ELECTRICAL SYMBOL LEGEND

1. EVERY SYMBOL SHOWN ON LEGEND MAY NOT APPEAR ON DRAWINGS.
2. DASHED ELECTRICAL EQUIPMENT GENERALLY INDICATES EXISTING EQUIPMENT.
3. LONG-SHORT-SHORT-LONG DASHING GENERALLY INDICATES MATCH LINE OR DEFINES AREA FOR SPECIAL NOTE.

CIRCUIT RELATED:

- LIGHTING OR POWER CIRCUIT(S). ARROW INDICATES HOME RUN, LONGER TICK(S) INDICATE NEUTRAL WIRE(S), SHORTER STRAIGHT TICK(S) INDICATE PHASE WIRE(S), SLANTED SHORTER TICK(S) INDICATE SWITCH LEG(S), DOT(S) INDICATE GROUNDING CONDUCTOR(S), DASHED WIRING (LONG-SHORT-LONG DASHES) INDICATES WIRING BELOW SLAB OR GRADE, DASHED WIRING (SERIES OF SHORT DASHES) INDICATES EXISTING WIRING, SLASH THROUGH ARROW INDICATES PARTIAL CIRCUIT, "D" ON HOMERUN ARROW INDICATES DEDICATED CIRCUIT: PROVIDE A SEPARATE NEUTRAL FOR EACH PHASE CONDUCTOR FOR ENTIRE LENGTH OF CIRCUIT FROM PANEL TO OUTLET; COUNT EACH NEUTRAL AS CURRENT-CARRYING AND GROUP A MAXIMUM OF SIX THHN/THWN CONDUCTORS IN A SINGLE RACEWAY; GROUNDING CONDUCTOR IS NOT COUNTED
- JUNCTION BOX
- GROUNDING FIXTURE

LIGHTING:

- LED LIGHTING FIXTURE. LETTER INDICATES TYPE, SMALL LETTER INDICATES SWITCH CONTROL, NUMBER INDICATES CIRCUIT, CROSS HATCHING INDICATES FIXTURE ON EMERGENCY SYSTEM, FOR SOLID CIRCLE WITHIN FIXTURE REFERENCE APPROPRIATE CATEGORY "A" CIRCUIT RELATED SYMBOL
- STRIP TYPE LED LIGHTING FIXTURE. LETTER INDICATES TYPE, SMALL LETTER INDICATES SWITCH CONTROL, NUMBER INDICATES CIRCUIT, FOR SOLID CIRCLE ATTACHED TO FIXTURE REFERENCE APPROPRIATE CATEGORY "A" CIRCUIT RELATED SYMBOL
- LED LIGHTING FIXTURE. LETTER INDICATES TYPE, SMALL LETTER INDICATES SWITCH CONTROL, NUMBER INDICATES CIRCUIT, FOR SOLID CIRCLE REFERENCE APPROPRIATE CATEGORY "A" CIRCUIT RELATED SYMBOL
- DESIGNATES FIXTURE ON EMERGENCY POWER. RE: LIGHTING PLAN NOTES AND FIXTURE SCHEDULE NOTES FOR ADDITIONAL INFORMATION
- WALL OR BRACKET MOUNTED FIXTURE OR DEVICE
- EXIT LIGHT FIXTURE. LETTER INDICATES TYPE, NUMBER INDICATES CIRCUIT, NUMBER AND LOCATION OF SHADED TRIANGLE SECTIONS INDICATE NUMBER OF EXIT SIGN FACES AND DIRECTION OF EACH FACE. PROVIDE CHEVRON DIRECTIONAL INDICATORS AS SHOWN ON DRAWINGS

CONTROL:

