CONSTRAINTS, THE CONTRACTOR SHALL DO SO AT NO ADDITIONAL COST AND SHALL NOTIFY THE ARCHITECT AND ENGINEER OF DEVIATIONS PRIOR TO INSTALLATION.
11. COORDINATE THE LOCATION OF ALL ROOF OPENINGS AND THE LOCATION OF ALL ROOF MOUNTED EQUIPMENT WITH THE STRUCTURAL AND ARCHITECTURAL PLANS PRIOR TO ANY INSTALLATION.
12. PLATFORMS, CURBS, AND FLASHINGS FOR MECHANICAL EQUIPMENT SHALL BE AS INDICATED ON THE STRUCTURAL AND ARCHITECTURAL PLANS, UNLESS NOTED OTHERWISE. WHERE THERE IS A CONFLICT WITH THE MECHANICAL PLANS, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT AND ENGINEER PRIOR TO FABRICATION AND INSTALLATION.
13. ALL EQUIPMENT, ACCESSORIES, AND RELATED PIPING SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL FITTINGS, TRANSITIONS, DAMPERS, VALVES, AND OTHER DEVICES REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.
14. MAINTENANCE LABEL SHALL BE AFFIXED TO ALL MECHANICAL EQUIPMENT AND A MAINTENANCE MANUAL SHALL BE PROVIDED FOR THE OWNER'S USE.
15. PROVIDE MERV 13 EFFICIENCY THROWAWAY FILTERS FOR ALL AIR CONDITIONING UNITS. SEE EQUIPMENT SCHEDULE AND SPECIFICATIONS FOR TYPE. SIZES SHALL BE AS RECOMMENDED BY THE MANUFACTURER, UNLESS OTHERWISE SPECIFIED.
16. AIR FILTERS SHALL BE STATE FIRE MARSHALL APPROVED AND LISTED. PREFORMED FILTERS HAVING COMBUSTIBLE FRAMING SHALL BE TESTED AS A COMPLETE ASSEMBLY. AIR FILTERS SHALL BE ACCESSIBLE FOR CLEANING OR REPLACEMENT.
17. ALL EQUIPMENT WITH MOVING PARTS SHALL BE PROVIDED WITH FLEXIBLE DUCT AND PIPE CONNECTIONS.
18. ALL EQUIPMENT SHALL BE LABELED AS TO THE SPACE IT SERVES.
19. ALL HVAC EQUIPMENT SHALL BE CERTIFIED BY THE CALIFORNIA ENERGY COMMISSION TO COMPLY WITH LATEST EFFICIENCY STANDARDS.
20. PROVIDE MANUAL VOLUME DAMPERS AND BACKDRAFT DAMPERS FOR FRESH AIR INTAKES ON ALL AIR HANDLING EQUIPMENT AND EXHAUST FANS SERVING CONDITIONED SPACES. EXCEPTION: EQUIPMENT WITH FACTORY ECONOMIZERS. DAMPERS SITUATED ON THE ROOF SHALL BE SECURED AFTER BALANCING, TO AVOID THE POSSIBILITY OF ADJUSTMENT.
21. ALL AIR HANDLING EQUIPMENT SERVING CONDITIONED SPACES SHALL PROVIDE CONTINUOUS FRESH AIR TO SPACES IN OCCUPIED MODE.
22. CONTRACTOR SHALL VERIFY ALL CLEARANCES AND AVAILABLE SPACE FOR DUCTWORK PRIOR TO ORDERING AND/OR FABRICATING MATERIAL.
23. CONTRACTOR TO SUBMIT ALL EQUIPMENT, DUCTWORK, AIR DISTRIBUTION DEVICES, AND OTHER ACCESSORIES TO THE ENGINEER FOR APPROVAL PRIOR TO ANY ORDERING OF SUCH ITEMS.
24. CONTRACTOR SHALL BE RESPONSIBLE FOR COMMISSIONING OF EQUIPMENT.
25. PAINT EXPOSED SURFACES, WHETHER OR NOT COLORS ARE DESIGNATED IN SCHEDULES, EXCEPT WHERE A SURFACE OR MATERIAL IS SPECIFICALLY INDICATED NOT TO BE PAINTED OR IS TO REMAIN NATURAL. WHERE AN ITEM OR SURFACE IS NOT SPECIFICALLY MENTIONED, PAINT THE SAME AS SIMILAR ADJACENT MATERIALS OR SURFACES. IF COLOR OR FINISH IS NOT DESIGNATED, THE OWNER'S REPRESENTATIVE WILL SELECT FROM STANDARD COLORS OR FINISHES AVAILABLE.

    1) PAINTING INCLUDES FIELD PAINTING EXPOSED BARE AND COVERED PIPES AND DUCTS (INCLUDING COLOR CODING), HANGERS, EXPOSED STEEL AND IRON WORK, AND PRIMED METAL SURFACES OF MECHANICAL AND ELECTRICAL EQUIPMENT.
26. ALL MECHANICAL PIPING SYSTEMS, DUCTS, CONTROLS, VALVES, APPARATUS, ETC., EXCEPT THOSE THAT ARE INSTALLED IN INACCESSIBLE LOCATIONS IN PARTITIONS, WALLS, AND FLOORS, AND THOSE BURIED UNDERGROUND, SHALL BE PERMANENTLY MARKED AND IDENTIFIED AS INDICATED IN THE RELATED SPECIFICATIONS.
27. UNLESS SPECIFICALLY SHOWN ON THESE PLANS NO STRUCTURAL MEMBER SHALL BE CUT, DRILLED NOR NOTCHED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE STRUCTURAL ENGINEER AND THE DISTRICT STRUCTURAL ENGINEER FROM THE DIVISION OF THE STATE ARCHITECT.
28. CONTRACTOR TO BALANCE THE AIRFLOW FOR THE HVAC UNITS AND ALSO CHECK PROPER OPERATION OF THE ECONOMIZER/ POWER EXHAUST TO MAINTAIN 0.02 INCHES MAXIMUM DIFFERENTIAL PRESSURE AT EACH DOOR TO MEET THE ADA REQUIREMENTS FOR DOOR OPENING/CLOSURE OF NO MORE THAN 5 POUNDS. CONTRACTOR TO MAKE NECESSARY ADJUSTMENTS TO MEET THESE REQUIREMENTS

----- CONTROLS -----

1. CONTROL SCHEMATICS ARE FOR SEQUENCE ONLY. REFER TO ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR ALL ELECTRICAL DEVICES REQUIRED.
2. ALL LINE VOLTAGE WIRING SHALL BE INSTALLED IN CONDUIT. ALL LINE VOLTAGE CONDUIT AND WIRING, INCLUDING FINAL CONNECTIONS, SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR AS INDICATED ON THE ELECTRICAL DRAWINGS OR SPECIFIED IN THE ELECTRICAL SECTION OF THE SPECIFICATIONS. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS OF ALL GOVERNING BODIES HAVING JURISDICTION THEREOF.
3. ALL LOW VOLTAGE CONDUIT AND WIRING AS APPLICABLE, INCLUDING FINAL CONNECTIONS, SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR AS INDICATED ON THE MECHANICAL DRAWINGS.

   A) ALL LOW VOLTAGE WIRING SHALL BE INSTALLED IN CONDUIT.

   B) WHERE THE CONTROLS CONTRACTOR IS RETAINED BY THE OWNER, THEY SHALL BE RESPONSIBLE FOR THE FOLLOWING:

   1) FURNISH AND INSTALL ALL DEVICES, WIRING, AND TERMINATIONS REQUIRED FOR A COMPLETE AND FUNCTIONAL INSTALLATION.

   2) COORDINATE ALL WORK AND REQUIREMENTS WITH OTHER TRADES INCLUDING GENERAL, MECHANICAL, AND ELECTRICAL CONTRACTORS PRIOR TO BID.

   3) CONTRACTOR SHALL FOLLOW ALL SUBMITTAL REQUIREMENTS PER DRAWINGS.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR ORDERING AIR CONDITIONING EQUIPMENT WITH THRU-THE-BASE POWER, CONTROL, AND GAS CONNECTIONS. VERIFY ALL CONNECTION LOCATIONS WITH UNIT MANUFACTURER AND COORDINATE WITH OTHER TRADES AS NECESSARY.
5. ELECTRICAL CONTRACTOR SHALL PROVIDE REQUIRED RELAY ACCESSORIES FOR CONNECTION OF 120 VOLT 1 PHASE VENTILATION EQUIPMENT TO 277 VOLT 1 PHASE LIGHTING AS APPLICABLE.
6. ALL THERMOSTATS SHALL HAVE LOCKABLE COVERS (WHERE INDICATED ON PLANS) AND SHALL BE OF THE ELECTRONIC, PROGRAMMABLE, AUTOMATIC CHANGEOVER TYPE TO SEQUENCE HEATING OR COOLING. SET POINT RANGE SHALL BE 10 DEGREES F. BETWEEN FULL HEATING AND COOLING. THEY SHALL HAVE CAPABILITY OF TERMINATING ALL HEATING AT A TEMPERATURE NO MORE THAN 70 DEGREES F., AND COOLING AT A TEMPERATURE NOT LESS THAN 78 DEGREES F. ADJUSTABLE TEMPERATURE DIFFERENTIAL SHALL BE 1- 1/2 DEGREES F. CONTROL LIMITS SHALL BE FROM 55 DEGREES F. TO 85 DEGREES F. MOUNT AT 48 INCHES ABOVE FLOOR OR AS REQUIRED BY LOCAL AUTHORITIES OR HANDICAP CODES.

   NOTES: 1) THERMOSTATS THAT ARE PART OF AN ENERGY MANAGEMENT SYSTEM SHALL FOLLOW CONTROL SPECIFICATIONS AND DRAWING REQUIREMENTS.

   2) SHOULD THE LOCATION OF THE THERMOSTAT NOT MEET THE ADA HEIGHT REQUIREMENTS DUE TO OBSTRUCTIONS, THEN AN ALTERNATE LOCATION SHALL BE PROPOSED OR REQUESTED BY THE CONTRACTOR THAT SHALL BE APPROVED BY THE ENGINEER AND ARCHITECT.
7. LINE VOLTAGE THERMOSTATS SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
8. CONTROLS CONTRACTOR AND AIR BALANCE CONTRACTOR SHALL COORDINATE WORK AND PERFORM NECESSARY TASKS AS REQUIRED TO OBTAIN AIR AND WATER FLOW QUANTITIES FOR SYSTEMS SHOWN HEREIN.
9. CONTROLS SHALL BE PROVIDED TO PROVIDE THE MINIMUM RATE OF OUTDOOR AIR REQUIRED BY THE STATE ENERGY REGULATIONS.

----- AIR DISTRIBUTION -----

1. ALL DUCTWORK SHALL BE SHEET METAL CONSTRUCTED OR SPIRAL, ERECTED, AND TESTED IN ACCORDANCE WITH THE MOST RESTRICTIVE OF LOCAL REGULATIONS, PROCEDURES DETAILED IN THE ASHRAE HANDBOOK OF FUNDAMENTALS, CHAPTER 6 OF THE MECHANICAL CODE, OR THE APPLICABLE STANDARDS ADOPTED BY THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION.
2. CONTRACTOR SHALL PROVIDE EXTERIOR MANUAL VOLUME DAMPER HANDLES W/ LOCK-DOWN AFTER COMPLETING AIR BALANCE & OBTAIN FINAL APPROVAL FROM ENGINEER.
3. ALL FLEXIBLE DUCTWORK SHALL NOT EXCEED FIVE FEET IN LENGTH TO RESPECTIVE DIFFUSERS, GRILLES, AND REGISTERS, OR OTHER AIR DEVICES.
4. PROVIDE SEISMIC RESTRAINTS TO ALL DUCTWORK, PIPE, AND EQUIPMENT SUPPORTS IN ACCORDANCE WITH THE LATEST SMACNA GUIDELINES FOR SEISMIC RESTRAINT OF MECHANICAL SYSTEMS. SUSPENDED EQUIPMENT SHALL BE PROVIDED WITH SEISMIC ANCHORAGE AND ISOLATION SUPPORTS.
5. ALL DUCT TURNS IN SUPPLY, RETURN, AND EXHAUST DUCTS SHALL HAVE SINGLE WALL TURNING VANES WITH TRAILING EDGE, UNLESS OTHERWISE NOTED.
6. DUCTWORK HANDLING CONDITIONED AIR SHALL BE INSULATED OR LINED AS INDICATED ON DRAWINGS. SUPPLY AND RETURN DUCT INSULATION SHALL BE MIN. 2" THICK, 1.5 LB./CUBIC FT. DENSITY AND HAVE A MIN. VALUE OF R-8 WHERE LOCATED IN ONE OR MORE OF THE FOLLOWING SPACES:

   A) OUTDOORS, OR

   B) IN A SPACE BETWEEN THE ROOF AND AN INSULATED CEILING, OR

   C) IN A SPACE DIRECTLY UNDER A ROOF WITH FIXED VENTS OR OPENINGS TO THE OUTSIDE OR UNCONDITIONED SPACES, OR

   D) IN AN UNCONDITIONED CRAWLSPACE; OR

   E) IN OTHER UNCONDITIONED SPACES

   PER 2019 CEC, OTHERWISE PROVIDE R-4.2 WHEN LOCATED IN CONDITIONED ATTIC SPACES ABOVE CEILINGS . ALL DUCTWORK EXPOSED ON ROOF SHALL BE INTERNALLY LINED WITH 2" THICK, 1.5LB./CUBIC FT. DENSITY DUCT LINER UNLESS OTHERWISE INDICATED OR SPECIFIED. ALL DUCT SIZES ARE NET CLEAR INSIDE DIMENSIONS. ALL DUCT JOINTS SHALL BE SEALED PER CHAPTER 6 MECHANICAL CODE REQUIREMENTS. PROVIDE PIPING AND DUCT INSULATION IN ACCORDANCE WITH THE LATEST STANDARDS OF THE CALIFORNIA ENERGY COMMISSION.
7. ALL INSULATION SHALL HAVE A FLAME SPREAD OF NOT MORE THAN 25 AND A SMOKE DENSITY NOT EXCEEDING 50.
8. MANUAL VOLUME DAMPERS SHALL BE PROVIDED IN ALL DUCT BRANCHES TO INDIVIDUAL DIFFUSERS, GRILLES, AND REGISTERS, AS WELL AS FRESH AIR INTAKE DUCTS. DAMPERS SHALL BE LOCATED AT THE BRANCH DUCT LOCATIONS. THE MECHANICAL CONTRACTOR SHALL COORDINATE LOCATIONS OF DAMPERS WITH THE AIR BALANCE CONTRACTOR PRIOR TO BID, SO THEY ARE ACCESSIBLE PRIOR TO INSTALLATION. IN LOCATIONS WHERE THESE DAMPERS ARE INACCESSIBLE, CABLE OPERATED ADJUSTMENT CONTROLS SHALL BE PROVIDED AT NO ADDITIONAL COST. OPPOSED BLADE DAMPERS SHALL NOT BE PERMITTED UNLESS NOTED OTHERWISE.
9. AUTOMATIC SMOKE FIRE DAMPER REQUIREMENTS ARE AS FOLLOWS:

   A) PROVIDE AUTOMATIC SMOKE FIRE DAMPERS AT ALL PENETRATIONS OF FIRE-RATED CEILINGS AND WALLS THROUGHOUT. CONTRACTOR SHALL COORDINATE FIRE-RATED AREAS WITH THE MECHANICAL DRAWINGS AND OTHER TRADES PRIOR TO INSTALL AND SHALL NOTIFY PERTINENT PARTIES PRIOR TO ANY WORK PERFORMED IN THESE AREAS. IN ADDITION, CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE PROPER ACCESS FOR DAMPERS INSTALLED. THE DAMPER FIRE RATING SHALL BE COMPATIBLE WITH THE CEILING/WALL RATING.

   B) LOCATION OF FIRE-RATED CEILINGS AND WALLS ARE AS INDICATED ON THE MECHANICAL DRAWINGS.

   C) FIRE AND/OR SMOKE DAMPER(S) SHALL BE PROVIDED AS REQUIRED BY THE LATEST CALIFORNIA BUILDING CODE.

   D) CONTRACTOR SHALL FURNISH FLUSH MOUNTED FIRE AND/OR SMOKE DAMPERS, SO THAT DAMPER DO NOT EXTEND PASS WALLS, FOR AREAS WITHOUT CEILINGS FOR QUALITY WORKMANSHIP.
10. CONTRACTOR SHALL PERFORM MAINTENANCE ON ALL EXISTING FIRE AND SMOKE/FIRE DAMPERS PER MANUFACTURER'S PROVISIONS. ANY FAILURES OR NON-OPERATING DAMPERS SHALL BE REPLACED AND SHALL CONFORM TO CURRENT CODE REGULATIONS.
11. ALL DUCTWORK PASSING THROUGH FIRE RATED CORRIDORS AND LOBBIES SHALL BE MIN. 26 GAGE SHEET METAL CONSTRUCTION.
12. ALL DUCTWORK, PIPING, CONDUIT, & ETC. PENETRATING FIRE RATED CONSTRUCTION SHALL HAVE APPROVED FIRE STOPPING.
13. UNLESS OTHERWISE NOTED THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING AND INSTALLING EXTERIOR LOUVERS CALLED OUT HEREIN. COORDINATE SIZE(S) AND LOCATION(S) WITH OTHER TRADES AS NECESSARY PRIOR TO BID.
14. UNLESS SPECIFICALLY SHOWN ON THESE PLANS NO STRUCTURAL MEMBERS SHALL BE CUT, DRILLED, NOR NOTCHED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE STRUCTURAL ENGINEER AND THE DISTRICT STRUCTURAL ENGINEER FROM THE DIVISION OF THE STATE ARCHITECT.

LEGEND

SYMBOL	ABBR.	DESCRIPTION
⊠	-	SUPPLY AIR RISER
◪	-	RETURN AIR RISER
⊠	-	EXHAUST AIR RISER
⊠	SAG	SUPPLY AIR GRILLE
⊘	RAG	RETURN AIR GRILLE
⊠	EAG	EXHAUST AIR GRILLE
☐	SWR	SIDEWALL REGISTER
▱	(L)	LINED DUCTWORK
⌇	-	FLEXIBLE CONNECTION
☰	FC	FLEXIBLE CONNECTION
⊢—⊣	-	NEW DUCT (SEE PLAN)
⊢—⊣	-	EXISTING DUCT (SEE PLAN)
⫽⫽⫽	-	DEMO DUCT (SEE PLAN)
—┘	MVD	MANUAL VOLUME DAMPER
– – ┘	BDD	BACKDRAFT DAMPER
S/F – – —	SFD	SMOKE / FIRE DAMPER
F – – —	FD	FIRE DAMPER
—RS—	RS	REFRIGERANT SUCTION LINE
—RL—	RL	REFRIGERANT LIQUID LINE
—CD—	CD	CONDENSATE DRAIN
— G —	G	GAS
—(E)CD—	(E)CD	EXISTING CONDENSATE DRAIN
—(E)G—	(E)G	EXISTING GAS
⬢	S.D.	SMOKE DETECTOR
◕	P.O.C.	POINT OF CONNECTION
Ⓣ	T-STAT	THERMOSTAT
◒	P.O.R.	POINT OF REMOVAL
(TS)	TS	TEMPERATURE SENSOR
(OS)	OS	OVERRIDE SWITCH
(PD)	PD	PRESSURE DIFFERENTIAL SWITCH
Ⓢ	S	SWITCH
	O.C.	ON CENTER
	I.D.	INSIDE DIAMETER
	O.D.	OUTSIDE DIAMETER
	W/	WITH
	S/M	SHEET METAL
	S/S	STAINLESS STEEL
	G.C.	GENERAL CONTRACTOR
	VTR	VENT THRU ROOF
	EMS	ENERGY MANAGEMENT SYSTEM
	OBD	OPPOSED BLADE DAMPER
	FSC	FAN SPEED CONTROL
	(E)	EXISTING
Ⓔ	E	ITEMS FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR AS SPECIFIED ON THE ELECTRICAL CONTRACT DOCUMENTS
Ⓜ	M	ITEMS FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR AS SPECIFIED ON THE MECHANICAL CONTRACT DOCUMENTS
(EM)	EM	ITEMS FURNISHED BY ELECTRICAL CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR.
(ME)	ME	ITEMS FURNISHED BY MECHANICAL CONTRACTOR AND INSTALLED BY ELECTRICAL CONTRACTOR.
	C.C.	CONTROLS CONTRACTOR
	CBD	COUNTER-BALANCE DAMPER
(DS)	D.S.	DOOR SWITCH

SHEET INDEX

S.NO.	SHEET No.	SHEET TITLE
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3	MD-1.1	SIMS BLDG DEMO ROOF PLAN
4	M-1.1	REMODELLED SIMS BLDG ROOF PLAN
5	M-1.2	FIRST FLOOR PLAN REMODEL
6	M-1.3	SECOND FLOOR PLAN REMODEL
7	M-2.1	MECHANICAL DETAILS
8	M-2.2	MECHANICAL DETAILS
9	M-3.1	ALERTON CONTROLS RISER DIAGRAM
10	M-3.2	ZONE DAMPER BOX DETAILS
11	M-4.1	TITLE 24 REPORT
12	M-4.2	TITLE 24 REPORT

SEISMIC NOTES

MEP COMPONENT ANCHORAGE NOTE

ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA-APPROVED CONSTRUCTION DOCUMENTS. WHERE NO DETAIL IS INDICATED, THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2019 CBC, SECTIONS 1616A.1.18 THROUGH 1616A.1.26 AND ASCE 7-16 CHAPTERS 13, 26 AND 30:

1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. TEMPORARY OR MOVABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER.
3. MOVABLE EQUIPMENT THAT IS STATIONED IN ONE PLACE FOR MORE THAN 8 HOURS AND HEAVIER THAN 400 POUNDS IS REQUIRED TO BE ANCHORED WITH TEMPORARY ATTACHMENTS.

THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE, BUT THE ATTACHMENT NEED NOT BE DETAILED ON THE PLANS. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.

A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVING A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

FOR THOSE ELEMENTS THAT DO NOT REQUIRE DETAILS ON THE APPROVED DRAWINGS, THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND THE DSA DISTRICT STRUCTURAL ENGINEER. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH ABOVE REQUIREMENTS.

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTION 13.6.8, 13.6.7, 13.6.5.6, AND 2019 CBC, SECTIONS 1616A.1.23, 1616A.1.24, 1616A.1.25 AND 1616A.1.26.

THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. WHEN BRACING AND ATTACHMENTS ARE BASED ON A PRE-APPROVED INSTALLATION GUIDE (E.G., SMACNA OR OSHPD OPM), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF AND DURING THE HANGING AND BRACING OF THE DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

MP☒ MD☒ PP☐ E☐ - OPTION 1: DETAILED ON THE APPROVED DRAWINGS WITH PROJECT SPECIFIC NOTES AND DETAILS.

MP☐ MD☐ PP☐ E☐ - OPTION 2: SHALL COMPLY WITH THE APPLICABLE OSHPD PRE-APPROVAL (OPM #) #0043-13.

SHOP DRAWINGS NOTES

CONTRACTOR SHALL SUBMIT A COMPLETE SET OF SHOP DRAWINGS 14 DAYS AFTER OFFICIAL PROJECT START DATE. INCLUSIVE OF ALL TRADE (MECHANICAL, PLUMBING, ELECTRICAL, ETC.) TO SCALE (MIN. 1/4"=1'-0") PRIOR TO FABRICATION AND OR INSTALLATION OF ANY AND OR ALL HVAC COMPONENTS, SYSTEM AND EQUIPMENT. SHOP DRAWINGS SHALL BE SUBMITTED AS A SINGLE ALL INCLUSIVE PACKAGE DIGITALLY (AUTOCAD 2014). AT A MINIMUM 4 HARD COPY SETS ARE TO BE SUBMITTED TO THE ENGINEER FOR REVIEW. INCOMPLETE AND UNCOORDINATED SUBMITTALS SHALL BE REJECTED UPON RECEIPT.

APPLICABLE CODES

2019 BUILDING STANDARDS ADMINISTRATIVE CODE, PART 1 TITLE 24 C.C.R.
2019 CALIFORNIA BUILDING CODE (CBC). PART 2, TITLE 24 C.C.R.
2019 CALIFORNIA ELECTRICAL CODE (CEC). PART 3, TITLE 24 C.C.R. (2017 NEC)
2019 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 C.C.R.
2019 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 C.C.R.
2019 CALIFORNIA ENERGY CODE , PART 6, TITLE 24 C.C.R.
2019 CALIFORNIA FIRE CODE , PART 9, TITLE 24 C.C.R.
2019 CALIFORNIA REFERENCED STANDARDS, PART 12, TITLE 24 C.C.R.
TITLE 19 C.C.R., PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS.
AMERICAN WITH DISABILITY ACT.

PARTIAL LIST OF APPLICABLE STANDARDS.

NFPA 13	AUTOMATIC SPRINKLER SYSTEM. 2016 EDITION.
NFPA 24	PRIVATE FIRE MAINS (INCLUDED IN 2016 NFPA 13) 2016 EDITION.
NFPA 72	NATIONAL FIRE ALARM CODE (CALIFORNIA AMENDED) 2016 EDITION. (NOTE: SEE UL STANDARD 1971 FOR "VISUAL DEVICES")

REFERENCE CODE SECTION FOR NFPA STANDARDS - 2019 CBC (SFM) CHPT. 35

AGENCY APPROVAL

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-119155 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☐
DATE: 06/23/2020

optimum energy design
Consulting Engineers
5200 E. La Palma Ave
Anaheim, CA 92807
Telephone (714) 693-2277

STAMP

ABBY BANERJEE
No. M29253
Exp. 6/30/21

PROJECT NAME:

NEWPORT HARBOR
HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
△		
△		
△		
△		

JOB NO: 501-20-0007
DATE: 2020-06-17
DRAWN: -- JG
CHECK: -- HL
ARCHITECT: N/A
ENGINEER: OED
DSA NUMBER: 04-119155

CONSULTANT

STAMP

SHEET DESCRIPTION:
MECHANICAL
GENERAL NOTES
& LEGEND

SHEET NO:
M-0.1

NEW/ REPLACEMENT PACKAGED UNIT (AIR COOLED)

SYMBOL	LOCATION	MANUF'R & MODEL NO.	SERVING	CFM	S.P.	RPM	REF.	COOLING					HEATING (FIVE STAGES)			COMP'R		COND FAN		INDOOR FAN			COMB. FAN FLA	EXH. FAN FLA	VOLTAGE	MCA	MFA / MOCP	EER	IEER	WEIGHT (lbs)	DETAIL REF.	REMARKS
								TOTAL MBH	SENSIBLE MBH	EDB / EWB		AMB	INPUT MBH	OUTPUT MBH	EDB	QTY	RLA	QTY	FLA	BHP	HP	FLA									
AC 1	ROOF	CARRIER 48A8S020A	SIMS BLD'G	8000	1"	724	R-410A	242	171	80 / 67		95	350	283.5	68	3	2*10.6, 12.8	2	3.3 EACH	4.44	5	7.6	-	-	460V-3ϕ	51	- / 60	10.1	13.8	4103	B M-2.1	1,2,3,4,5,6,7,8,9
AC 2	ROOF	CARRIER 48A9S020A	SIMS BLD'G	8000	1"	724	R-410A	242	171	80 / 67		95	350	283.5	68	3	2*10.6, 12.8	2	3.3 EACH	4.44	5	7.6	-	-	460V-3ϕ	51	- / 60	10.1	13.8	4103	B M-2.1	1,2,3,4,5,6,7,8,9
AC 3	ROOF	CARRIER 48A8S020A	SIMS BLD'G	8000	1"	724	R-410A	242	171	80 / 67		95	350	283.5	68	3	2*10.6, 12.8	2	3.3 EACH	4.44	5	7.6	-	-	460V-3ϕ	51	- / 60	10.1	13.8	4103	B M-2.1	1,2,3,4,5,6,7,8,9
AC 4	ROOF	CARRIER 48A9S020A	SIMS BLD'G	8000	1"	724	R-410A	242	171	80 / 67		95	350	283.5	68	3	2*10.6, 12.8	2	3.3 EACH	4.44	5	7.6	-	-	460V-3ϕ	51	- / 60	10.1	13.8	4103	B M-2.1	1,2,3,4,5,6,7,8,9

EQUIPMENT SCHEDULE

REMARKS

1. Rooftop Unit With GreenSpeed Intelligence

Base Unit

2. Dry-Bulb Changeover Ultra Low Leak Economizer
3. Premium Efficiency 10HP w/VFD Bypass
4. Cu/Cu w/ Variable Comp
5. Controls Expansion Module (CEM) with Phase Monitor
6. Domestic w/BACnet Communication
7. Hinged Service Door
8. 5 Year Warranty on Parts and Compressor
9. Anti Corrosion coating (Luvata electrofin insitu or equiv.) on both outdoor and indoor coils.
10. Provide smoke detector with outdoor water proof cover.

NOTES

1. Weights include economizer, curb and all other accessories required.
2. Net Capacities at ARHI conditions
3. Areas with unit supplying more than 2,000 cfm shall be equipped with new smoke detector, the system shall shut down unit(s) in that covered area per 2019 CMC 608. Contractor to remove existing and connect new/replacement smoke detectors to new ac unit.
4. Manufacturer shall size relief cfm to match supply air approximately
5. Reconnect to existing electrical power for ac units and smoke detctors
6. Control Contractor shall coordinate with the Mechanical Contractor, to provide all required accessories (incl. zone, OSA & RA dampers) and wiring to connect to existing EMS. Co-ordinate all requirements with other trades including notifying electrical contractor of necessary conduit and power requirements. All costs for scope of work shall be submitted for final bid.
7. Mech Contractor shall coordinate with the carrier/sigler manufacturer, for all required accessories for a complete and fully functional system, and installation prior to final bid.

OLD/EXISTING PACKAGED UNIT (AIR COOLED) (FOR REFERENCE ONLY)

SYMBOL	LOCATION	MANUF'R & MODEL NO.	SERVING	CFM	S.P.	RPM	REF.	COOLING					HEATING (FIVE STAGES)			COMP'R							COMB. FAN FLA	EXH. FAN FLA	VOLTAGE	MCA	MFA / MOCP	EER	WEIGHT (lbs)	REMARKS
								TOTAL MBH	SENSIBLE MBH	EDB / EWB		AMB	INPUT MBH	OUTPUT MBH	EDB	QTY	RLA	QTY	FLA	BHP	HP	FLA								
AC 1	ROOF	CARRIER 48A9S020A	SIMS BLD'G	8000	2"	899	R-410A	255	184	80 / 67		95	350	283.5	68	3	2*10.6, 12.8	2	3.3 EACH	6.33	10	14	-	-	460V-3ϕ	58	- / 70	9.8	4176	VAV PACKAGE UNIT W/ LOW LEAK ECONOMIZER
AC 2	ROOF	CARRIER 48A9S020A	SIMS BLD'G	8000	2"	899	R-410A	255	184	80 / 67		95	350	283.5	68	3	2*10.6, 12.8	2	3.3 EACH	6.33	10	14	-	-	460V-3ϕ	58	- / 70	9.8	4176	VAV PACKAGE UNIT W/ LOW LEAK ECONOMIZER
AC 3	ROOF	CARRIER 48A9S020A	SIMS BLD'G	8000	2"	899	R-410A	255	184	80 / 67		95	350	283.5	68	3	2*10.6, 12.8	2	3.3 EACH	6.33	10	14	-	-	460V-3ϕ	58	- / 70	9.8	4176	VAV PACKAGE UNIT W/ LOW LEAK ECONOMIZER
AC 4	ROOF	CARRIER 48A9S020A	SIMS BLD'G	8000	2"	899	R-410A	255	184	80 / 67		95	350	283.5	68	3	2*10.6, 12.8	2	3.3 EACH	6.33	10	14	-	-	460V-3ϕ	58	- / 70	9.8	4176	VAV PACKAGE UNIT W/ LOW LEAK ECONOMIZER

EQUIPMENT SCHEDULE

NOTE:

A. CONTRACTOR TO FIELD VERIFY AND RECORD ALL EXISTING UNIT DIMENSIONS FOR RECORD
B. EXISTING ZONE DAMPERS AND DAMPER BOX TO BE REMOVED AND REPLACED (WITH THE SAME SIZE) BY MECHANICAL CONTRACTOR. CONTROL CONTRACTOR TO PROVIDE EQUIPMENT/MATERIALS.

AGENCY APPROVAL

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APP: 04-119155 INC:
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DATE: 06/23/2020

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STAMP

REGISTERED PROFESSIONAL ENGINEER
JEFF BARNES
No. M29253
Exp. 6/30/21
MECHANICAL
STATE OF CALIFORNIA

PROJECT NAME:

NEWPORT HARBOR
HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
1		
2		
3		
4		

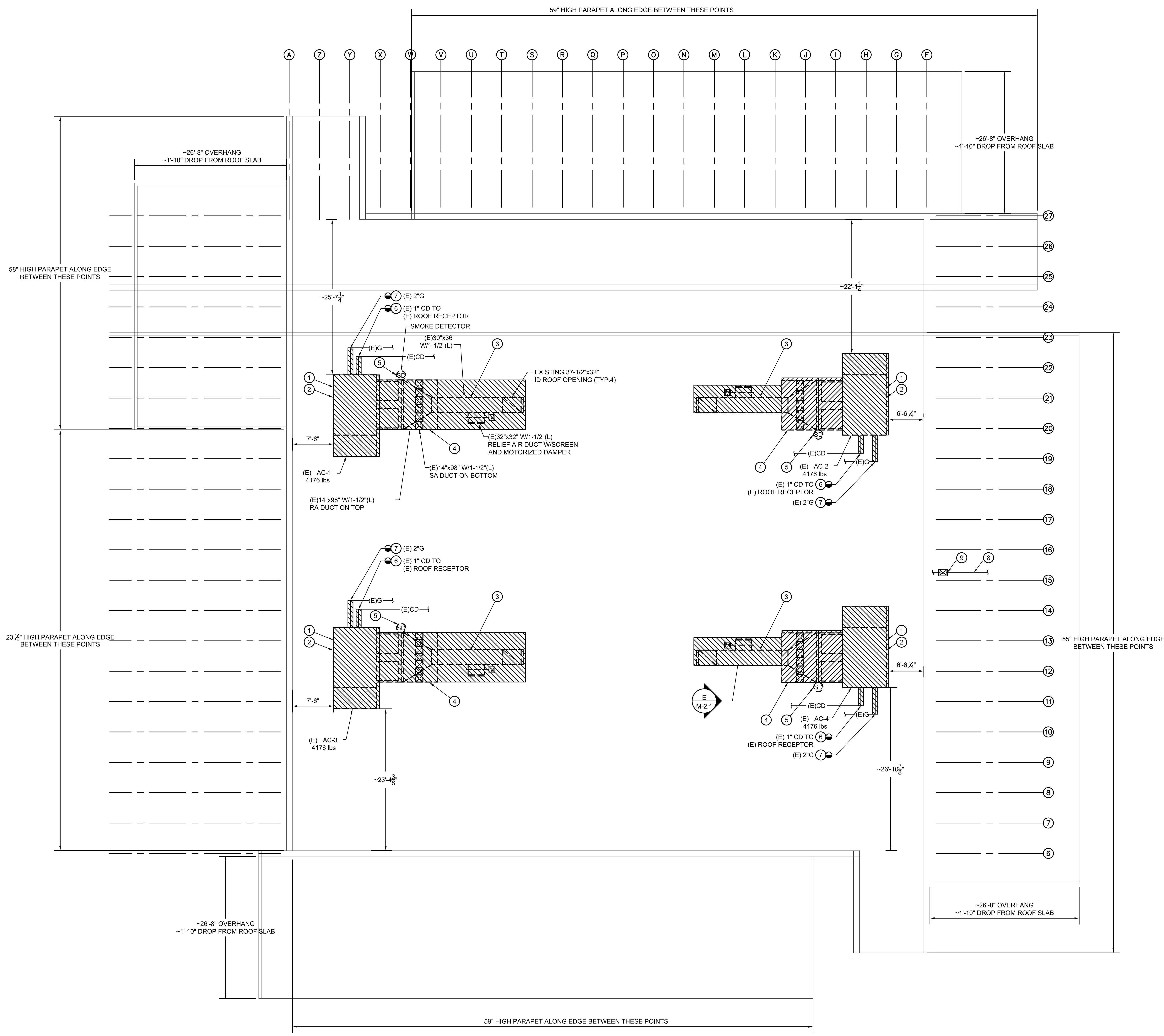
JOB NO: 501-20-0007
DATE: 2020-06-17
DRAWN: -- JG
CHECK: -- HL
ARCHITECT: N/A
ENGINEER: OED
DSA NUMBER: 04-119155

CONSULTANT

STAMP

SHEET DESCRIPTION:
MECHANICAL SCHEDULES SIM BLDG.

SHEET NO:
M-0.2



SIM BUILDING REMODEL ROOF PLAN

1/8" = 1'-0" 1

DEMOLITION KEY NOTES:

1. EXISTING AC UNIT AND ACCESSORIES TO BE REMOVED AND REPLACED WITH NEW AC UNIT. CONTRACTOR TO RECORD ALL EXISTING (E) UNIT & DUCTWORK DIMENSIONS FOR RECORD.
2. EXISTING CURB AND FLASHING TO BE REMOVED AND REPLACED NEW TO ACCOMMODATE NEW AC UNITS.
3. EXISTING LINED RETURN AIR DUCTS TO BE REMOVED AND REPLACED w/ NEW LINED RETURN AIR DUCT OF SAME SIZE. MECHANICAL CONTRACTOR TO COORDINATE w/ CONTROL CONTRACTOR TO PROVIDE NEW OUTSIDE AIR DUCT w/ NEW CONTROL DAMPER.
4. EXISTING LINED SUPPLY AIR DUCT TO BE REMOVED AND REPLACED w/ NEW LINED SUPPLY AIR DUCT OF SAME SIZE(S). EXISTING MULTI-ZONE BOX AND DAMPER SIZES TO BE RECORDED BEFORE BEING REMOVED AND REPLACED w/ NEW BY CONTROL CONTRACTOR. INSTALLATION BY MECHANICAL CONTRACTOR.
5. EXISTING SMOKE DETECTOR TO BE REMOVED AND REPLACED NEW. (E) SMOKE DETECTOR IS EXPOSED MOUNTED TO DUCTWORK.
6. DEMO (E) CD CONNECTION TO MECH UNIT. TEMPORARY CAP (E)CD LINE, PREPARE FOR RECONNECTION.
7. DEMO (E) GAS CONNECTION TO MECH UNIT. TEMPORARY CAP (E)GAS LINE, PREPARE FOR RECONNECTION.
8. EXISTING 3"GAS PIPING BEL GRADE TO REMAIN.
9. EXISTING GAS SOV IN YARD BOX BEL GRADE TO REMAIN.