- SWITCH. SMALL LETTER INDICATES FIXTURES CONTROLLED, "P" INDICATES PILOT LIGHT, "WP" INDICATES WEATHERPROOF, "K" INDICATES KEY POERATED, "MO" INDICATES SPOT MOMENTARY CONTACT, "2" INDICATES DPDT, "3" INDICATES 3-WAY, "4" INDICATES 4-WAY, "M" INDICATES MANUAL MOTOR STARTER, CIRCUIT DESIGNATION NEXT TO SWITCH INDICATES BRANCH CIRCUIT NUMBER
- WALL BOX DIMMER SWITCH. "MARK" INDICATES WATTAGE IF OTHER THAN 600, "3D" INDICATES 3-WAY DIMMER
- MULTI-LEVEL SWITCH. CIRCUIT DESIGNATION NEXT TO SWITCH INDICATES BRANCH CIRCUIT NUMBER
- DIGITAL TIME SWITCH
- PHOTOELECTRIC CONTROL
- EMERGENCY POWER OFF (EPO) PUSHBUTTON
- PUSH BUTTON
- WALL MOUNT OCCUPANCY SENSOR
- DUAL TECHNOLOGY CEILING MOUNTED OCCUPANCY SENSOR
- CEILING MOUNTED RESTROOM OCCUPANCY SENSOR
- CEILING MOUNTED CORRIDOR OCCUPANCY SENSOR
- CEILING MOUNTED HIGH CEILING OCCUPANCY SENSOR
- ROOM CONTROLLER

POWER OUTLETS:

- 20A-125V DUPLEX RECEPTACLE
- 20A-125V GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLE. "WP" INDICATES WEATHER PROOF DEVICE
- 20A-125V DUPLEX RECEPTACLE MOUNTED ABOVE COUNTER TOP. REFER TO ARCHITECT FOR EXACT HEIGHT ABOVE COUNTER
- 20A-125V CONTROLLED DUPLEX RECEPTACLE
- 20A-125V ISOLATED GROUND TYPE DUPLEX RECEPTACLE
- 20A-125V DUPLEX TAMPER RESISTANT RECEPTACLE WITH (2) USB CHARGING PORTS
- 20A-125V FOURPLEX RECEPTACLE. SAME SYMBOLOGY AS DUPLEX RECEPTACLE
- SPECIAL PURPOSE SINGLE POWER RECEPTACLE. RATED AS INDICATED (IF NO RATING INDICATED, RECEPTACLE RATING SHALL MATCH BRANCH CIRCUIT OVERCURRENT PROTECTIVE DEVICE AND SHALL MEET REQUIREMENTS OF EQUIPMENT BEING CONNECTED), "C" INDICATES CLOCK OUTLET
- 20A-125V FLUSH FLOOR DUPLEX RECEPTACLE. 20A WHEN INDICATED OR IF BRANCH CIRCUIT SERVES ONLY SINGLE DUPLEX. PROVIDE CARPED FLANGE WHERE APPLICABLE
- LC1-X CIRCUIT DESIGNATION NEXT TO RECEPTACLE DEVICES INDICATES BRANCH CIRCUIT NUMBER. RE: PANEL SCHEDULES FOR INFORMATION.

EQUIPMENT:

- +42" A NOTATION INDICATING THE MOUNTING HEIGHT OF A DEVICE AS MEASURED FROM FINISHED FLOOR OR GRADE TO CENTER LINE OF DEVICE
- MOTOR
- DISCONNECT SWITCH. FRAME SIZE/FUSE SIZE/POLES AS INDICATED, "NF" INDICATES NON-FUSIBLE. NEMA 1 ENCLOSURE UNLESS OTHERWISE NOTED. PROVIDE FUSED BUSWAY PLUG WHEN SWITCH IS INDICATED ON BUSWAY. ALL DISCONNECT SWITCHES SHALL BE 30NF/3 UNLESS OTHERWISE NOTED
- SINGLE CIRCUIT BREAKER IN INDIVIDUAL ENCLOSURE
- MAGNETIC MOTOR CONTROLLER. NUMBER INDICATES NEMA SIZE. STARTER NEMA SIZE SHALL BE "NEMA 1" UNLESS OTHERWISE NOTED
- COMBINATION DISCONNECT SWITCH / MOTOR CONTROLLER
- CONTACTOR
- PANELBOARD
- SWITCHBOARD / DP
- TRANSFORMER
- GROUNDING CONNECTION TO GROUNDING ELECTRODE AS DEFINED IN NEC ARTICLE 250
- BELL. "WP" INDICATED OUTDOOR RATED