DEMOLITION NOTES:

1. CONTRACTOR SHALL REUSE EXISTING WALL AND/OR ROOF OPENING(S). MODIFY EXISTING OPENING(S) AS REQUIRED FOR NEW DUCT(S), REGISTER(S), AND ETC. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES AS NECESSARY.
2. CONTRACTOR SHALL PATCH AND REPAIR EXISITNG WALL AND/OR ROOF OPENING(S) AS NECESSARY FOR EXISTING DUCTS, REGISTERS, & ETC. BEING REMOVED.
3. CONTRACTOR SHALL REUSE EXISTING OPENING(S) IN ROOF FOR FUTURE DUCTWORK AND ETC, WHEREVER POSSIBLE COORDINATE WITH OTHER TRADES AS NECESSARY.
4. CONTRACTOR SHALL RECORD AND VERIFY EXISTING UNITS' TOTAL AIRFLOWS AND AT EACH ZONE DAMPER BEFORE REMOVING EXISTING UNITS.PROVIDE TAB PRE-READ.
5. RECONNECT EXISTING GAS LINES TO NEW AC UNITS.
6. EXISTING THERMOSTAT TO BE REMOVED AND REPLACED NEW, MOUNT 48" A.F.F TO TOP OF THERMOSTAT SEE 1/M-2.2 FOR DETAILS.
7. CONTRACTOR RECONNECT NEW AC UNITS CONDENSATE LINE TO EXISTING RECEPTACLES FOR EACH.
8. NO DEMOLITION SHALL BEGIN UNTIL PLANS INCLUDING THE DEMOLITION WORK HAVE BEEN APPROVED BY DSA

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REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA

PROJECT NAME:

NEWPORT HARBOR
HIGH SCHOOL SIMS BUILDING
600 IRVINE AVENUE
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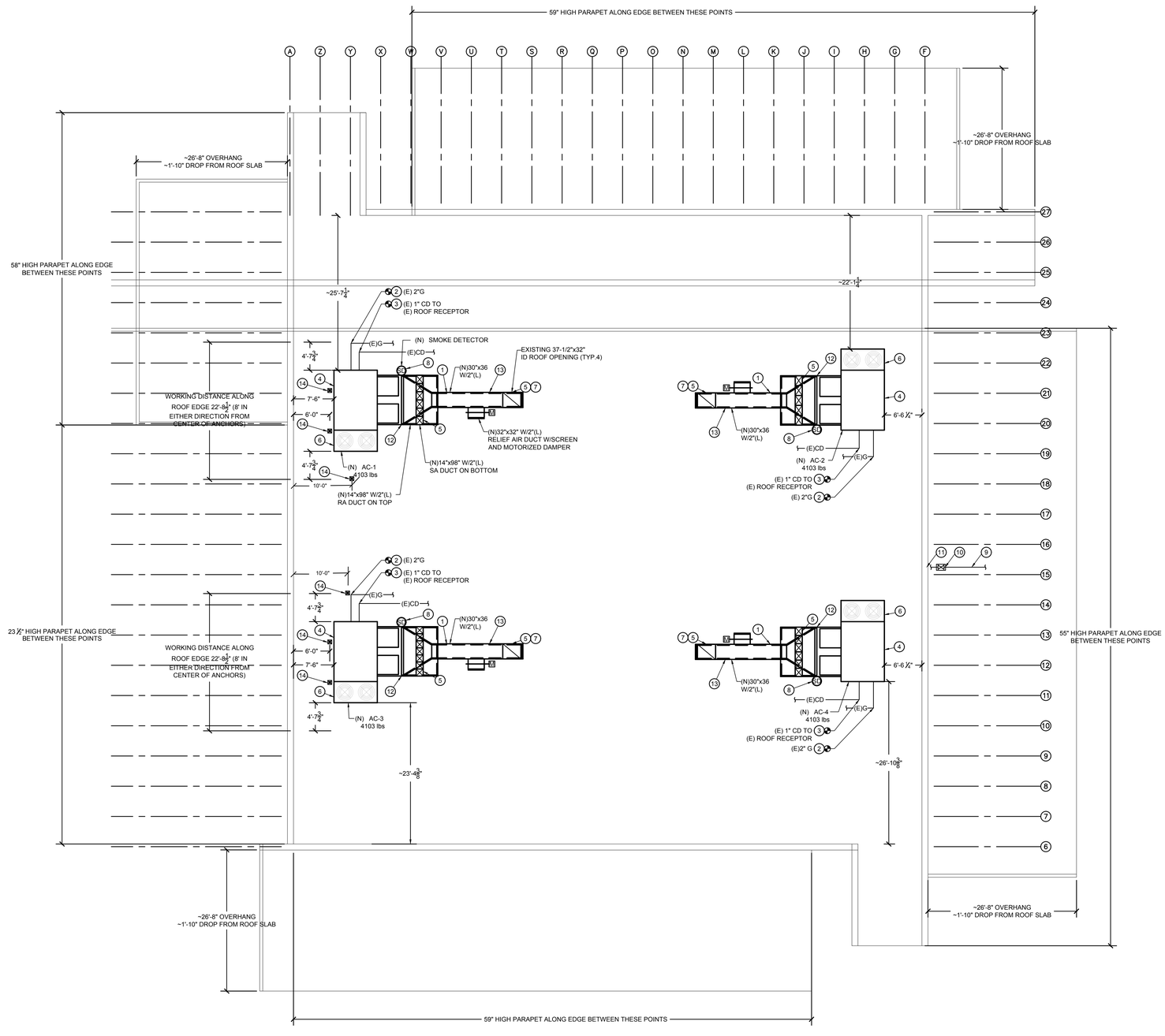
CHECK: HL
ARCHITECT: N/A
ENGINEER: OED
DSA NUMBER: 04-119155

CONSULTANT

STAMP

SHEET DESCRIPTION:
SIMS BLDG.
DEMO ROOF
PLAN

SHEET NO:
MD-1.1



CONSTRUCTION KEY NOTES:

1. DUCT SUPPORTS 8' O.C. SEE DETAIL #B/M-2.1
2. CONTRACTOR TO RECONNECT GAS LINE TO EXISTING 2" GAS LINE W/ NEW GAS COCK AND UNION AND 3/4" GAS FLEX CONNECTOR.
3. CONNECT NEW 1"CD TO EXISTING CONDENSATE DRAIN W/ NEW VENTED P-TRAP.
4. EXISTING EQUIPMENT EQUIPMENT ATTACHMENT AND FLASHING MODIFY AS REQUIRED TO FIT NEW UNIT.SEE DETAIL #C/M-2.1 AND #D/M-2.1
5. DUCT CONNECT TO EXISTING DUCT AT ROOF CURB SEE DETAIL #F/M-2.1 FOR DUCT THRU ROOF DETAIL.
6. CONTRACTOR TO CONNECT NEW UNITS TO NEW THERMOSTATS.COORDINATE WITH CONTROL CONTRACTOR. MOUNT 48" A.F.F SEE 1/M-2.2 FOR DETAILS
7. EXISTING ROOF OPENING TO BE REUSED.
8. NEW DUCT MOUNTED SMOKE DETECTOR WITH WATERPROOF ENCLOSURE. SEE ELECTRICAL PLANS FOR ELECTRICAL CONNECTIONS.
9. EXISTING 3"GAS PIPING BEL GRADE.
10. EXISTING GAS SOV IN YARD BOX BEL GRADE.
11. PROVIDE "GAS SHUTOFF VALVE" SIGNAGE ON WALL AS REQUIRED.
12. DOUBLE DUCT SUPPORT SEE DETAIL 2/M-2.2
13. SINGLE RETURN DUCT SUPPORT. SEE DETAIL #E/M-2.1
14. PROVIDE GUARDIAN CB-1-B PERSONAL FALL ARREST PROTECTION ANCHOR BASE PLATE AT POINT SHOWN, SEE 3/M-2.2 FOR DETAILS

CONSTRUCTION NOTES:

1. FRESH AIR INTAKES SHALL BE 10'-0" MIN. AWAY FROM ALL EXHAUST OUTLETS, PLUMBING VENTS, AND FLUES.
2. CONTRACTOR SHALL MAINTAIN PROPER CLEARANCES FROM ALL ELECTRICAL EQUIPMENT AND SERVICE CLEARANCES FOR MECHANICAL EQUIPMENT.
3. CONTRACTOR SHALL COORDINATE WORK WITH OTHER TRADES AS NECESSARY PRIOR TO INSTALLATION.
4. FOR INACCESSIBLE AREAS THE CONTRACTOR SHALL PROVIDE ACCESS PANELS FOR ALL DAMPERS, EQUIPMENT, SMOKE DETECTORS, AND CONTROL DEVICES. THESE PANELS SHALL MATCH THE RATING OF THE WALL AND/OR CEILING THAT THEY ARE LOCATED IN. MINIMUM ACCESS PANEL SIZES SHALL BE AS FOLLOWS:

   1) HAND ACCESS: 12"x12"

   2) BODY ACCESS: 30"x30" MIN.

   WHERE A LARGER ACCESS SIZE IS REQUIRED DUE TO INSTALLATION CONSTRAINTS, THE CONTRACTOR SHALL DO SO AT NO ADDITIONAL COST AND SHALL NOTIFY THE ARCHITECT AND ENGINEER OF DEVIATIONS PRIOR TO INSTALLATION.
5. CONTRACTOR SHALL FURNISH LINED DUCT WORK AS SHOWN - NO EXCEPTIONS.
6. CONTRACTOR SHALL COORDINATE EXACT EQUIPMENT PAD SIZES AND LOCATIONS WITH OTHER TRADES PRIOR TO INSTALLATION.
7. MECHANICAL CONTRACTOR TO MEASURE AND VERIFY SIZES OF INDIVIDUAL ZONE DAMPERS FOR REMOVAL AND REPLACEMENT.CONTROL CONTRACTOR TO PROVIDE NEW ZONE DAMPERS, MECHANICAL CONTRACTOR TO INSTALL. COORDINATE AS NECESSARY.
8. MECHANICAL CONTRACTOR TO MEASURE AND VERIFY AIRFLOW AT INDIVIDUAL ZONE DAMPERS FOR REMOVAL AND REPLACEMENT. CONTRACTOR TO PRE-BALANCE REPLACEMENT UNITS TO EXISTING CONDITIONS AND AIRFLOWS.

N

SIM BUILDING REMODEL ROOF PLAN | 1/8" = 1'-0" | 1

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HIGH SCHOOL SIMS BUILDING

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ENGINEER:	OED
DSA NUMBER:	04-119155

CONSULTANT

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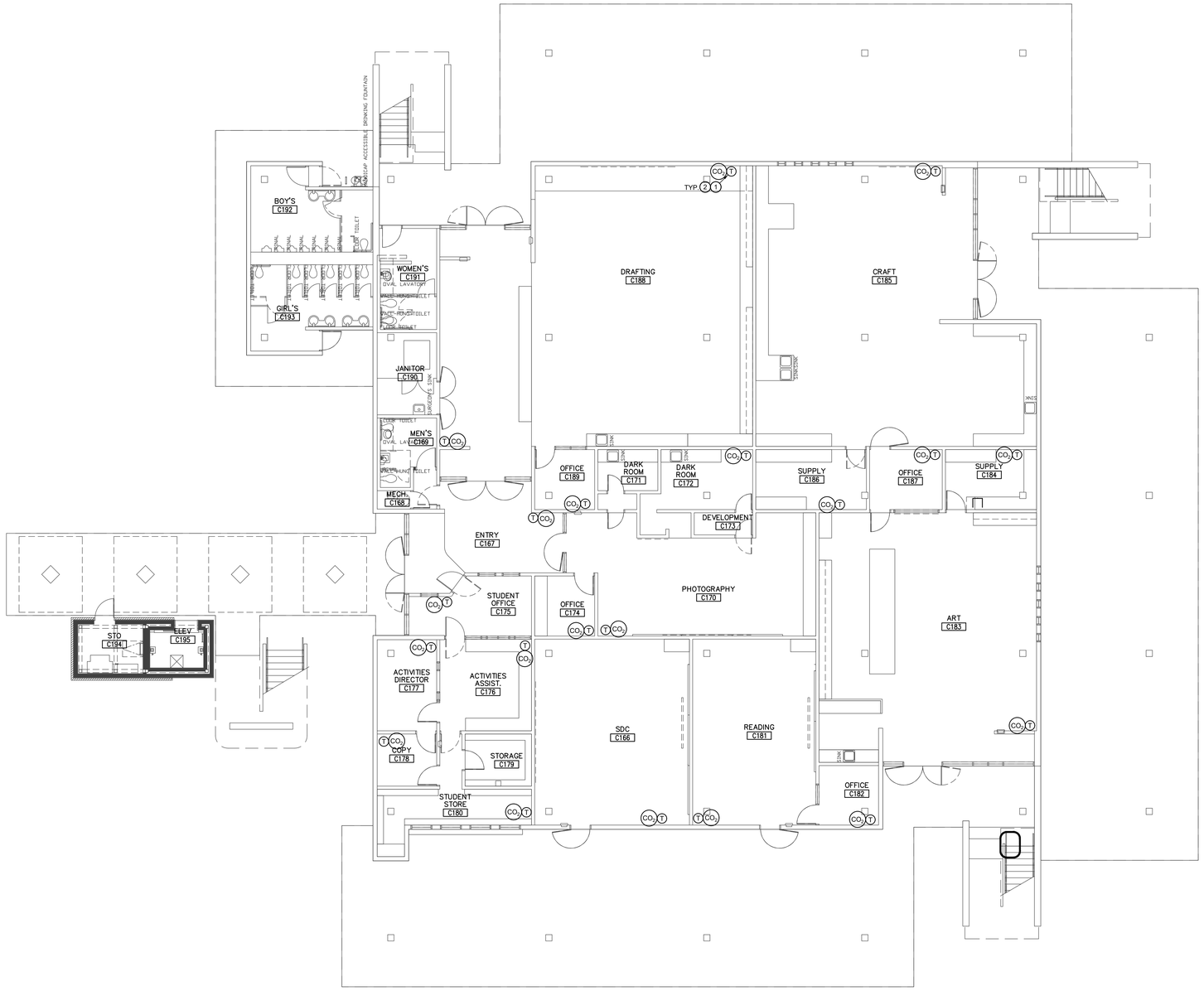
SHEET DESCRIPTION:
REMODELLED SIMS BLDG. ROOF PLAN

SHEET NO:
M-1.1



CONSTRUCTION KEY NOTES:

1. ELECTRONIC EMS PROGRAMMABLE THERMOSTAT. MOUNT AT 48" A.F.F.
2. CARBON DIOXIDE SENSOR MOUNT AT 48" A.F.F. INTEGRATE INTO FRONT END BMS.

CONSTRUCTION NOTES:

1. CONTRACTOR SHALL COORDINATE WORK WITH OTHER TRADES AS NECESSARY PRIOR TO INSTALLATION.
2. CONTRACTOR SHALL MAINTAIN PROPER CLEARANCES FROM ALL ELECTRICAL EQUIPMENT AND SERVICE CLEARANCES FOR MECHANICAL EQUIPMENT.

SIM BUILDING REMODEL FIRST FLOOR PLAN | 1/8" = 1'-0" | 1

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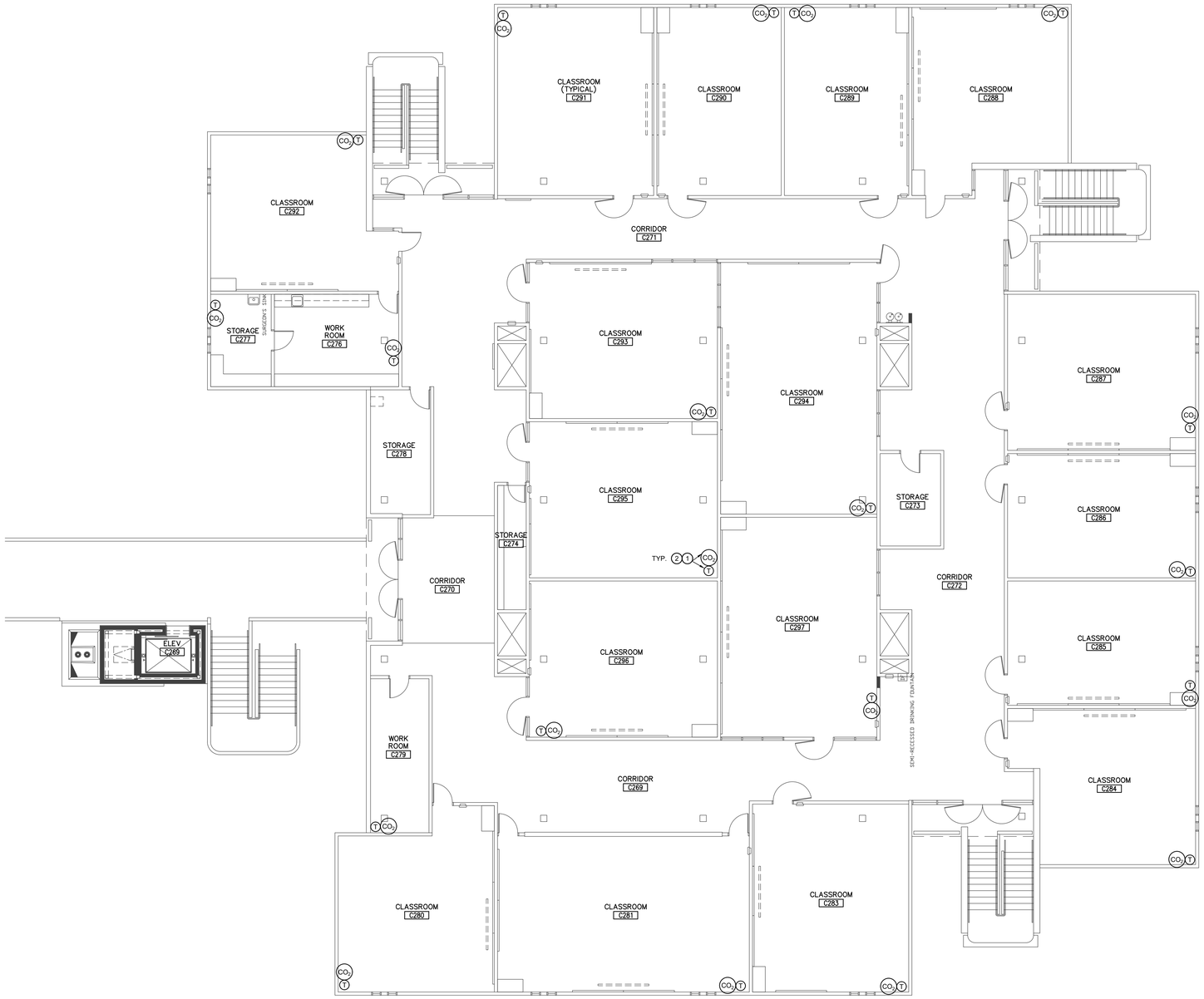
SHEET DESCRIPTION:
FIRST FLOOR PLAN REMODEL

SHEET NO:
M-1.2



CONSTRUCTION KEY NOTES:

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2. CARBON DIOXIDE SENSOR MOUNT AT 48" A.F.F. INTEGRATE INTO FRONT END BMS

CONSTRUCTION NOTES:

1. CONTRACTOR SHALL COORDINATE WORK WITH OTHER TRADES AS NECESSARY PRIOR TO INSTALLATION.
2. CONTRACTOR SHALL MAINTAIN PROPER CLEARANCES FROM ALL ELECTRICAL EQUIPMENT AND SERVICE CLEARANCES FOR MECHANICAL EQUIPMENT.

SIM BUILDING REMODEL SECOND FLOOR PLAN | 1/8" = 1'-0" | 1

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600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

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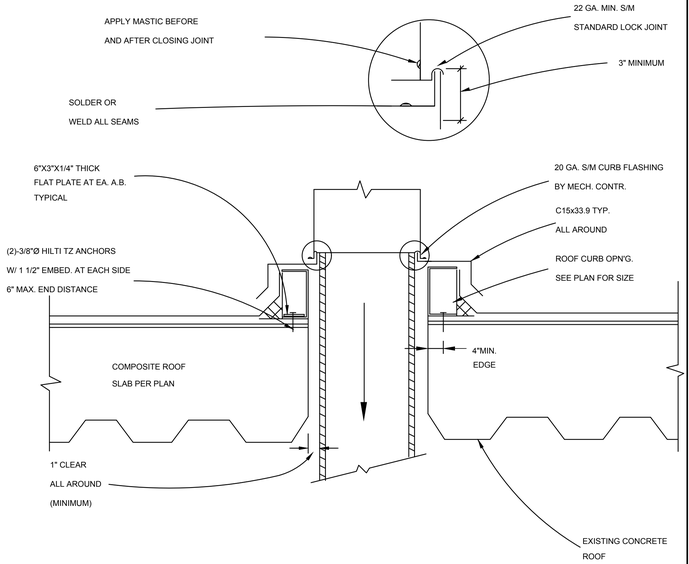
ARCHITECT:	N/A
ENGINEER:	OED
DSA NUMBER:	04-119155

CONSULTANT

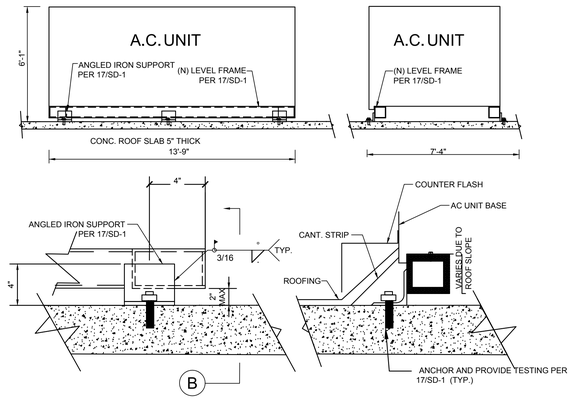
STAMP

SHEET DESCRIPTION:
SECOND FLOOR PLAN REMODEL

SHEET NO:
M-1.3



DUCT THROUGH ROOF DETAIL | SCALE NONE | F



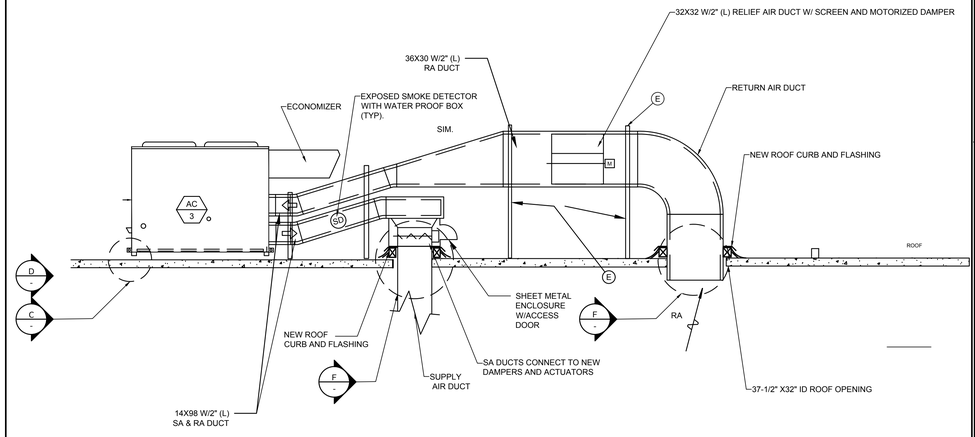
A.C. UNIT ANCHORAGE D

NPRTHS

NOTE:

SEE SD-1 FOR DETAILS

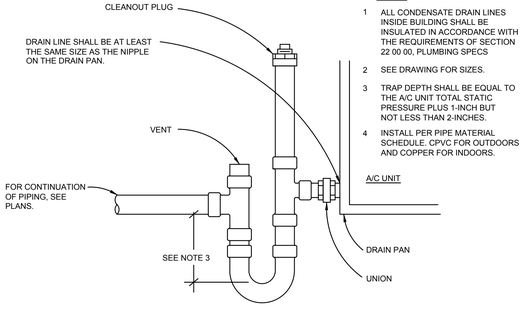
A.C. UNIT ANCHORAGE | SCALE NONE | D



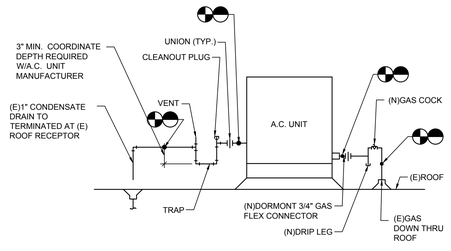
NOTE:

1. SMOKE DETECTOR DUCT MOUNTED WITH WEATHER PROOF ENCLOSURE
2. SUPPORT DUCT 8' O.C.

SECTION | SCALE: NONE | B

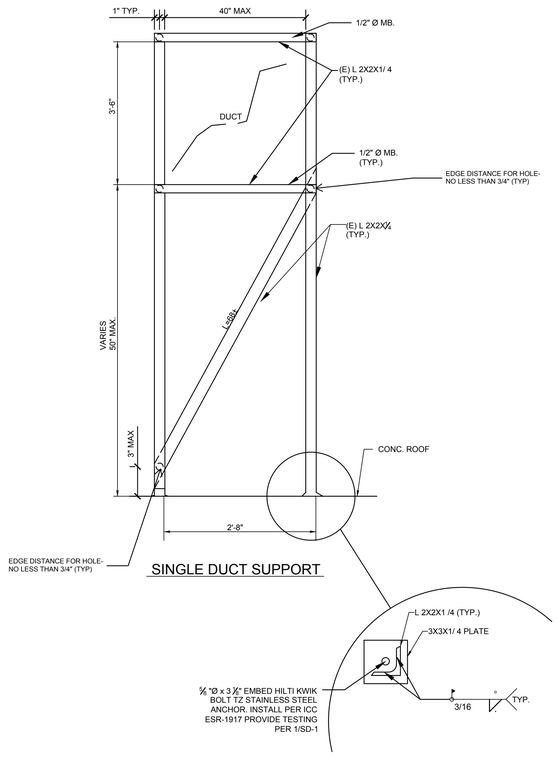


CONDENSATE TRAP DETAIL | NOT TO SCALE | G

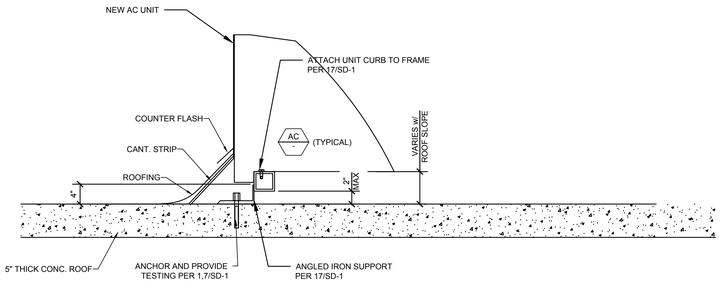


GAS & CD CONNECTIONS OF MECH UNIT ON ROOF | NOT TO SCALE | H

AIR CONDITIONER DUCT SUPPORT E



AIR CONDITIONING DUCT SUPPORT | SCALE NONE | E



NOTE:
1) SEE DETAIL D HEREON

NOTE:

SEE SD-1 FOR DETAILS

MOUNTING DETAIL | SCALE NONE | C

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MECHANICAL
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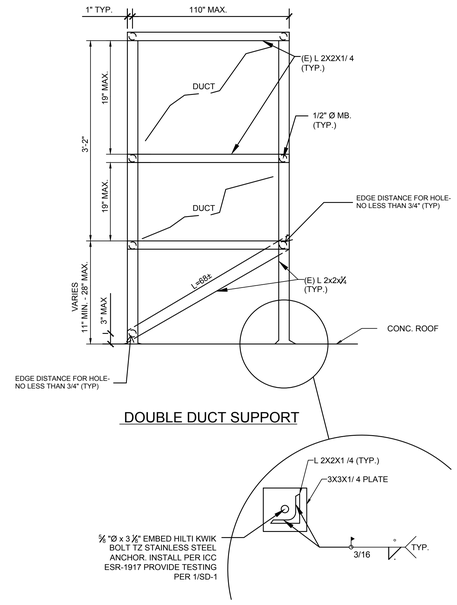
ENGINEER:	OED
DSA NUMBER:	04-119155

CONSULTANT

STAMP

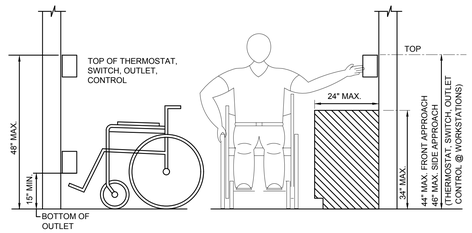
SHEET DESCRIPTION:
MECHANICAL
DETAILS

SHEET NO:
M-2.1

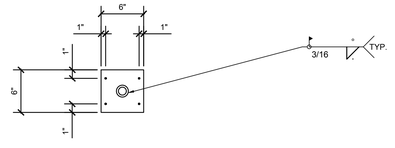


DOUBLE DUCT SUPPORT

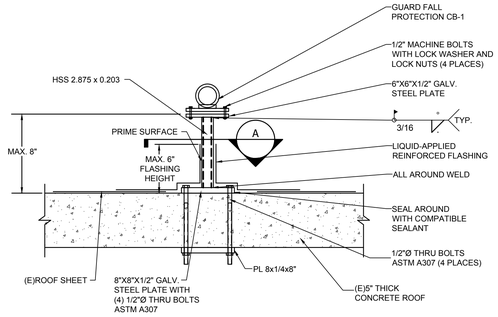
DOUBLE DUCT SUPPORT | SCALE NONE | 2



CONTROL DEVICE MOUNTING DETAIL | SCALE NONE | 1



A SECTION A
Scale: NTS



PERSONAL FALL ARREST PROTECTION ANCHORAGE | SCALE NONE | 3

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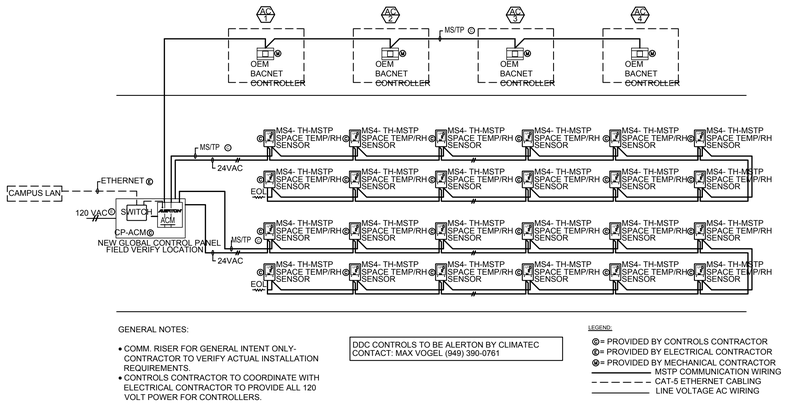
ARCHITECT:	N/A
ENGINEER:	OED
DSA NUMBER:	04-119155

CONSULTANT

STAMP

SHEET DESCRIPTION:
MECHANICAL
DETAILS

SHEET NO:
M-2.2



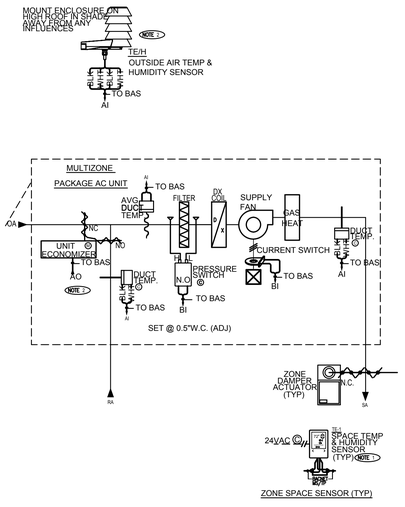
GENERAL NOTES:

- COMM. RISER FOR GENERAL INTENT ONLY- CONTRACTOR TO VERIFY ACTUAL INSTALLATION REQUIREMENTS.
- CONTROLS CONTRACTOR TO COORDINATE WITH ELECTRICAL CONTRACTOR TO PROVIDE ALL 120 VOLT POWER FOR CONTROLLERS.

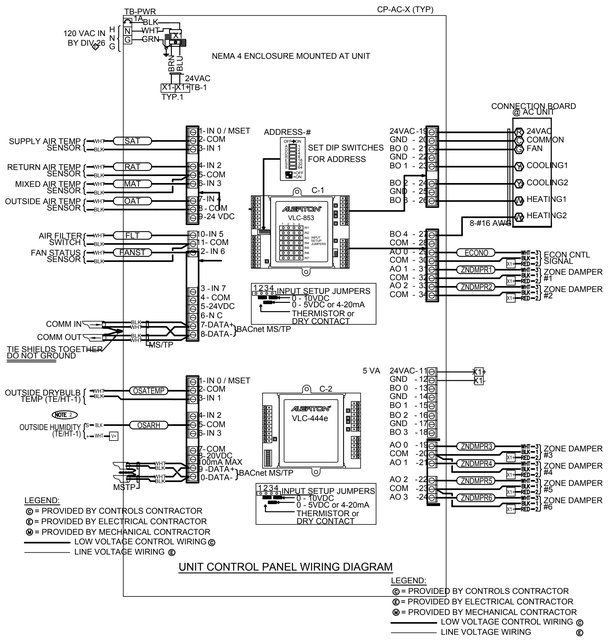
DDC CONTROLS TO BE ALERTON BY CLIMATEC
CONTACT: MAX VOGEL (949) 390-0761

LEGEND:
- = PROVIDED BY CONTROLS CONTRACTOR
- = PROVIDED BY ELECTRICAL CONTRACTOR
- = PROVIDED BY MECHANICAL CONTRACTOR
- MSTP COMMUNICATION WIRING
- CAT-5 ETHERNET CABLING
- LINE VOLTAGE AC WIRING

BAS NETWORK COMMUNICATION RISER DIAGRAM



UNIT FLOW DIAGRAM



LEGEND:
- = PROVIDED BY CONTROLS CONTRACTOR
- = PROVIDED BY ELECTRICAL CONTRACTOR
- = PROVIDED BY MECHANICAL CONTRACTOR
- LOW VOLTAGE CONTROL WIRING
- LINE VOLTAGE WIRING

UNIT CONTROL PANEL WIRING DIAGRAM

NOTES:

1. LOCATE SPACE SENSOR ACCORDING TO MECHANICAL DRAWINGS.
2. OSA TEMP/ RH SENSOR AT AC-1 ONLY.
3. PROVIDE DEMAND CONTROL VENTILATION, CO_2 MONITORING PER SHEETS M-1.2 AND M-1.3

MULTIZONE A/C UNIT AND ZONE CONTROL DIAGRAM

AGENCY APPROVAL

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-119155 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☐
DATE: 06/23/2020

optimum energy design
Consulting Engineers
5200 E. La Palma Ave
Anaheim, CA 92807
Telephone (714) 693-2277

STAMP

REGISTERED PROFESSIONAL ENGINEER
No. M29253
Exp. 6/30/21
MECHANICAL
STATE OF CALIFORNIA

PROJECT NAME:

NEWPORT HARBOR
HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
△		
△		
△		
△		

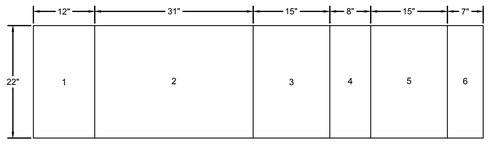
JOB NO:	501-20-0007
DATE:	2020-06-17
DRAWN:	-- JG
CHECK:	-- HL
ARCHITECT:	N/A
ENGINEER:	OED
DSA NUMBER:	04-119155

CONSULTANT

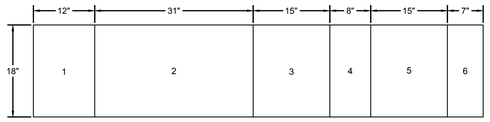
STAMP

SHEET DESCRIPTION:
ALERTON CONTROLS DIAGRAM

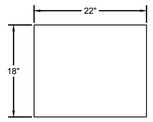
SHEET NO:
M-3.1



TOP VIEW

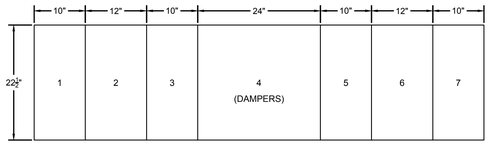


SIDE VIEW

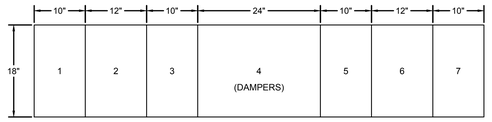


END VIEW

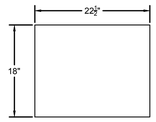
AC-2



TOP VIEW

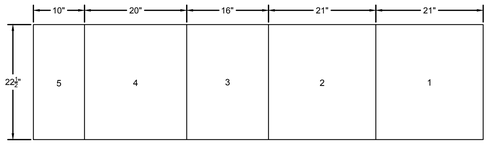


SIDE VIEW

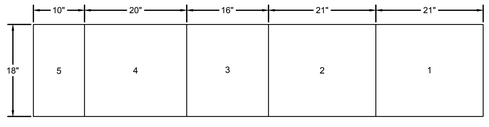


END VIEW

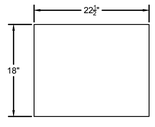
AC-4



TOP VIEW

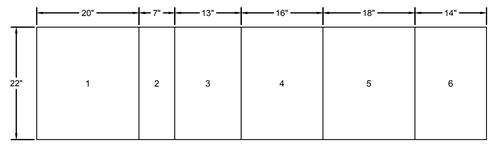


SIDE VIEW

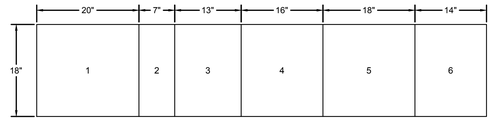


END VIEW

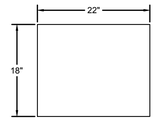
AC-1



TOP VIEW



SIDE VIEW



END VIEW

AC-3

NOTE:
CONTROL CONTRACTOR TO PROVIDE ZONE DAMPER BOXES, MECHANICAL CONTRACTOR TO INSTALL. MECHANICAL AND CONTROL CONTRACTORS TO COORDINATE AND VERIFY SIZES, QUANTITIES FOR EACH UNIT BEFORE REMOVAL AND OR REPLACEMENT.

AGENCY APPROVAL

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-119155 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☐
DATE: 06/23/2020

optimum energy design
Consulting Engineers
5200 E. La Palma Ave
Anaheim, CA 92807
Telephone (714) 693-2277

STAMP

REGISTERED PROFESSIONAL ENGINEER
ROBERT BARNES
No. M29253
Exp. 6/30/21
MECHANICAL
STATE OF CALIFORNIA

PROJECT NAME:

NEWPORT HARBOR
HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
△		
△		
△		
△		

JOB NO:	501-20-0007
DATE:	2020-06-17
DRAWN:	-- JG
CHECK:	-- HL
ARCHITECT:	N/A
ENGINEER:	OED
DSA NUMBER:	04-119155

CONSULTANT

STAMP

SHEET DESCRIPTION:
ZONE DAMPER BOX DETAILS

SHEET NO:
M-3.2

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created 5/20) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 9 of 14
Project Address:	600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

Table Continued

Nonresidential and Hotel/ Motel Ventilation Systems

04		05		06		07
System Name:	AC-4	System Design OA CFM Air Flow[1]:	1,162.95	System Design Transfer Air CFM:	0	Air Filtration per §120.1(c) and §141.0(b)2[2]: Provided per §120.1(c) (NR & Hotel/ Motel)

08	09	10	11	12	13	14	15	16	
Space Name or Item Tag	Mechanical Ventilation Required per §120.1(c)3[3]: Occupancy Type[4]	Conditioned Floor Area (ft²)	# of showerheads/ toilets	# of people[5]	Required Min OA CFM	Exh. Vent. per §120.1(c)4: Required Minimum CFM	Provided per Design CFM	DCV or Occupant Sensor Controls per §120.1(d)3, §120.1(d)5 & §120.2(e)3[6]	
AC-4	All others	7,753			1,162.95			DCV	NA: Not required per §120.1(d)3
								Occ Sensor	

17	Total System Required Min OA CFM	1,162.95	18	Ventilation for this System Complies?	Yes

[1] FOOTNOTES: System CFM should include both mechanical and natural ventilation for the zone/system.
[2] Air filtration requirements apply to the following three system types per §120.1(c)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.
[3] Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.
[4] See Standards Tables 120.1-A and 120.1-B.
[5] For lecture halls with fixed seating, the expected number of occupants shall be determined in accordance with the California Building Code.
[6] §120.2(e)3 requires systems serving rooms that are required by §130.1(c) to have lighting occupancy sensing controls to also have occupancy sensing zone controls for ventilation. Examples of spaces which require lighting occupancy sensors include offices 250ft² or smaller, multipurpose rooms less than 1,000ft², classrooms, conference rooms, restrooms, aisles and open areas in warehouses, library book stack aisles, corridors, stairwells, parking garages, and loading and unloading zones, unless excepted by §130.1(c).