CODE ANALYSIS SUMMARY

EXISTING BUILDING "F"
TYPE OF CONSTRUCTION : III - A
OCCUPANCY : E, S-2, B

GENERAL NOTES

1. THE CONTRACTOR SHALL VISIT THE SITE INCLUDING ALL AREAS INDICATED ON THE DRAWINGS. HE SHALL THOROUGHLY FAMILIARIZE HIMSELF WITH THE EXISTING CONDITIONS AND BY SUBMITTING A BID. ACCEPTS THE CONDITIONS UNDER WHICH HE SHALL BE REQUIRED TO PERFORM HIS WORK.
2. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN A COMPLETE SET OF CONTRACT DOCUMENTS AND ADDENDA (DRAWINGS AND SPECIFICATIONS.) HE SHALL CHECK THE CONTRACT DOCUMENTS OF THE OTHER TRADES AND DETERMINE HIS RESPONSIBILITIES. FAILURE TO DO SO SHALL NOT RELEASE THE CONTRACTOR FROM COMPLETING ALL RESPONSIBLE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
3. THE CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS, FEES, CHARGES, AND INCIDENTAL COSTS NECESSARY FOR EXECUTION AND COMPLETION OF ELECTRICAL WORK, INCLUDING ALL CHARGES BY STATE, COUNTY AND LOCAL GOVERNMENTAL AGENCIES.
4. ALL ELECTRICAL WORK REFERENCED HEREIN SHALL BE COORDINATED WITH OTHER TRADES AND SITE CONDITIONS. ANY COSTS TO INSTALL WORK TO ACCOMPLISH SAID COORDINATION WHICH DIFFERS FROM THE WORK AS SHOWN ON THE CONTRACT DOCUMENTS SHALL BE INCURRED BY THE CONTRACTOR ANY DISCREPANCIES, AMBIGUITIES OR CONFLICTS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT DURING BID TIME FOR CLARIFICATION. ANY SUCH CONFLICTS NOT CLARIFIED PRIOR TO BID SHALL BE SUBJECT TO THE INTERPRETATION OF THE ARCHITECT AT NO ADDITIONAL COST TO THE OWNER.
5. AFTER ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS HAVE BEEN FULLY COMPLETED. REPRESENTATIVES OF THE OWNERS WILL INSPECT THE WORK. THE CONTRACTOR SHALL PROVIDE COMPETENT PERSONNEL TO DEMONSTRATE THE OPERATION OF ANY ITEM OR SYSTEM TO THE FULL SATISFACTION OF EACH REPRESENTATIVE. FINAL ACCEPTANCE OF THE WORK WILL BE MADE BY THE OWNER AFTER RECEIPT OF APPROVAL AND RECOMMENDATION OF ACCEPTANCE FROM EACH REPRESENTATIVE.
6. FURNISH A ONE YEAR WRITTEN GUARANTEE OF MATERIALS AND WORKMANSHIP FROM PUNCH LIST COMPLETION.
7. ALL FINAL CONNECTIONS TO OWNER FURNISHED EQUIPMENT SHALL BE MADE BY THE CONTRACTOR.
8. EXACT METHOD AND LOCATION OF CONDUIT PENETRATION AND OPENINGS IN CONCRETE OR MASONRY WALLS, GRADE BEAMS, FLOORS OR STRUCTURAL STEEL MEMBER SHALL BE FIELD COORDINATED AS PER EXISTING CONDITION. PERFORM CORING, SAWCUTTING, PATCHING, AND REFINISHING OF WALLS AND SURFACES WHEREVER IT IS NECESSARY TO PENETRATE. OPENINGS SHALL BE SEALED IN AN APPROVED METHOD TO MEET THE FIRE RATING OF THE PARTICULAR WALL, FLOOR OR CEILING. EXACT METHOD AND LOCATION OF CONDUIT PENETRATIONS AND OPENINGS IN CONCRETE WALLS OR FLOORS SHALL BE UL APPROVED.