K. TERMINAL BOX CONTROLS

This Section Does Not Apply

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created 5/20) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 6 of 14
Project Address:	600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

01 System Name	02 System Zoning	03 Conditioned Floor Area Being Served (ft²)	04 Thermostats §110.2(b) & (c)[1], §120.2(a) or §141.0(b)2E	05 Shut-Off Controls §120.2(e)	06 Isolation Zone Controls §120.2(g)	07 Demand Response §110.12 and §120.2(b)	08 Supply Air Temp. Reset §140.4(f)	09 Window Interlocks per §140.4(n)
AC-1	multi-zone w/ DDC to zone	≤ 25,000 ft²	Setback Thermostat	Auto Timeswitch	4 Hour Timer	EMCS	Included	Provided
AC-2	multi-zone w/ DD DDC to zone	≤ 25,000 ft²	Setback Thermostat	Auto Timeswitch	4 Hour Timer	EMCS	Included	Provided
AC-3	multi-zone w/ DD DDC to zone	≤ 25,000 ft²	Setback Thermostat	Auto Timeswitch	4 Hour Timer	EMCS	Included	Provided
AC-4	multi-zone w/ DD DDC to zone	≤ 25,000 ft²	Setback Thermostat	Auto Timeswitch	4 Hour Timer	EMCS	Included	Provided

[1] FOOTNOTES: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliances, wood stoves are not required to have setback thermostats.
* NOTES: Controls with a * require a note in the space below explaining how compliance is achieved.
EX: System 1: SA Temp Reset: Exempt because zones compliant with §140.4(d); EXCEPTION 1 to §140.4(f)

J. VENTILATION AND INDOOR AIR QUALITY

Table Instructions: Complete the following Table to demonstrate compliance with mandatory ventilation requirements in §120.1 and §120.2(e)3B for all nonresidential, high-rise residential and hotel/motel occupancies. For alterations, only ventilation systems being altered within the scope of the permit application need to be documented in this table. In lieu of this table, the required outdoor ventilation rates and airflows may be shown on the plans or the calculations can be presented in a spreadsheet.

01	☐	Check the box if the project is showing ventilation calculations on the plans, or attaching the calculations instead of completing this table.
02	☐	Check this box if the project includes new or altered high-rise residential dwelling units.
03	☐	Check the box if the project is using natural ventilation in any spaces to meet required ventilation rates per §120.1(c)2.

Table Continued

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created 5/20) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 3 of 14
Project Address:	600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

Dry System Equipment Sizing (includes air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters)

01 Name or Item Tag	02 Equipment Category per Tables 110.2	03 Equipment Type per Tables 110.2 & Title 20	04 Smallest Size Available[1] §140.4(a)	05 Heating Output[2,3]: Sensible Per Design (kBtu/h)	06 Heating Output: Rated (kBtu/h)	07 Heating Output: Supp. Heating Output (kBtu/h)	08 Cooling Output[2,3]: Sensible Per Design (kBtu/h)	09 Cooling Output: Rated (kBtu/h)	10 Load Calculations[3,4]: Total Heating Load (kBtu/h)	11 Load Calculations: Total Sensible Cooling Load (kBtu/h)
AC-4	Unitary AC/ Condensers	AC, air cooled, package (3 phase)	Yes	283.5	283.5	0	171	242	116	255

(Columns 05–11: Equipment Sizing per Mechanical Schedule (Btu/h) §140.4 (a&b))

[1] FOOTNOTES: Equipment shall be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the building per §140.4(a). Healthcare facilities are excepted.
[2] It is common practice to show rated output capacity on the equipment schedule. Sensible cooling output comes from specification sheet tables.
[3] If equipment is heating only, leave cooling output and load blank. If equipment is cooling only, leave heating output and load blank.
[4] Authority Having Jurisdiction may ask for load calculations used for compliance per §140.4(b).

Dry System Equipment Efficiency (other than Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP))

01 Name or Item Tag	02 Size Category (Btu/h)	03 Heating Mode: Rating Condition (°F)	04 Heating Mode: Efficiency Unit	05 Heating Mode: Min Efficiency Required per Tables 110.2/ Title 20	06 Heating Mode: Design Efficiency	07 Cooling Mode: Efficiency Unit	08 Cooling Mode: Min Efficiency Required per Tables 110.2/ Title 20	09 Cooling Mode: Design Efficiency
AC-1	≥240,000 and <760,000				0.81	EER	10	10.1
						IEER	11.6	13.8
AC-2	≥240,000 and <760,000				0.81	EER	10	10.1
						IEER	11.6	13.8
AC-3	≥240,000 and <760,000				0.81	EER	10	10.1
						IEER	11.6	13.8
AC-4	≥240,000 and <760,000				0.81	EER	10	10.1
						IEER	11.6	13.8

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created 5/20) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 8 of 14
Project Address:	600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

Table Continued

17	Total System Required Min OA CFM	1,153.5	18	Ventilation for this System Complies?	Yes

Nonresidential and Hotel/ Motel Ventilation Systems

04		05		06		07
System Name:	AC-3	System Design OA CFM Air Flow[1]:	1,036.65	System Design Transfer Air CFM:	0	Air Filtration per §120.1(c) and §141.0(b)2[2]: Provided per §120.1(c) (NR & Hotel/ Motel)

08	09	10	11	12	13	14	15	16	
Space Name or Item Tag	Mechanical Ventilation Required per §120.1(c)3[3]: Occupancy Type[4]	Conditioned Floor Area (ft²)	# of showerheads/ toilets	# of people[5]	Required Min OA CFM	Exh. Vent. per §120.1(c)4: Required Minimum CFM	Provided per Design CFM	DCV or Occupant Sensor Controls per §120.1(d)3, §120.1(d)5 & §120.2(e)3[6]	
South/West	All others	6,911			1,036.65			DCV	NA: Not required per §120.1(d)3
								Occ Sensor	

17	Total System Required Min OA CFM	1,036.65	18	Ventilation for this System Complies?	Yes

Table Continued

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created 5/20) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 5 of 14
Project Address:	600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

01 Fan Name or Item Tag	02 Fan Function	03 Qty	04 Maximum Design Supply Airflow (CFM)	05 HP Unit[2]	06 Design HP	07 Fan Power Pressure Drop Adjustment - Table 140.4-B: Device	08 Design Airflow through Device (CFM)
SF-3	Supply	1	8,000	BHP	4.44		
						Calculated Adjustment (in H_2O)	

Total System Design Supply Airflow (CFM):	8,000	Total System Design (B)HP:	4.44	**Maximum System Fan Power (B)HP:**	

System Name:	AC-4	**Economizer:**[1]	Differential Temperature	**Economizer Controls:**	Designed per §140.4(e) and (m)	**System Fan Type:**	Variable Air Volume

01 Fan Name or Item Tag	02 Fan Function	03 Qty	04 Maximum Design Supply Airflow (CFM)	05 HP Unit[2]	06 Design HP	07 Fan Power Pressure Drop Adjustment - Table 140.4-B: Device	08 Design Airflow through Device (CFM)
SF-4	Supply	1	8,000	BHP	4.44		
						Calculated Adjustment (in H_2O)	

Total System Design Supply Airflow (CFM):	8,000	Total System Design (B)HP:	4.44	**Maximum System Fan Power (B)HP:**	

[1] FOOTNOTE: Computer room economizers must meet requirements of §140.9(a) and will be documented on the NRCC-PRC-E document.
[2] The unit used for HP must be consistent for all fans within a system.

I. SYSTEM CONTROLS

This Section Does Not Apply

I. SYSTEM CONTROLS

Table Instructions: Complete the following Table to demonstrate compliance with mandatory controls in §110.2 and §120.2 and prescriptive controls in §140.4(f) and (n) or requirements in §141.0(b)2E for altered space conditioning systems.

Table Continued

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created 5/20) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 2 of 14
Project Address:	600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

Selections made in Table O have been changed by the permit applicant. See Table E. Additional Remarks for permit applicant's explanation.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

This Section Does Not Apply

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Table Instructions: Complete the following equipment schedules to show compliance with mandatory requirements found in §110.1 and §110.2(a) and prescriptive requirements found in §140.4(a), §140.4(b) and §140.4(k) or §141.0(b)2 for alterations.

Dry System Equipment Sizing (includes air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters)

01 Name or Item Tag	02 Equipment Category per Tables 110.2	03 Equipment Type per Tables 110.2 & Title 20	04 Smallest Size Available[1] §140.4(a)	05 Heating Output[2,3]: Sensible Per Design (kBtu/h)	06 Heating Output: Rated (kBtu/h)	07 Heating Output: Supp. Heating Output (kBtu/h)	08 Cooling Output[2,3]: Sensible Per Design (kBtu/h)	09 Cooling Output: Rated (kBtu/h)	10 Load Calculations[3,4]: Total Heating Load (kBtu/h)	11 Load Calculations: Total Sensible Cooling Load (kBtu/h)
AC-1	Unitary AC/ Condensers	AC, air cooled, package (3 phase)	Yes	283.5	283.5	0	171	242	128	258
AC-2	Unitary AC/ Condensers	AC, air cooled, package (3 phase)	Yes	283.5	283.5	0	171	242	115	245
AC-3	Unitary AC/ Condensers	AC, air cooled, package (3 phase)	Yes	283.5	283.5	0	171	242	103	244

(Columns 05–11: Equipment Sizing per Mechanical Schedule (Btu/h) §140.4 (a&b))

Table Continued

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created 5/20) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 7 of 14
Project Address:	600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

Table Continued

Nonresidential and Hotel/ Motel Ventilation Systems

04		05		06		07
System Name:	AC-1	System Design OA CFM Air Flow[1]:	1,120.05	System Design Transfer Air CFM:	0	Air Filtration per §120.1(c) and §141.0(b)2[2]: Provided per §120.1(c) (NR & Hotel/ Motel)

08	09	10	11	12	13	14	15	16	
Space Name or Item Tag	Mechanical Ventilation Required per §120.1(c)3[3]: Occupancy Type[4]	Conditioned Floor Area (ft²)	# of showerheads/ toilets	# of people[5]	Required Min OA CFM	Exh. Vent. per §120.1(c)4: Required Minimum CFM	Provided per Design CFM	DCV or Occupant Sensor Controls per §120.1(d)3, §120.1(d)5 & §120.2(e)3[6]	
North/West	All others	7,467			1,120.05			DCV	NA: Not required per §120.1(d)3
								Occ Sensor	

17	Total System Required Min OA CFM	1,120.05	18	Ventilation for this System Complies?	Yes

Nonresidential and Hotel/ Motel Ventilation Systems

04		05		06		07
System Name:	AC-2	System Design OA CFM Air Flow[1]:	1,153.5	System Design Transfer Air CFM:	0	Air Filtration per §120.1(c) and §141.0(b)2[2]: Provided per §120.1(c) (NR & Hotel/ Motel)

08	09	10	11	12	13	14	15	16	
Space Name or Item Tag	Mechanical Ventilation Required per §120.1(c)3[3]: Occupancy Type[4]	Conditioned Floor Area (ft²)	# of showerheads/ toilets	# of people[5]	Required Min OA CFM	Exh. Vent. per §120.1(c)4: Required Minimum CFM	Provided per Design CFM	DCV or Occupant Sensor Controls per §120.1(d)3, §120.1(d)5 & §120.2(e)3[6]	
North/East	All others	7,690			1,153.5			DCV	NA: Not required per §120.1(d)3
								Occ Sensor	

Table Continued

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created 5/20) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name:	Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 4 of 14
Project Address:	600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

G. PUMPS

This Section Does Not Apply

H. FAN SYSTEMS & AIR ECONOMIZERS

Table Instructions: Complete the following Table for fan systems to demonstrate compliance with prescriptive requirements found in §140.4(c), §140.4(e) and §140.4(m). First document the system details, then add fans within that system to document compliance with fan power requirements. Fan systems serving healthcare facilities, or those serving only process loads, are exempt from these requirements and do not need to be included in Table H.

System Name:	AC-1	**Economizer:**[1]	Differential Temperature	**Economizer Controls:**	Designed per §140.4(e) and (m)	**System Fan Type:**	Variable Air Volume

01 Fan Name or Item Tag	02 Fan Function	03 Qty	04 Maximum Design Supply Airflow (CFM)	05 HP Unit[2]	06 Design HP	07 Fan Power Pressure Drop Adjustment - Table 140.4-B: Device	08 Design Airflow through Device (CFM)
SF-1	Supply	1	8,000	BHP	4.44		
						Calculated Adjustment (in H_2O)	

Total System Design Supply Airflow (CFM):	8,000	Total System Design (B)HP:	4.44	**Maximum System Fan Power (B)HP:**	

System Name:	AC-2	**Economizer:**[1]	Differential Temperature	**Economizer Controls:**	Designed per §140.4(e) and (m)	**System Fan Type:**	Variable Air Volume

01 Fan Name or Item Tag	02 Fan Function	03 Qty	04 Maximum Design Supply Airflow (CFM)	05 HP Unit[2]	06 Design HP	07 Fan Power Pressure Drop Adjustment - Table 140.4-B: Device	08 Design Airflow through Device (CFM)
SF-2	Supply	1	8,000	BHP	4.44		
						Calculated Adjustment (in H_2O)	

Total System Design Supply Airflow (CFM):	8,000	Total System Design (B)HP:	4.44	**Maximum System Fan Power (B)HP:**	

System Name:	AC-3	**Economizer:**[1]	Differential Temperature	**Economizer Controls:**	Designed per §140.4(e) and (m)	**System Fan Type:**	Variable Air Volume

Table Continued

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created 5/20) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE NRCC-MCH-E

This document is used to demonstrate compliance for mechanical systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in §140.4, or §141.0(b)2 for alterations.

Project Name:	Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 1 of 14
Project Address:	600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

A. GENERAL INFORMATION

01	Project Location (city)	Newport Beach	04	Total Conditioned Floor Area	29,821
02	Climate Zone	6	05	Total Unconditioned Floor Area	0
03	Occupancy Types Within Project:		06	# of Stories (Habitable Above Grade)	2

- ☐ Office (B) ☐ Retail (M) ☐ Non-refrigerated Warehouse (S)
- ☐ Hotel/ Motel Guest Rooms (R-1) ☐ School (F) ☐ Healthcare Facility (H)
- ☐ High-Rise Residential (R-2/R-3) ☐ Relocatable Class Bldg (E) ☑ Other (Write In): See Table J

[1] FOOTNOTES: Climate zone can be determined on the California Energy Commission's website at http://www.energy.ca.gov/maps/renewable/building_climate_zones.html

B. PROJECT SCOPE

Table Instructions: Include any mechanical systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in §140.4, or §141.0(b)2 for alterations.

My project consists of (check all that apply)

01 Air System(s)	02 Wet System Components	03 Dry System Components
☑ Heating Air System	☐ Water Economizer	☑ Air Economizer
☑ Cooling Air System	☐ Pumps	☐ Electric Resistance Heat
Mechanical Controls	☐ Hydronic System Piping	☑ Fan Systems
☑ Mechanical Controls	☐ Cooling Towers	☐ Ductwork
	☐ Chillers	☑ Ventilation
	☐ Boilers	☐ Zonal Systems/ Terminal Boxes

C. COMPLIANCE RESULTS

Table Instructions: If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance.

01 System Summary §110.1, §110.2, §140.4 (See Table F)		02 Pumps §140.4(k) (See Table G)		03 Fans/ Economizers §140.4(c), §140.4(e) (See Table H)		04 System Controls §110.2, §120.2, §140.4(f) (See Table I)		05 Ventilation §120.1 (See Table J)		06 Terminal Box Controls §140.4(d) (See Table K)		07 Distribution §120.3, §140.4(l) (See Table L)		08 Cooling Towers §110.2(e)2 (See Table M)	09 Compliance Results
Yes	AND		AND	Yes	AND	Yes	AND	Yes	AND		AND		AND		COMPLIES
												Mandatory Measures Compliance (See Table Q for Details)			COMPLIES

AGENCY APPROVAL

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-119155 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☐
DATE: 06/23/2020

optimum energy design
Consulting Engineers
5200 E. La Palma Ave
Anaheim, CA 92807
Telephone (714) 693-2277

STAMP

REGISTERED PROFESSIONAL ENGINEER
ABBY BANERJEE
No. M29253
Exp. 6/30/21
MECHANICAL
STATE OF CALIFORNIA

PROJECT NAME:

NEWPORT HARBOR
HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
△		
△		
△		
△		

JOB NO:	501-20-0007
DATE:	2020-06-17
DRAWN:	-- JG
CHECK:	-- HL
ARCHITECT:	N/A
ENGINEER:	OED
DSA NUMBER:	04-119155

CONSULTANT

STAMP

SHEET DESCRIPTION:
TITLE 24
REPORT

SHEET NO:
M-4.1

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 5/20)
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 12 of 14
Project Address: 600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

P. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E. Additional Remarks. These documents must be completed by a HERS Rater and provided to the building inspector during construction. The final documents must be created by a HERS Providers registry, but drafts can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCV/

YES	NO	Form/Title	Field Inspector Pass	Field Inspector Fail
○	◉	NRCV-MCH-04-H Duct Leakage Test *NOTE: Must be completed by a HERS Rater*	☐	☐
○	◉	NRCV-MCH-24 Enclosure Air Leakage Worksheet *NOTE: Must be completed by a HERS Rater*	☐	☐
○	◉	NRCV-MCH-27 High-rise Residential *NOTE: Must be completed by a HERS Rater*	☐	☐
○	◉	NRCV-MCH-32 Local Mechanical Exhaust *NOTE: Must be completed by a HERS Rater*	☐	☐

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 5/20)
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 14 of 14
Project Address: 600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Javier Gordon	Documentation Author Signature:	Javier Gordon
Company:	Optimum Energy Design	Signature Date:	2020-05-18
Address:	5200 E La Palma Avenue	CEA/ HERS Certification Identification (if applicable):	N/A
City/State/Zip:	Anaheim/CA/92807	Phone:	(714) 693-2277

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. **The information provided on this Certificate of Compliance is true and correct.**
2. **I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)**
3. **The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.**
4. **The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.**
5. **I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.**

Responsible Designer Name:	Abby Banerjee	Responsible Designer Signature:	
Company :	Optimum Energy Design	Date Signed:	2020-05-18
Address:	5200 E La Palma Avenue	License:	M29253
City/State/Zip:	Anaheim/CA/92807	Phone:	(714) 693-2277

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 5/20)
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 11 of 14
Project Address: 600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

◉	○	NRCA-MCH-02-A Outdoor Air must be submitted for all newly installed HVAC units. *Note: MCH02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.*	☐	☐
○	◉	NRCA-MCH-03-A Constant Volume Single Zone HVAC NOTE: This form does not automatically move to "Yes". If Constant Volume Single Zone HVAC Systems are included in the scope, permit applicant should move this form to "Yes".	☐	☐
○	◉	NRCA-MCH-04-A Air Distribution Duct Leakage	☐	☐
◉	○	NRCA-MCH-05-A Air Economizer Controls	☐	☐
○	◉	NRCA-MCH-06-A Demand Control Ventilation Systems Acceptance must be submitted for all systems required to employ demand controlled ventilation (refer to §120.1(c)3) can vary outside ventilation flow rates based on maintaining interior carbon dioxide (CO2) concentration setpoints.	☐	☐
○	◉	NRCA-MCH-07-A Supply Fan Variable Flow Controls	☐	☐
○	◉	NRCA-MCH-08-A Valve Leakage Test	☐	☐
○	◉	NRCA-MCH-09-A Supply Water Temperature Reset Controls	☐	☐
○	◉	NRCA-MCH-10-A Hydronic System Variable Flow Controls	☐	☐
◉	○	NRCA-MCH-11-A Automatic Demand Shed Controls	☐	☐
◉	○	NRCA-MCH-12-A FDD for Packaged Direct Expansion Units	☐	☐
○	◉	NRCA-MCH-13-A Automatic FDD for Air Handling Units and Zone Terminal Units Acceptance	☐	☐
○	◉	NRCA-MCH-14-A Distributed Energy Storage DX AC Systems Acceptance *NOTE: This form does not automatically move to "Yes". If Distributed Energy Storage DX AC Systems are included in the scope, permit applicant should move this form to "Yes".*	☐	☐
○	◉	NRCA-MCH-15-A Thermal Energy Storage (TES) System Acceptance *NOTE: This form does not automatically move to "Yes". If Chilled Water Storage, Ice-on-Coil Internal Melt, Ice-on-Coil External Melt, Ice Harvester, Brine, Ice-Slurry, Eutectic Salt, Clathrate Hydrate Slurry (CHS), Cryogenic or Encapulated (Ice Ball) Systems are included in the scope, permit applicant should move this form to "Yes".*	☐	☐
◉	○	NRCA-MCH-16-A Supply Air Temperature Reset Controls	☐	☐
○	◉	NRCA-MCH-17-A Condenser Water Temperature Reset Controls	☐	☐
○	◉	NRCA-MCH-18 Energy Management Control Systems	☐	☐
○	◉	NRCA-MCH-19 Occupancy Sensor Controls	☐	☐
○	◉	NRCA-MCH-20 Multi-Family Ventilation	☐	☐
○	◉	NRCA-MCH-21 Multi-Family Envelope Leakage	☐	☐

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 5/20)
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 13 of 14
Project Address: 600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

Q. MANDATORY MEASURES DOCUMENTATION LOCATION

Table Instructions: Indicate where mandatory measures are documented in the plan set or construction documentation. For any mandatory measures that do not apply, mark the plan sheet or construction document location as "N/A", any active cells that are left blank will result in non-compliance in Table C.