9. FINAL CONNECTIONS TO MECHANICAL, PLUMBING AND VIBRATING EQUIPMENT AND SEISMIC SEPARATIONS SHALL BE FLEXIBLE STEEL CONDUIT IN DRY INTERIOR LOCATIONS. USE LIQUID-TIGHT FLEXIBLE STEEL CONDUIT IN AREAS EXPOSED TO WEATHER, DAMP LOCATIONS, CONNECTIONS TO TRANSFORMER ENCLOSURES, AND FINAL CONNECTIONS TO MOTORS.
10. EQUIPMENT OUTLETS, LIGHTING FIXTURES, CONDUIT, WIRE AND CONNECTION METHODS IN HVAC AIR-PLENUMS SHALL BE APPROVED FOR USE IN PLENUMS AND SHALL CONFORM TO THE CALIFORNIA ELECTRICAL CODE.
11. ROUTE EXPOSED CONDUIT ABOVE ACCESSIBLE CEILING SPACES, PARALLEL AND PERPENDICULAR TO WALLS AND ADJACENT PIPING. ARRANGE CONDUIT TO MAINTAIN HEADROOM AND TO PRESENT A NEAT APPEARANCE.
12. CONDUIT SHALL NOT BE INSTALLED IN ANY FLOOR SLAB. CONDUIT SHALL BE INSTALLED CONCEALED IN THE CEILING SPACE, CONCEALED WALLS, OR 24" MINIMUM BELOW SLAB ON GRADE UNLESS NOTED OTHERWISE.
13. LOCATE ELECTRICAL EQUIPMENT AND BOXES IN ACCESSIBLE CEILING SPACE OR PROVIDE AN ACCESS PANEL FOR INACCESSIBLE CEILING SYSTEMS. ACCESS DOORS SHALL BE A MINIMUM DIMENSION OF 24" x 24" AND SHALL SUIT ACCESSIBILITY AND CONSTRUCTION CONDITIONS. ACCESS DOORS SHALL HAVE A FIRE RATING EQUAL TO THE CEILING ASSEMBLY IN WHICH THEY ARE INSTALLED.
14. WHENEVER A DISCREPANCY OF ANY SYSTEM AND/OR EQUIPMENT ARISES ON THE CONTRACT DOCUMENTS OR SPECIFICATIONS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING AND INSTALLING ALL MATERIAL AND SERVICES REQUIRED BY THE STRICTEST CONDITIONS NOTED ON THE DRAWINGS OR SPECIFICATIONS TO ENSURE COMPLETE AND OPERABLE SYSTEMS AS REQUIRED BY THE OWNER AND ARCHITECT/ENGINEER.
15. STRAIGHT FEEDER BRANCH CIRCUIT AND CONDUIT RUNS SHALL BE PROVIDED WITH SUFFICIENT PULL BOXES OR JUNCTION BOXES TO LIMIT THE MAXIMUM LENGTH OF ANY SINGLE CABLE PULL TO 100 FEET. PULL BOXES SHALL BE SIZED PER CODE OR AS INDICATED ON DRAWINGS.
16. PANEL SCHEDULES SHALL BE REVISED TO REFLECT FINAL ROOM NAMES AND NUMBERS USING OWNERS ROOM NAME AND NUMBER DESIGNATIONS. ALL CONDUCTORS SHALL BE UL LISTED, COPPER #12 MINIMUM SIZE, TYPE THHN/THWN THERMOPLASTIC, 600 VOLT, 75 DEGREES CELSIUS WET AND 90 DEGREES CELSIUS DRY, UNLESS NOTED OTHERWISE.
17. ALL CABLING SHALL BE ROUTED IN CONDUIT. SIZE CONDUIT AS REQUIRED TO ROUTE SYSTEMS WITH MAXIMUM 40% CABLE FILL. MINIMUM CONDUIT SIZE SHALL BE 3/4" INTERIOR & 1" EXTERIOR.

ADDITIONAL NOTES:

•ALL WORK SHALL CONFORM TO 2019 TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR).

•CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY AN ADDENDUM OR A CONSTRUCTION CHANGED DOCUMENT (CCD) APPROVED BY THE DIVISION OF THE STATE ARCHITECT, AS REQUIRED BY SECTION 4-338, PART 1, TITLE 24, CCR.

•A "DSA CERTIFIED" CLASS 3 PROJECT INSPECTOR EMPLOYED BY THE DISTRICT (OWNER) AND APPROVED BY THE DSA SHALL PROVIDE CONTINUOUS INSPECTION OF THE WORK. THE DUTIES OF THE INSPECTOR ARE DEFINED IN SECTION 4-342, PART 1, TITLE 24, CCR.

•A DSA ACCEPTED TESTING LABORATORY DIRECTLY EMPLOYED BY THE DISTRICT (OWNER) SHALL CONDUCT ALL THE REQUIRED TESTS AND INSPECTIONS FOR THE PROJECT.

•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)

UTILITY PENETRATIONS NOTE

UTILITY PENETRATIONS OF ANY KIND IN FIRE AND SMOKE PARTITIONS AND CEILING ASSEMBLIES SHALL BE FIRESTOPPED AND SEALED WITH AN APPROVED UL LISTED SYSTEM OR MATERIAL.

STEEL ELECTRICAL OUTLET BOXES WHICH DO NOT EXCEED 16 SQUARE INCHES IN AREA, NEED NOT BE PROTECTED IN ONE HOUR OR TWO HOUR FIRE RATED WALLS, PARTITIONS, CEILING, OR AREA SEPARATION UNLESS THEY:

1. OCCUR ON OPPOSITE SIDES OF THE WALL WITHIN 24 INCH HORIZONTAL DISTANCE OF ONE ANOTHER IN THIS CASE , ONLY ONE OUTLET BOX NEEDS TO BE PROTECTED BY AN APPROVED FIRESTOP MATERIAL OR DETAIL TO CORRECT THIS CONDITION.
2. OCCUR IN COMBINATION WITH OUTLET BOXES OF ANY SIZE SUCH THAT THE AGGREGATE AREA OF UNPROTECTED OUTLET BOXES EXCEEDS 100 SQUARE INCHES IN ANY 100 SQUARE FEET OF WALL AREA IN THIS CASE, ONLY A SUFFICIENT NUMBER OF OUTLET BOXES NEED TO BE PROTECTED BY AN APPROVED MATERIAL OR DETAIL TO DECREASE THE AGGREGATE AREA OF UNPROTECTED UTILITY BOXES TO LESS THAN 100 SQUARE FEET OF WALL.

STEEL ELECTRICAL OUTLET BOXES WHICH EXCEED 16 SQUARE INCHES IN AREA, AND ALL OTHER STEEL UTILITY OUTLET BOXES REGARDLESS OF SIZE, SHALL BE PROTECTED BY AN APPROVED FIRESTOP MATERIAL AS LISTED OR EQUAL.

FIRESTOPPING MATERIAL:
MPP-1 MOLDABLE PUTTY PADS
3M CONTRACTOR PRODUCTS
MINNEAPOLIS, MN
3M TEST REPORT NO. 1167
DATED AUGUST 21, 1987

FLAMESAFE FSP 1077 FIRESTOP PADS
INTERNATIONAL PROTECTIVE COATINGS
OAKHURST, NJ

FSP FIRESTOP PUTTY PADS
HEVI-DUTY NELSON PRODUCTS
TULSA, OK

STEEL UTILITY BOXES WHICH EXCEED 100 SQUARE INCHES IN AREA SHALL BE PROTECTED BY ENCASEMENT.

UTILITY AND ELECTRICAL OUTLETS OR BOXES SHALL BE SECURELY FASTENED TO THE STUD FRAMING OF THE WALL, PARTITION OR CEILING ASSEMBLY. THE OPENING IN THE GYPSUM BOARD FACING SHALL BE CUT SO THAT THE CLEARANCE BETWEEN THE BOX AND THE GYPSUM BOARD DOES NOT EXCEED 1/8 INCH IN SMOKE WALLS OR PARTITIONS, THE 1/8 INCH CLEARANCE SHALL BE FILLED WITH AN APPROVED FIRE-RATED SEALANT.