01	02
	Plan sheet or construction document location
Compliance with Mandatory Measures documented through MCH Mandatory Measures Note Block: Yes	M-Sheets

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 5/20)
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: Newport Harbor High School (NHHS) SIM Building HVAC Modernization	Report Page:	Page 10 of 14
Project Address: 600 Irvine Avenue, Newport Beach, CA, 92663	Date Prepared:	2020-05-18

L. DISTRIBUTION (DUCTWORK AND PIPING)

This Section Does Not Apply

M. COOLING TOWERS

This Section Does Not Apply

N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCI/

YES	NO	Form/Title	Field Inspector Pass	Field Inspector Fail
◉		NRCI-MCH-01-E - Must be submitted for all buildings.	☐	☐

O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Table Instructions: Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCA/

YES	NO	Form/Title	Field Inspector Pass	Field Inspector Fail

AGENCY APPROVAL

IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-119155 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☐
DATE: 06/23/2020

optimum energy design
Consulting Engineers
5200 E. La Palma Ave
Anaheim, CA 92807
Telephone (714) 693-2277

STAMP

REGISTERED PROFESSIONAL ENGINEER
ABBY BANERJEE
No. M29253
Exp. 6/30/21
MECHANICAL
STATE OF CALIFORNIA

PROJECT NAME:

NEWPORT HARBOR HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
1		
2		
3		
4		

JOB NO:	501-20-0007
DATE:	2020-06-17
DRAWN:	-- JG
CHECK:	-- HL
ARCHITECT:	N/A
ENGINEER:	OED
DSA NUMBER:	04-119155

CONSULTANT

STAMP

SHEET DESCRIPTION:
TITLE 24 REPORT

SHEET NO:
M-4.2

GENERAL NOTES

1. THIS CONTRACTOR SHALL SUPPLY POWER TO AND MAKE CONNECTION TO ALL MOTORS AND EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS AS SHOWN ON THE MECHANICAL AND PLUMBING DRAWINGS, INCLUDING ALL FRACTIONAL HORSEPOWER MOTORS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REVIEW THE MECHANICAL AND PLUMBING DRAWINGS FOR DUCTS, LINES AND EQUIPMENT.

2. ALL COMMUNICATIONS WORK SHALL BE COORDINATED WITH THE COMMUNICATION SYSTEMS EQUIPMENT MANUFACTURER AND THE SCHOOL DISTRICT MAINTENANCE DEPARTMENT PRIOR TO ROUGH -IN AND INSTALLATION OF ANY AND ALL COMMUNICATION SYSTEM DEVICES AND RELATED CONDUIT AND WIRE.

3. THE CONTRACTOR SHALL SECURE AND PAY FOR PERMITS AND FEES NECESSARY FOR EXECUTION AND COMPLETION OF ELECTRICAL WORK, INCLUDING ALL CHARGES BY THE LOCAL GOVERNMENT AGENCIES AND THE UTILITY COMPANIES.

4. UNLESS OTHERWISE NOTED, MOUNTING HEIGHTS INDICATED ON ELECTRICAL OUTLETS ARE FROM FINISHED FLOOR TO CENTER OF OUTLETS.

5. NO CONDUIT SHALL BE RUN HORIZONTALLY IN CONCRETE FLOOR SLABS.

6. ALL FINAL CONNECTIONS TO OWNER-FURNISHED EQUIPMENT SHALL BE MADE BY THIS CONTRACTOR.

7. MEP COMPONENT ANCHORAGE NOTE

   ALL MECHANICAL, PLUMBING, AND ELECTRICAL COMPONENTS SHALL BE ANCHORED AND INSTALLED PER THE DETAILS ON THE DSA APPROVED CONSTRUCTION DOCUMENTS. THE FOLLOWING COMPONENTS SHALL BE ANCHORED OR BRACED TO MEET THE FORCE AND DISPLACEMENT REQUIREMENTS PRESCRIBED IN THE 2019 CBC SECTIONS 1617A.1.18 THROUGH 1617A.1.26 AND ASCE 7-16 CHAPTERS 13, 26 AND 30.

   1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
   2. TEMPORARY, OR MOVABLE EQUIPMENT THAT IS PERMANENTLY ATTACHED (E.G. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRICITY, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING FLEXIBLE CABLE.
   3. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT WHICH IS HEAVIER THAN 400 POUNDS OR HAS A CENTER OF MASS LOCATED 4 FEET OR MORE ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT IS REQUIRED TO BE RESTRAINED IN A MANNER APPROVED BY DSA.

   THE FOLLOWING MECHANICAL AND ELECTRICAL COMPONENTS SHALL BE POSITIVELY ATTACHED TO THE STRUCTURE BUT NEED NOT DEMONSTRATE DESIGN COMPLIANCE WITH THE REFERENCES NOTED ABOVE. THESE COMPONENTS SHALL HAVE FLEXIBLE CONNECTIONS PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT. FLEXIBLE CONNECTIONS MUST ALLOW MOVEMENT IN BOTH TRANSVERSE AND LONGITUDINAL DIRECTIONS:

   A. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVING A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
   B. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUNDS PER FOOT, WHICH ARE SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

   THE ANCHORAGE OF ALL MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS SHALL BE SUBJECT TO THE APPROVAL OF THE DESIGN PROFESSIONAL IN GENERAL RESPONSIBLE CHARGE OR STRUCTURAL ENGINEER DELEGATED RESPONSIBILITY AND ACCEPTANCE BY DSA. THE PROJECT INSPECTOR WILL VERIFY THAT ALL COMPONENTS AND EQUIPMENT HAVE BEEN ANCHORED IN ACCORDANCE WITH THE ABOVE REQUIREMENTS.

   PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

   PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO COMPLY WITH THE FORCES AND DISPLACEMENTS PRESCRIBED IN ASCE 7-16 SECTION 13.3 AS DEFINED IN ASCE 7-16 SECTIONS 13.6.5, 13.6.6, 13.6.7, 13.6.8 AND 2019 CBC, SECTIONS 1617A.1.24, 1617A.1.25, AND 1617A.1.26.

   THE METHOD OF SHOWING BRACING AND ATTACHMENTS TO THE STRUCTURE FOR THE IDENTIFIED DISTRIBUTION SYSTEM ARE AS NOTED BELOW. WHEN BRACING AND ATTACHMENTS ARE BASED ON A PREAPPROVED INSTALLATION GUIDE (E.G., OSHPD OPM FOR 2013 CBC OR LATER.), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF AND DURING THE HANGING AND BRACING OF THE DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

   MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEM (E):

   MP☐MD☐PP☐E☒ - OPTION 1: DETAILED ON THE APPROVED DRAWINGS WITH PROJECTS SPECIFIC NOTES AND DETAILS.

   MP☐MD☐PP☐E☐ - OPTION 2: SHALL COMPLY WITH THE APPLICABLE OSHPD PRE-APPROVAL (OPM #) # ________.

8. SHUT DOWN OF EXISTING ELECTRICAL SYSTEMS SERVING THE REST OF THE SCHOOL WILL NOT BE ALLOWED.

9. THIS CONTRACTOR SHALL COORDINATE ALL LINE AND LOW VOLTAGE COMPONENTS AND WIRING TYPES TO, MATCH EXISTING SYSTEMS, WITH THE SCHOOL DISTRICT PRIOR TO BID AND INCLUDE ALL COSTS FOR A COMPLETE OPERABLE SYSTEM EXPANSION.

10. ALL EXPOSED CONDUIT SHALL BE PAINTED TO MATCH EXISTING FINISH. COLOR TO BE SELECTED BY THE OWNER. SEE SPECIFICATION 26 00 00 SECTION 2.1 I(1).

11. THE NUMERAL(S) SHOWN AT TOP LIGHT FIXTURE IDENTIFICATION SYMBOL WHICH INDICATES NUMBER OF LIGHT FIXTURES REQUIRED SHALL NOT BE USED BY THE CONTRACTOR FOR HIS QUANTITY TAKE-OFF AT BIDDING OR FOR DETERMINATION OF HOW MANY FIXTURES WILL BE INSTALLED. THE CONTRACTOR SHALL INSTALL A LIGHT FIXTURE WHEREVER A FIXTURE OUTLET IS SHOWN ON DRAWINGS.

12. IDENTIFICATION NAME PLATES FOR PANELS AND SWITCHBOARDS/DISTRIBUTION PANEL FEEDER CIRCUIT BREAKERS SHALL MATCH THE NOMENCLATURE PROVIDED BY THE OWNER AT THE END OF THE CONTRACT.

13. ALL EXTERIOR MOUNTED EQUIPMENT SHALL BE WEATHERPROOF AND PROVIDED IN A WEATHERPROOF ENCLOSURE.

14. INSTALL RACEWAY SYSTEMS AS FOLLOWS:

    A. RIGID GALVANIZED STEEL IN ALL OUTDOOR LOCATIONS AND IN INDOOR LOCATIONS WHERE SUBJECT TO PHYSICAL DAMAGE.

    B. I.M.C. OR E.M.T. IN ALL INDOOR AREAS.

    C. FLEXIBLE METAL CONDUIT FOR FINAL CONNECTIONS TO LIGHT FIXTURES, MOTORS, VIBRATING ELECTRICAL EQUIPMENT AND HORIZONTAL RUNS IN WOOD STUD WALLS.

    D. PVC CONDUIT FOR UNDERGROUND RUNS. USE 20 MIL PVC TAPED RIGID STEEL RISER ELBOWS AND RISERS FOR CONDUIT STUB-UPS.

    E. USE COMPRESSION TYPE FITTINGS FOR ALL METALLIC CONDUIT.

    F. 1" CONDUIT MINIMUM FOR UNDERGROUND INSTALLATIONS.

15. ALL NEW WIRING SHALL BE COPPER.

16. PROVIDE THE OWNER AND THIS ENGINEER WITH ONE SET OF ELECTRICAL "AS-BUILTS" AT THE COMPLETION OF JOB.

17. CONDUIT ROUTING INDICATED ON THESE PLANS IS DIAGRAMMATIC. ACTUAL ROUTING OF CONDUITS SHALL BE COORDINATED IN THE FIELD TO AVOID INTERFERENCE WITH OTHER UTILITIES AND TRADES. THE CONTRACTOR SHALL INSTALL ALL CONDUIT, JUNCTION/PULL BOXES, ETC., AS REQUIRED FOR A COMPLETE SYSTEM IN FULL COMPLIANCE WITH ALL APPLICABLE CODES.

18. ALL OUTLET LOCATIONS SHALL BE COORDINATED WITH ARCHITECTURAL ELEVATIONS PRIOR TO INSTALLATION.

19. NOT USED.

20. ELECTRICAL CONTRACTOR SHALL PERFORM ALL WORK IN STRICT ACCORDANCE WITH GOVERNING CODES.

21. ALL EQUIPMENT SHALL BE NEW AND BEAR A "UL" LABEL - U.O.N..

22. COMPLETE ELECTRICAL INSTALLATION SHALL BE GUARANTEED IN WRITING FOR A PERIOD OF (1) YEAR - U.O.N..

23. ELECTRICAL CONTRACTOR SHALL VISIT SITE PRIOR TO BID DATE, TO VERIFY ALL EXISTING CONDITIONS TO BE ENCOUNTERED IN THE INSTALLATION OF ALL NEW EQUIPMENT, FIXTURES DEVICES, FEEDERS, ETC.. EXACT INSTALLATION METHOD AND REQUIREMENTS SHALL BE VERIFIED AND DETERMINED PRIOR TO BID DATE. CONTRACTORS SHALL IMMEDIATELY NOTIFY THIS ENGINEER OF ANY REQUIRED MODIFICATIONS WHICH ARE NOT SHOWN ON THESE DRAWINGS. SUBMITTAL OF BID INDICATES CONTRACTOR IS COGNIZANT OF ALL JOB SITE CONDITIONS AND WORK TO BE PERFORMED.

24. ALL EQUIPMENT ELECTRICAL CHARACTERISTICS, LOCATIONS, AND CONNECTION REQUIREMENTS SHALL BE VERIFIED PRIOR TO ANY ROUGH-IN WORK.

25. ALL POWER AND LIGHTING BRANCH CIRCUITS SHALL BE INSTALLED WITH A #12 GREEN GROUND WIRE U.O.N. THE COMPLETE ELECTRICAL SYSTEM SHALL BE GROUNDED IN ACCORDANCE WITH ARTICAL 250 OF THE CALIFORNIA ELECTRICAL CODE (CEC).

26. IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO DO ALL CORING, CUTTING, PATCHING AND REFINISHING OF WALLS AND SURFACES WHEREVER IT IS NECESSARY FOR HIM TO PENETRATE FOR HIS WORK. ALL OPENINGS MADE SHALL BE SEALED TO MEET THE RATED INTEGRITY OF THE PARTICULAR WALL, FLOOR OR CEILING.

27. THE CONTRACTOR SHALL STRATEGICALLY LOCATE JUNCTION BOXES AND PULL BOXES, ETC., IN ACCESSIBLE CEILING SPACES. PROVIDSE ACCESS PANELS WHERE JUNCTION/PULL BOXES ARE LOCATED IN INACCESSIBLE CEILING SPACES. COORDINATE LOCATION OF REQUIRED ACCESS PANELS PRIOR TO ROUGH-IN.

28. ALL WIRING AND ELECTRICAL EQUIPMENT INSTALLED FOR MECHANICAL AND PLUMBING EQUIPMENT SHALL BE IN ACCORDANCE WITH THESE DRAWINGS AND THE WIRING DIAGRAMS OF THE MECHANICAL AND PLUMBING DRAWINGS.

29. UNLESS SPECIFICALLY SHOWN ON THESE PLANS NO STRUCTURAL MEMBER SHALL BE CUT, DRILLED, NOR NOTCHED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE STRUCTURAL ENGINEER AND THE DISTRICT STRUCTURAL ENGINEER FROM THE DIVISION OF THE STATE ARCHITECT.

DEMOLITION NOTES

1. ALL ELECTRICAL EQUIPMENT, OUTLETS, DEVICES, ETC., THAT ARE MARKED FOR DELETION SHALL BE REMOVED COMPLETELY, INCLUDING CONDUIT AND WIRES BACK TO THE LAST REMAINING FIXTURE, OUTLET, DEVICE, SERVING PANEL, ETC.

2. WHERE EXISTING OUTLET/DEVICES TO REMAIN ARE FED BY OUTLETS BEING REMOVED BY WORK UNDER THIS CONTRACT, THE CONTRACTOR SHALL ROUTE NEW CONDUIT, WIRE, ETC., AS REQUIRED TO MAINTAIN THE SUBJECT OUTLETS IN OPERATION.

3. THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE OWNER PRIOR TO REMOVAL OF EXISTING ELECTRICAL/LOW VOLTAGE EQUIPMENT AND TURN OVER REMOVED EQUIPMENT THAT THE OWNER REQUESTS, IN AS-FOUND CONDITION. EQUIPMENT THAT IS TO BE TURNED OVER SHALL BE BOXED AND TAGGED TO IDENTIFY THE SPECIFIC EQUIPMENT.

4. ALL EXISTING CONDUITS WITHIN PROJECT AREA FOR LIGHTING FIXTURES, RECEPTACLES, OTHER BRANCH CIRCUITS LOADS AND COMMUNICATIONS/SIGNAL SYSTEMS, WHETHER SHOWN ON PLANS OR NOT, SHALL BE A PART OF THIS CONTRACT.

5. IN GENERAL, THE DEMOLITION PLAN SHOWS EXISTING EQUIPMENT THAT IS TO REMAIN, BE REMOVED OR REMOVED AND RELOCATED. HOWEVER, ELECTRICAL EQUIPMENT WHETHER SHOWN ON THIS DRAWING OR NOT, THAT IS LOCATED IN A REMOVED WALL OR CEILING, SHALL BE REMOVED UNLESS OTHERWISE NOTED.

6. WHERE EXISTING EQUIPMENT IS REMOVED BY WORK UNDER THIS CONTRACT, EXISTING CONDUIT FEEDS UP THROUGH THE FLOOR SHALL BE CUT OFF AND PLUGGED FLUSH WITH FLOOR AND CONDUCTORS REMOVED FROM THAT POINT BACK TO THE LAST OUTLET REMAINING IN SERVICE. WHERE THE SUBJECT CONDUIT FEEDS OUTLETS/ DEVICES REMAINING IN OPERATION THE CONTRACTOR SHALL REROUTE THE SUBJECT CONDUIT AND CONDUCTORS AS REQUIRED TO MAINTAIN OPERATION OF SUCH CIRCUITS/SYSTEMS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO IDENTIFY AND DIMENSION ALL SUCH CONDUITS ON THE "RECORD" DRAWINGS.

7. WHERE EXISTING ROOF MOUNTED EQUIPMENT IS REMOVED BY WORK UNDER THIS CONTRACT, THE EXISTING CONDUIT FEEDS UP THROUGH THE ROOF SHALL BE REMOVED FROM THAT POINT BACK TO THE SERVING PANEL OR LAST EQUIPMENT REMAINING IN SERVICE. WHERE THE SUBJECT CONDUIT FEEDS EQUIPMENT REMAINING IN OPERATION THE CONTRACTOR SHALL REROUTE THE SUBJECT CONDUIT AND CONDUCTORS AS REQUIRED TO MAINTAIN OPERATION OF SUCH EQUIPMENT. THE CONTRACTOR SHALL PATCH, REPAIR AND REFINISH ALL WALL AND ROOF PENETRATIONS AFFECTED BY THE REMOVAL OF THE CONDUIT.

8. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO MAINTAIN CONTINUITY OF ALL ELECTRICAL AND COMMUNICATION SYSTEMS, EQUIPMENT, ETC., REMAINING IN OPERATION. MAINTAINING CONTINUITY SHALL CONSIST OF RE-ROUTING CONDUIT, WIRE, ETC., AS REQUIRED TO MAINTAIN THE SUBJECT SERVICES IN OPERATION.

9. EXISTING CIRCUITS THAT ARE REMOVED AND NOT RE-USED SHALL BE IDENTIFIED ON THE PANEL SCHEDULE AS "SPARE".

10. REFER TO GENERAL NOTES, THIS SHEET, FOR ADDITIONAL REQUIREMENTS.

11. UNLESS SPECIFICALLY SHOWN ON THESE PLANS NO STRUCTURAL MEMBER SHALL BE CUT, DRILLED,NOR NOTCHED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE STRUCTURAL ENGINEER AND THE DISTRICT STRUCTURAL ENGINEER FROM THE DIVISION OF THE STATE ARCHITECT.

REFERENCES & ABBREVIATIONS

	DETAIL REFERENCE	MCB	MAIN CIRCUIT BREAKER
1	KEYNOTE REFERENCE	FLA	FULL LOAD AMPS
A.F.F.	ABOVE FINISH FLOOR	C.	CONDUIT
U.O.N.	UNLESS OTHERWISE NOTED	V.	VOLTS
C.O.	CONDUIT ONLY W/PULL ROPE	A	AMPS
WP	WEATHER PROOF	GFI	GROUND FAULT INTERRUPTER
CU.	COPPER	GND	GROUND
M.L.O.	MAIN LUGS ONLY	V.L.	VERIFY LOCATION
E or (E)	EXISTING TO REMAIN	A.C.	ABOVE COUNTER
E.Q.	EQUAL	N.L.	NIGHT LIGHT

SYMBOL LIST

	CONDUIT RUN, CONCEALED IN CEILING, WALLS OR UNDER FLOOR 3/4" MIN. IN CEILING OR WALLS, 1"C. MINIMUM FOR UNDERGROUND / UNDER FLOOR.
	CONDUIT TURNED DOWN.
	CONDUIT TURNED UP.
	CONDUIT RUN UNDERGROUND. 1"C. MINIMUM. PROVIDE SIZE PER PLAN.
#10	CROSS LINES ON CONDUIT RUNS INDICATE NUMBER OF #12 WIRES CONTAINED THEREIN. TWO #12 ARE TO BE PROVIDED WHEN CROSS LINES ARE NOT SHOWN. NUMERALS ADJACENT TO CROSS LINES ON CONDUIT RUNS INDICATE SIZE OF CONDUCTORS IN LIEU OF #12. PROVIDE CONDUIT SIZE AS REQUIRED TO ACCOMMODATE THE WIRE SIZE TO BE CONTAINED THEREIN.
B-1,3	CONDUIT HOME RUN TO PANELBOARD. LETTER AND NUMERALS INDICATES ELECTRICAL PANEL AND CIRCUIT NUMBER.
WP	WEATHERPROOF.
	BRANCH CIRCUIT PANEL, MOUNTING AS SHOWN ON SCHEDULES.
	MOLDED CASE CIRCUIT BREAKER (SINGLE LINE DIAGRAM).
AT	CIRCUIT BREAKER AMPERE TRIP RATING (SINGLE LINE DIAGRAM).
— E —	EXISTING CONDUIT AND CONDUCTORS TO REMAIN IN PLACE.
(E)	EXISTING EQUIPMENT TO REMAIN IN OPERATION.
(N)	NEW EQUIPMENT.
(R)	EXISTING EQUIPMENT TO DISCONNECTED AND REMOVED.
S	2 POLE MOTOR RATED SWITCH.
C J WP	JUNCTION BOX. WP = WEATHER PROOF NEMA 3R. C = CEILING TYPE.
GFI	DUPLEX RECEPTACLE, WITH GROUND FAULT INTERRUPTER (20 AMP, 120V., 3W, WALL PLATE TO MATCH DEVICE) MTD. AT +18". RECEPTACLE SHALL BE PROVIDED COMPLETE WITH WEATHERPROOF COVERS U.L. LISTED FOR WET LOCATIONS WHEN IN USE.
AC 1	HVAC EQUIPMENT DESIGNATION. SEE MECHANICAL PLANS.
_AS/_ P/ AF	FUSED DISCONNECT SWITCH. HEAVY DUTY TYPE WITH REQUIRED QUANTITY OF DUAL ELEMENT TIME DELAY FUSES. NEMA 3R FOR OUTDOOR USE. AS=SWITCH AMPERE RATING. P=NUMBER OF POLES. AF=FUSE AMPERE RATING.
_AS/_ P	NON-FUSED DISCONNECT SWITCH. HEAVY DUTY TYPE. AS=SWITCH AMPERE RATING. P=NUMBER OF POLES.
1	NOTE IDENTIFICATION SYMBOL.
X / E4X	DETAIL IDENTIFICATION SYMBOL.
T	THERMOSTAT. MOUNTED AT +48" A.F.F. TO TOP OF BOX. SEE MECHANICAL.
DD	FIRE ALARM DUCT SMOKE DETECTOR.

APPLICABLE CODES

ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LAWS AND REGULATIONS, AND THE REQUIREMENTS OF THE CALIFORNIA CODE OF REGULATIONS (C.C.R.), TITLE 24, INCLUSIVE OF:

2019 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 C.C.R.

2019 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 C.C.R. (2018 INTERNATIONAL BUILDING CODE, VOL. 1 & 2, AND 2019 CALIFORNIA AMENDMENTS)

2019 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 C.C.R. (2017 NATIONAL ELECTRICAL CODE AND 2019 CALIFORNIA AMENDMENTS)

2019 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 C.C.R. (2018 IAPMO UNIFORM MECHANICAL CODE AND 2019 CALIFORNIA AMENDMENTS)

2019 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 C.C.R. (2018 IAPMO UNIFORM PLUMBING CODE AND 2019 CALIFORNIA AMENDMENTS)

2019 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 C.C.R.

2019 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 C.C.R. (2018 INTERNATIONAL FIRE CODE AND 2019 CALIFORNIA AMENDMENTS)

2019 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 C.C.R. (2018 INTERNATIONAL EXISTING BUILDING CODE AND 2019 CALIFORNIA AMENDMENTS)

2019 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 C.C.R.

TITLE 19 C.C.R. PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

NFPA 72 - NATIONAL FIRE ALARM AND SIGNALING CODE (CA AMENDED) 2016 ED.

AGENCY APPROVAL
IDENTIFICATION STAMP
DIV. OF THE STATE ARCHITECT
APP: 04-119155 INC:
REVIEWED FOR
SS ☑ FLS ☑ ACS ☐
DATE: 06/23/2020

optimum energy design
Consulting Engineers
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STAMP
REGISTERED PROFESSIONAL ENGINEER
ABBY BANERJEE
No. M29253
Exp. 6/30/21
MECHANICAL
STATE OF CALIFORNIA

PROJECT NAME:
NEWPORT HARBOR
HIGH SCHOOL SIMS BUILDING
600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
△		
△		
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△		

JOB NO:	501-20-0007
DATE:	2020-06-17
DRAWN:	CBF
CHECK:	RES
ARCHITECT:	
ENGINEER:	A&F
DSA NUMBER:	04-119155

CONSULTANT
A&F ENGINEERING GROUP, INC.
9320 BASELINE RD., SUITE C, RANCHO CUCAMONGA, CA 91701
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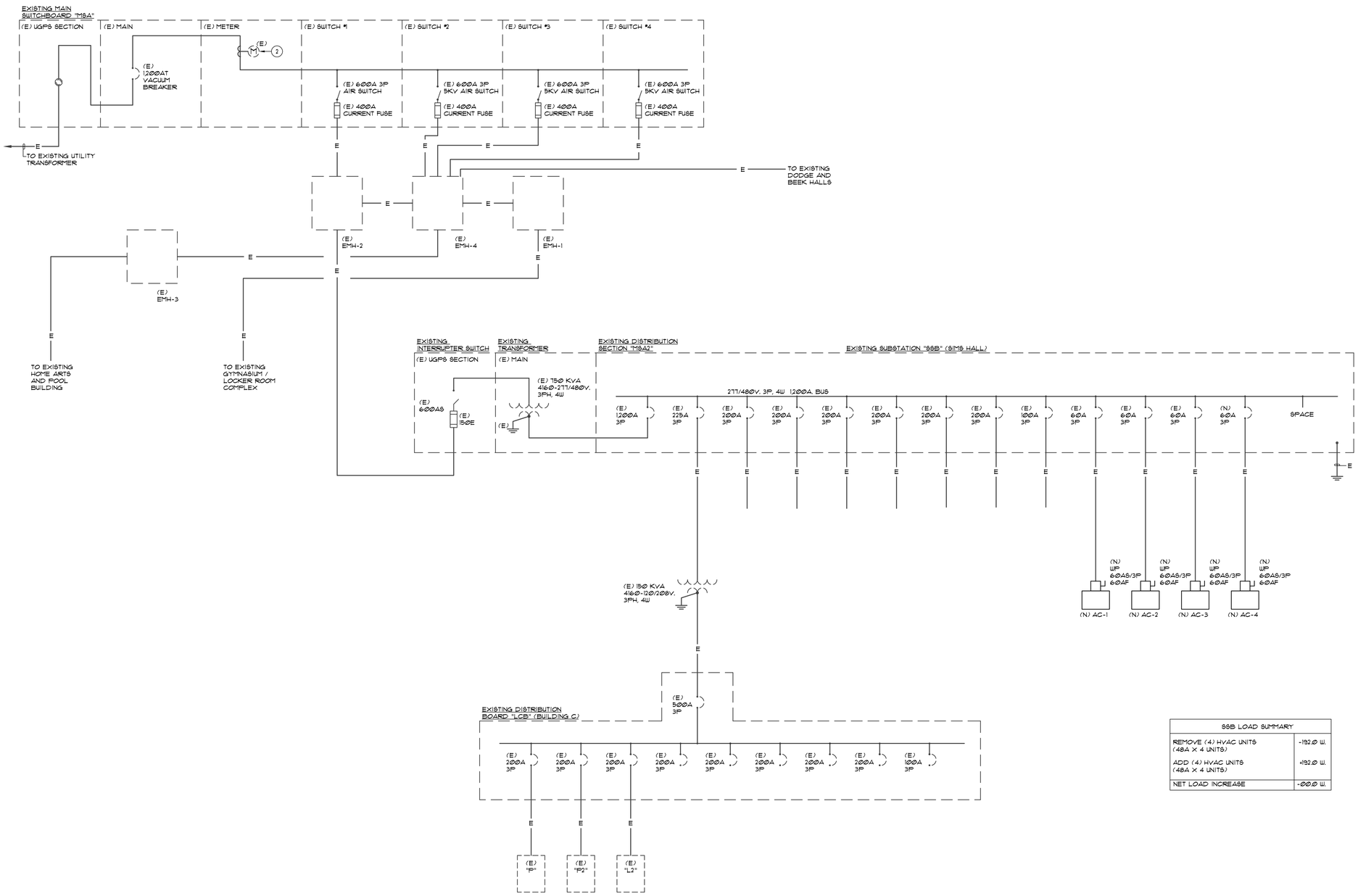
REGISTERED PROFESSIONAL ENGINEER
ROLANDO E. SOTELO
No. E17229
6/30/20
ELECTRICAL
STATE OF CALIFORNIA

SHEET DESCRIPTION:
GENERAL NOTES AND SYMBOL LIST

SHEET NO:
E-01



SSB LOAD SUMMARY	
REMOVE (4) HVAC UNITS (48A X 4 UNITS)	-192.0 W.
ADD (4) HVAC UNITS (48A X 4 UNITS)	+192.0 W.
NET LOAD INCREASE	-00.0 W.

SINGLE LINE NOTES:

1. NEW CIRCUIT BREAKER TO MATCH EXISTING IN MANUFACTURE AND SHORT CIRCUIT DUTY.
2. EXISTING 4160KV SERVICE. EXISTING SCE METER #7349N-00413G.

CONSTRUCTION NOTES:

1. REFER TO GENERAL NOTES, DRAWING E-01, FOR ADDITIONAL REQUIREMENTS.
2. CONTRACTOR TO PROVIDE UPDATED NAME PLATES TO IDENTIFY THE NEW CIRCUIT BREAKERS WITHIN THE MAIN SWITCHBOARD AND DISTRIBUTION BOARDS. CONTRACTOR TO PROVIDE NEW TYPED PANEL DIRECTORIES FOR BRANCH CIRCUIT PANELS AFFECTED BY THE SCOPE OF WORK UPON COMPLETION OF THE REMODEL WORK.
3. CONTRACTOR TO EXPAND NEW BUSSING WITHIN EXISTING MAIN SWITCHGEAR AND/OR ALL DISTRIBUTION BOARDS AS REQUIRED FOR INSTALLATION OF NEW CIRCUIT BREAKERS.
4. CONTRACTOR TO PROVIDE ALL REQUIRED MOUNTING HARDWARE REQUIRED FOR FULLY OPERABLE CIRCUIT BREAKERS.

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DSA NUMBER:	04-119155

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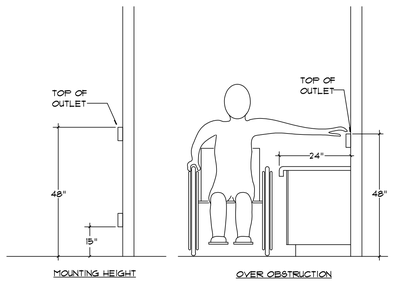
REGISTERED PROFESSIONAL ENGINEER
RICARDO L. SOTELO
No. E17229
6/30/20
ELECTRICAL
STATE OF CALIFORNIA

SHEET DESCRIPTION:
SINGLE LINE DIAGRAM & LOAD TABLE

SHEET NO:
E-02

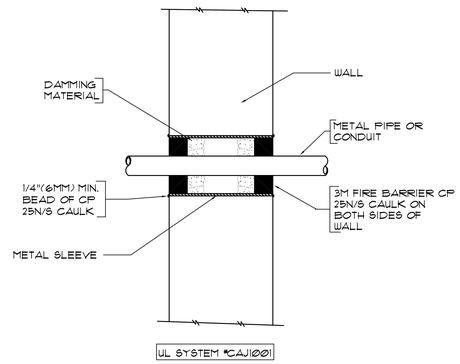


DEVICE MOUNTING HEIGHTS

SCALE: NONE | 1

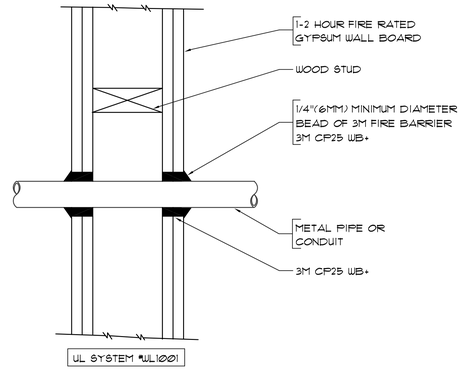
NOT USED

SCALE: NONE | 2



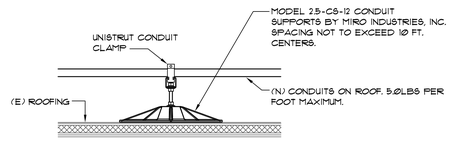
CONCRETE - WALL PENETRATION

SCALE: NONE | 3



WOOD - WALL PENETRATION

SCALE: NONE | 4



INSTALLATION INSTRUCTIONS:

1. CENTER THE PIPE STAND BENEATH THE PIPE SO THAT THE STRUT ALLOWS THE PIPE TO BE POSITIONED SQUARELY OVER THE PIPESTAND.
2. ADJUST THE PIPESTAND TO THE DESIRED HEIGHT AND ENSURE LOAD IS EVENLY DISTRIBUTED WITH OTHER PIPE STANDS. MAKE CERTAIN THE STRUT IS LEVEL.
3. SET THE PIPE ON THE PIPE STAND WITHOUT DROPPING OR CAUSING ANY UNDUE IMPACT.
4. AN ADDITIONAL SHEET OF ROOFING MATERIAL, A TRAFFIC PAD, OR A MIRO SUPPORT PAD SHOULD BE INSTALLED BENEATH THE PIPE STAND.
5. FOR BUILT UP ROOFS, CLEAR ALL LOOSE AGGREGATE FROM AN AREA 2 INCHES OUTSIDE EACH BASE FOOTPRINT.
6. CARE SHOULD BE TAKEN TO INSTALL EACH PIPE STAND, SO EACH SUPPORT CARRIES A PROPORTIONAL AND EQUAL AMOUNT OF WEIGHT.

ROOF MOUNTED CONDUIT

SCALE: NONE | 5

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MECHANICAL
STATE OF CALIFORNIA

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HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

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CHECK:	RES
ARCHITECT:	
ENGINEER:	A&F
DSA NUMBER:	04-119155

CONSULTANT

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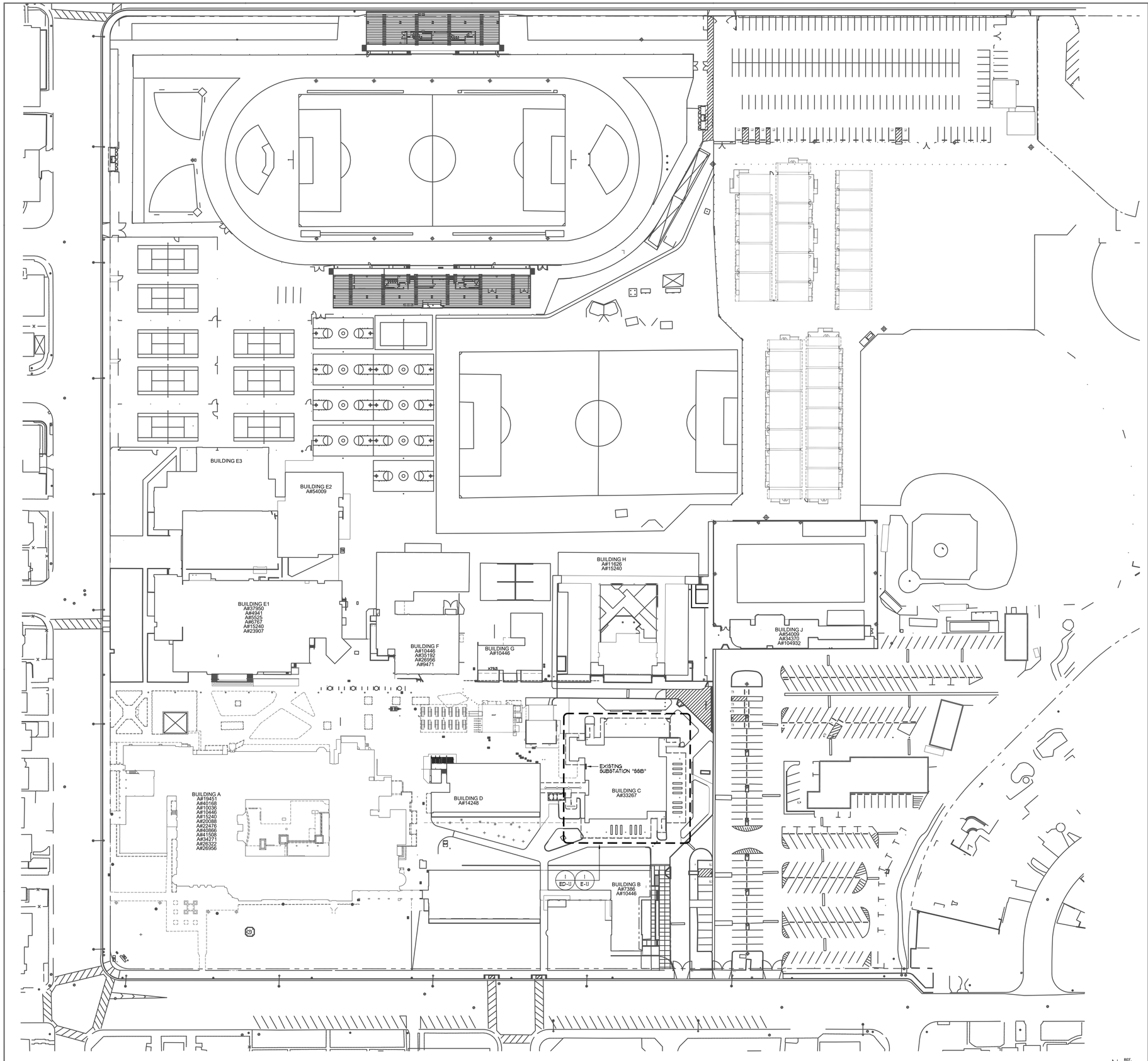
RICARDO E. SOTELO
No. E17229
6/30/20
ELECTRICAL
STATE OF CALIFORNIA

SHEET DESCRIPTION:
ELECTRICAL DETAILS

SHEET NO:
E-03



OVERALL SITE PLAN | 1" = 50'-0" | 1

CONSTRUCTION NOTES:

1. REFER TO GENERAL NOTES AND DEMOLITION NOTES, DRAWING E-01, FOR ADDITIONAL REQUIREMENTS.
2. IT SHALL BE THIS CONTRACTOR'S RESPONSIBILITY TO MAINTAIN REQUIRED CLEARANCES BETWEEN UNDERGROUND ELECTRICAL CONDUITS AND FOOTINGS. CONDUIT STUB-UPS SHALL NOT BE INSTALLED IN FOOTINGS. EXACT METHOD FOR STUBBING-UP CONDUITS AT FOOTING LOCATIONS SHALL BE COORDINATED IN THE FIELD WITH THE GENERAL CONTRACTOR AND THE ARCHITECT.
3. THE CONTRACTOR SHALL NOTE THE DRAWINGS ARE DIAGRAMMATIC. EXACT ROUTING OF NEW CONDUITS AND LOCATION OF JUNCTION BOXES AND PULL BOXES SHALL BE COORDINATED AND DETERMINED IN THE FIELD. NEW CONDUIT, JUNCTION BOXES AND PULL BOXES SHALL BE PLACED / LOCATED IN SUCH A MANNER AS TO AVOID INTERFERENCE WITH EXISTING BUILDING STRUCTURES, UTILITIES AND THE WORK BEING PERFORMED BY OTHER TRADES.