APPLICABLE CODES

PARTIAL LIST OF APPLICABLE CODES AS OF JANUARY 1, 2020 *
2019 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR *
2019 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR
(2018 INTERNATIONAL BUILDING CODE, VOL. 1 & 2, AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR
(2017 NATIONAL ELECTRICAL CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR
(2018 IAPMO UNIFORM MECHANICAL CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR
(2018 IAPMO UNIFORM PLUMBING CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 CCR
2019 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR
(2018 INTERNATIONAL FIRE CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR
(2018 INTERNATIONAL EXISTING BUILDING CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR
2019 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR
TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS
2016 ASME A17.1/CSA B44-13 SAFETY CODE FOR ELEVATORS AND ESCALATORS (PER 2019 CBC PART 2 CH35)
NOTE: CALOSHA ELEVATOR UNIT ENFORCES CCR TITLE 8 AND USES THE 2004 ASME A17.1 BY ADOPTION

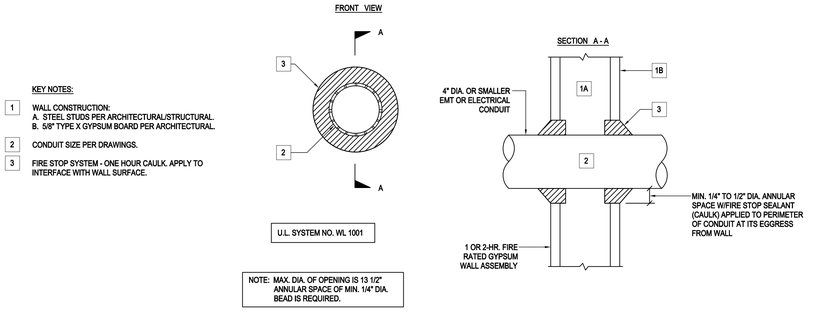
PARTIAL LIST OF APPLICABLE STANDARDS
NFPA 13 - STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS (CA AMENDED); 2016 EDITION
NFPA 14 - STANDARD FOR THE INSTALLATION OF STANDPIPE AND HOSE SYSTEMS (CA AMENDED); 2016 EDITION
NFPA 17 - STANDARD FOR DRY CHEMICAL EXTINGUISHING SYSTEMS; 2017 EDITION
NFPA 17A - STANDARD FOR WET CHEMICAL EXTINGUISHING SYSTEM; 2017 EDITION
NFPA 20 - STANDARD FOR THE INSTALLATION OF STATIONARY PUMPS FOR FIRE PROTECTION; 2016 EDITION
NFPA 22 - STANDARD FOR WATER TANKS FOR PRIVATE FIRE PROTECTIO; 2013 EDITION
NFPA 24 - STANDARD FOR THE INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES (CA AMENDED); 2016 EDITION
NFPA 72 - NATIONAL FIRE ALARM AND SIGNALING CODE (CA AMENDED); 2016 EDITION
NFPA 80 - STANDARD FOR FIRE DOORS AND OTHER OPENING PROTECTIVES; 2016 EDITION
NFPA 2001 - STANDARD ON CLEAN AGENT FIRE EXTINGUISHING SYSTEMS FOR PROTECTION OF COMMERCIAL COOKING EQUIPMENT; 2005 EDITION
UL 300 - STANDARD FOR FIRE TESTING OF FIRE EXTINGUISHING SYSTEMS FOR PROTECTION OF COMMERCIAL COOKING EQUIPMENT; 2005 (R2010)
UL 464 - AUDIBLE SIGNALING DEVICES FOR FIRE ALARM AND SIGNALING SYSTEMS, INCLUDING ACCESSORIES; 2003 EDITION
UL 521 - STANDARD FOR HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS; 1999 EDITION
UL 1971 - STANDARD FOR SIGNALING DEVICES FOR THE HEARING IMPAIRED; 2002 EDITION (R2010)
ICC 300 - STANDARD FOR BLEACHERS, FOLDING AND TELESCOPIC SEATING, AND GRANDSTANDS; 2017 EDITION

FOR A COMPLETE LIST OF APPLICABLE NFPA STANDARDS REFER TO 2019 CBC (SFM) CHAPTER 35 AND CALIFORNIA FIRE CODE CHAPTER 80.

SEE CALIFORNIA BUILDING CODE, CHAPTER 35, FOR STATE OF CALIFORNIA AMENDMENTS TO THE NFPA STANDARDS.