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ROBERT E. BANISTER
No. M29251
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MECHANICAL
STATE OF CALIFORNIA

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HIGH SCHOOL SIMS BUILDING

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ARCHITECT:	
ENGINEER:	A&F
DSA NUMBER:	04-119155

CONSULTANT

A&P ENGINEERING GROUP, INC.
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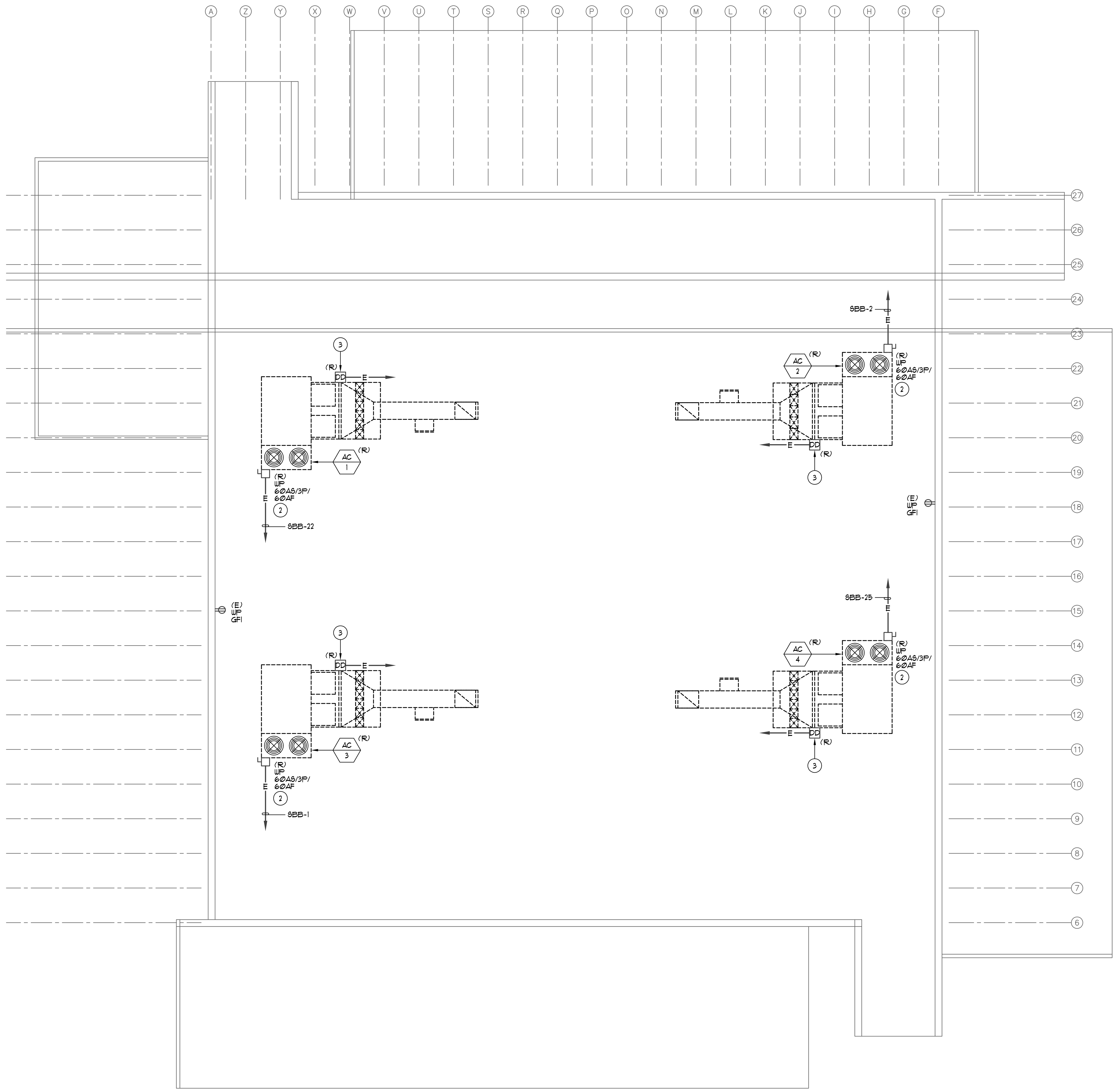
REGISTERED PROFESSIONAL ENGINEER
RICARDO C. SOTO
No. E17229
6/30/20
ELECTRICAL
STATE OF CALIFORNIA

SHEET DESCRIPTION:
OVERALL
SITE PLAN

SHEET NO:
E-04



SIMS BUILDING DEMOLITION ROOF PLAN 1/8" = 1'-0" 1

PLAN NOTES:

1. THE CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL ENGINEER FOR EXACT LOCATION OF MAIN CONTROLLER PRIOR TO ROUGH-IN.
2. CONTRACTOR TO REMOVE AC UNIT AND DISCONNECT SWITCH ONLY. EXISTING CONDUIT AND CONDUCTORS TO BE USED TO ENERGIZE THE NEW AC UNIT. NO NEW LOAD INCREASE. REFER TO REMODEL PLAN FOR ADDITIONAL REQUIREMENTS.
3. CONTRACTOR TO REMOVE DUCT DETECTOR ONLY. EXISTING CONDUIT, CABLES / CONDUCTORS TO BE USED TO ENERGIZE / CONNECT THE NEW DUCT DETECTOR TO THE EXISTING FIRE ALARM SYSTEM. REFER TO REMODEL PLAN FOR ADDITIONAL REQUIREMENTS.

CONSTRUCTION NOTES:

1. REFER TO GENERAL NOTES AND DEMOLITION NOTES, DRAWING E-01, FOR ADDITIONAL REQUIREMENTS.
2. CONTRACTOR TO UPDATE PANEL DIRECTORY AT ALL EXISTING DISTRIBUTION BOARDS AND BRACH CIRCUIT PANELS FOR ALL REMOVED AND ADDED HVAC EQUIPMENT.
3. SEE PANEL SCHEDULES, DRAWING E-03 AND E-04, FOR CIRCUITS FEEDING MECHANICAL EQUIPMENT.
4. THE CONTRACTOR SHALL PROVIDE AN UPDATED TYPED PANEL DIRECTORY FOR ALL PANELS WITHIN SCOPE OF WORK UPON COMPLETION OF WORK. HAND WRITTEN DIRECTORY NOT ALLOWED.
5. ALL CIRCUITS SERVING THE REMODEL AREA, WHETHER IDENTIFIED ON PLAN OR NOT, SHALL BE TRACED AND IDENTIFIED PRIOR TO START OF THE DEMOLITION PHASE. CIRCUITS AFFECTED BY THE REMODEL THAT SERVE AREAS OF THE BUILDING THAT ARE NOT A PART OF THE REMODEL SHALL BE MAINTAINED IN OPERATION DURING THE CONSTRUCTION PHASE. INTERRUPTION OF SERVICE WILL NOT BE ALLOWED.
6. THE CONTRACTOR SHALL REMOVE ALL EXISTING CONDUIT AND FEEDERS FROM EQUIPMENT MARKED TO BE REMOVED ALL THE WAY BACK TO THE SERVING PANEL.

AGENCY APPROVAL

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optimum energy design
Consulting Engineers
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Telephone (714) 693-2277

STAMP

PROJECT NAME:

NEWPORT HARBOR HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
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CHECK:	RES
ARCHITECT:	
ENGINEER:	A&F
DSA NUMBER:	04-119155

CONSULTANT

A&F ENGINEERING GROUP, INC.

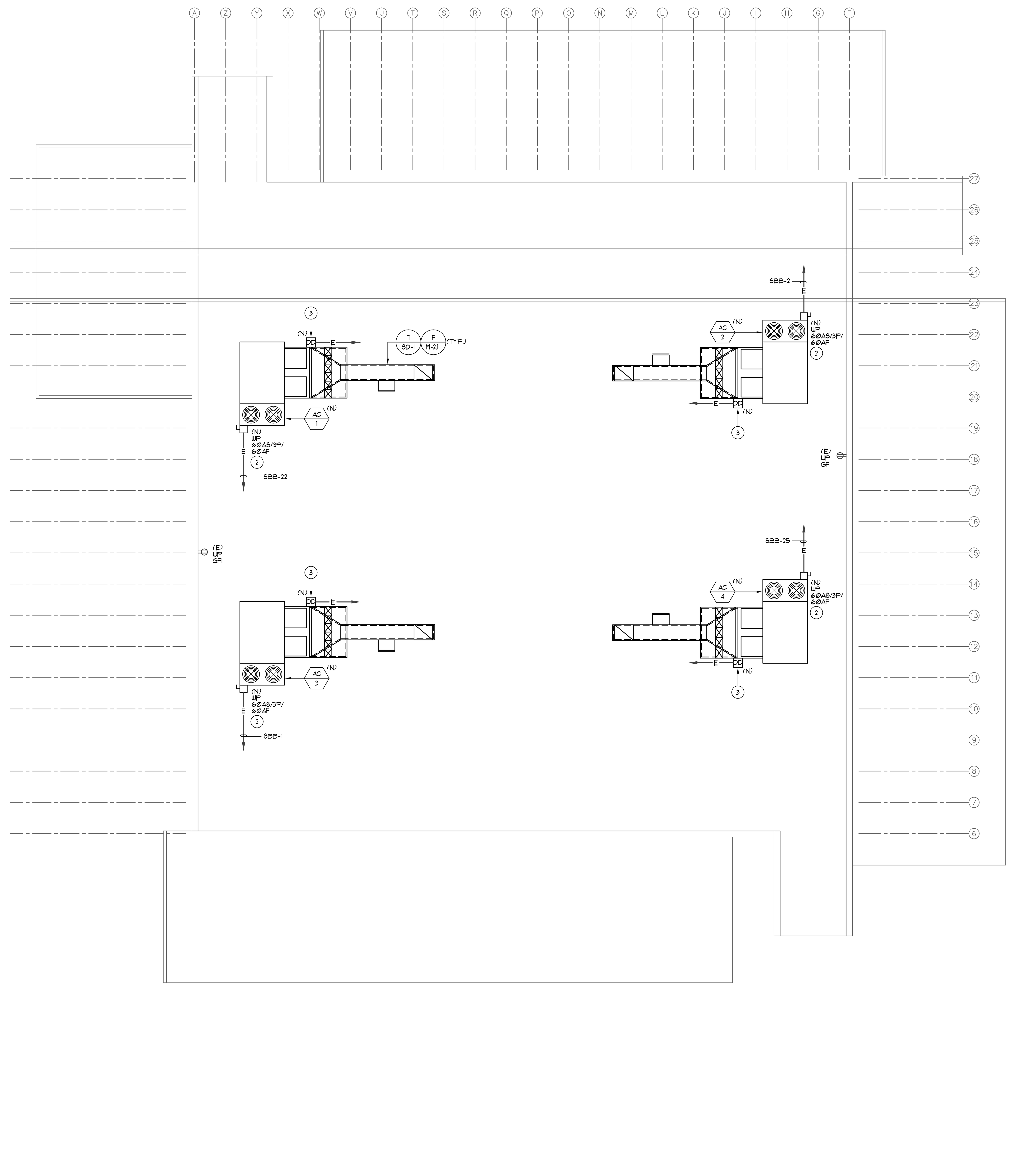
STAMP

SHEET DESCRIPTION:

SIMS BLDG. DEMOLITION ROOF PLAN

SHEET NO:
ED-1.1

SD	SIMPLEX	4098-9714 4098-9756	SMOKE DETECTOR WITH DUCT DETECTOR HOUSING	4-S 2-1/8" DP W/3-O RING IN DUCT	7272-0026:0219 3240-0026:0241



SIMS BUILDING REMODEL ROOF PLAN 1/8" = 1'-0" 1

PLAN NOTES:

1. THE CONTRACTOR SHALL COORDINATE WITH THE MECHANICAL ENGINEER FOR EXACT LOCATION OF MAIN CONTROLLER PRIOR TO ROUGH-IN.
2. CONTRACTOR TO CONNECT NEW AC UNIT TO THE EXISTING CONDUCTORS PREVIOUSLY FEEDING THE REMOVED AC UNIT. CONTRACTOR TO PROVIDE AND EXTEND NEW CONDUIT / CONDUCTORS AS REQUIRED TO ENSURE A FULLY OPERABLE AC UNIT UPON COMPLETION OF INSTALLATION.
3. CONTRACTOR TO CONNECT NEW DUCT DETECTOR TO THE EXISTING CABLES / CONDUCTORS PREVIOUSLY FEEDING THE REMOVED DUCT DETECTOR. CONTRACTOR TO PROVIDE AND EXTEND NEW CONDUIT, CABLES / CONDUCTORS AS REQUIRED TO ENSURE FULLY OPERABLE DUCT DETECTOR UPON COMPLETION OF INSTALLATION. AC UNIT HAS ONE (1) DUCT DETECTOR AT THE MAIN SUPPLY AIR DUCT.

CONSTRUCTION NOTES:

1. REFER TO GENERAL NOTES AND DEMOLITION NOTES, DRAWING E-01, FOR ADDITIONAL REQUIREMENTS.
2. CONTRACTOR TO UPDATE PANEL DIRECTORY AT ALL EXISTING DISTRIBUTION BOARDS AND BRACH CIRCUIT PANELS FOR ALL REMOVED AND ADDED HVAC EQUIPMENT.
3. THE CONTRACTOR SHALL NOTE THAT THE DRAWING IS DIAGRAMMATIC. EXACT ROUTING OF NEW CONDUITS AND LOCATION OF JUNCTION BOXES AND PULL BOXES SHALL BE COORDINATED AND DETERMINED IN THE FIELD. NEW CONDUIT, JUNCTION BOXES AND PULL BOXES SHALL BE ROUTED / PLACED IN SUCH A MANNER AS TO ADHERE TO ALL APPLICABLE CODES AND TO AVOID INTERFERENCE WITH EXISTING BUILDING STRUCTURES, UTILITIES AND THE WORK BEING PERFORMED BY OTHER TRADES. ALL EXTERIOR CONDUIT, FITTINGS, JUNCTION BOXES AND PULL BOXES TO BE WEATHER PROOF TYPE: NEMA 3R.
4. CONTRACTOR SHALL ROUTE ELECTRICAL CONDUITS IN THE SAME ROUTE AS REFRIGERATION PIPING. CONTRACTOR TO COORDINATE WITH THE MECHANICAL AND PLUMBING DRAWINGS PRIOR TO START OF WORK TO DETERMINE EXACT ROUTE.
5. CIRCUITS INDICATED ON THE PANEL SCHEDULES, WHETHER SHOWN ON THE DRAWING OR NOT, SHALL BE A PART OF THIS CONTRACT AND THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE REQUIRED CONDUIT AND WIRE AS REQUIRED TO MEET THE INTENT OF THE PLANS AND SPECIFICATIONS.
6. THE CONTRACTOR SHALL PROVIDE AND INSTALL PVC COATED RIGID CONDUIT, BOXES, PULL BOXES, DISCONNECTS (SAFETY SWITCHES) AND FITTINGS FOR ALL OUTDOOR INSTALLATIONS UNDER THIS CONTRACT TO AVOID DETERIORATION AND CORROSION DUE TO THE MARINE ENVIRONMENT.
7. THE CONTRACTOR SHALL PROVIDE AN UPDATED TYPED PANEL DIRECTORY FOR ALL PANELS WITHIN SCOPE OF WORK UPON COMPLETION OF WORK. HAND WRITTEN DIRECTORY NOT ALLOWED.
8. THE CONTRACTOR SHALL REFER TO THE MECHANICAL AND PLUMBING DRAWINGS FOR EXACT EQUIPMENT LOCATIONS AND ELECTRICAL CONNECTIONS REQUIREMENTS. CONTRACTOR SHALL PROVIDE ALL POWER AND CONTROL CONNECTIONS AS INDICATED ON THE MECHANICAL AND PLUMBING DRAWINGS.
9. ALL CIRCUITS SERVING THE REMODEL AREA, WHETHER IDENTIFIED ON PLAN OR NOT, SHALL BE TRACED AND IDENTIFIED PRIOR TO START OF THE DEMOLITION PHASE. CIRCUITS AFFECTED BY THE REMODEL THAT SERVE AREAS OF THE BUILDING THAT ARE NOT A PART OF THE REMODEL SHALL BE MAINTAINED IN OPERATION DURING THE CONSTRUCTION PHASE. INTERRUPTION OF SERVICE WILL NOT BE ALLOWED.

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STAMP
REGISTERED PROFESSIONAL ENGINEER · No. M29253 · Exp. 6/30/21 · MECHANICAL · STATE OF CALIFORNIA

PROJECT NAME:

NEWPORT HARBOR HIGH SCHOOL SIMS BUILDING

600 IRVINE AVENUE
NEWPORT BEACH, CA 92663

No.	Rev. Date	Description
△		
△		
△		
△		

JOB NO: 501-20-0007
DATE: 2020-06-17
DRAWN: CBF
CHECK: RES
ARCHITECT:
ENGINEER: A&F
DSA NUMBER: 04-119155

CONSULTANT

A&F ENGINEERING GROUP, INC.
9320 BASELINE RD., SUITE C, RANCHO CUCAMONGA, CA 91701
TEL: (909) 941-3008 FAX: (909) 941-3212

STAMP
REGISTERED PROFESSIONAL ENGINEER · ROLANDO E. SOTELO · No. E17229 · 6/30/20 · STATE OF CALIFORNIA

SHEET DESCRIPTION:
SIMS BLDG.
REMODEL
ROOF PLAN

SHEET NO:
E-1.1