* ALL PARTS OF THE 2019 CALIFORNIA BUILDING CODE BECOME EFFECTIVE JANUARY 1, 2020 EXCEPT THE EFFECTIVE DATE FOR THE USE OF THE 2019 BUILDING ENERGY EFFICIENCY STANDARDS (TITLE 24, PART 1, CHAPTER 10) IS JANUARY 8, 2019 AND THE EFFECTIVE DATE FOR THE USE OF THE CALIFORNIA ADMINISTRATIVE CODE (TITLE 24, PART 1, CHAPTER 4) IS JANUARY 8, 2019.

CONDUIT PENETRATION AT FIRE RATED PARTITION DETAIL



KEY NOTES:

1. WALL CONSTRUCTION:
   A. STEEL STUDS PER ARCHITECTURAL/STRUCTURAL.
   B. 5/8" TYPE X GYPSUM BOARD PER ARCHITECTURAL.
2. CONDUIT SIZE PER DRAWINGS.
3. FIRE STOP SYSTEM - ONE HOUR CAULK. APPLY TO INTERFACE WITH WALL SURFACE.

U.L. SYSTEM NO. WL 1001

NOTE: MAX. DIA. OF OPENING IS 13 1/2" ANNULAR SPACE OF MIN. 1/4" DIA. BEAD IS REQUIRED.

DRAWING INDEX

SHEET	DESCRIPTION
E0.1	ELECTRICAL GENERAL NOTES, SYMBOLS & ABBREVIATIONS
E0.2	ELECTRICAL SPECIFICATIONS
E2.01	ELECTRICAL FLOOR PLAN
E3.01	ELECTRICAL ROOF PLAN

SCOPE NOTES

PROJECT REQUIRES HVAC REPLACEMENT AT BOYS AND GIRLS LOCKER ROOMS. CONTRACTOR SHALL DISCONNECT AND PROTECT EXISTING BRANCH CIRCUIT WIRING AND RE-CONNECT TO THE REPLACEMENT UNITS. PROVIDE NEW CIRCUIT WHERE INDICATED ON DRAWINGS.

DIAGRAMMATIC NOTE

DRAWINGS ARE DIAGRAMMATIC AND DO NOT INDICATE DETAILED CONDUIT ROUTING OR LENGTHS REQUIRED FOR COMPLETE INSTALLATION. ROUTING OF RACEWAYS SHALL BE AT THE OPTION OF THE CONTRACTOR BUT SHALL BE IN STRICT COMPLIANCE WITH LOCAL CODES, CONTRACT DOCUMENTS AND SPECS UNLESS OTHERWISE NOTED. ALL WORK SHALL BE COORDINATED WITH OTHER TRADES. DO NOT SCALE THE ELECTRICAL DRAWINGS FOR LOCATIONS.

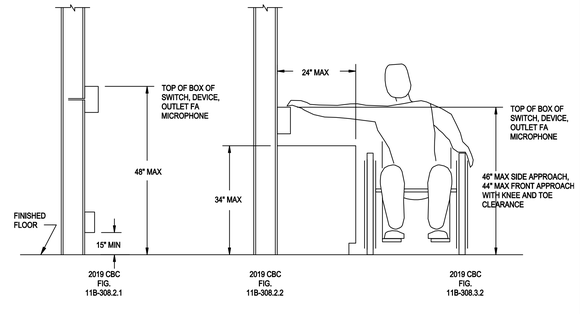
DEVICE LOCATIONS NOTE

COORDINATE WITH OTHER TRADES AS TO THE EXACT LOCATION OF THEIR RESPECTIVE EQUIPMENT. SUPPLY POWER AND MAKE CONNECTION TO MOTORS AND EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS AS INDICATED ON ELECTRICAL DRAWING AND/OR DRAWINGS OF OTHER TRADES. REVIEW THE DRAWINGS OF OTHER TRADES FOR CONTROL DIAGRAMS, SIZE, AND LOCATION OF EQUIPMENT DISCONNECT, SWITCHES, STARTERS, WIRING, CONTROLS, AND CONDUIT FOR MECHANICAL AND PLUMBING OPERATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING MANUFACTURER'S SHOP DRAWINGS PRIOR TO ROUGHING IN ALL CONDUIT TO THIS EQUIPMENT.

STRUCTURAL NOTE

UNLESS SPECIFICALLY SHOWN ON THESE PLANS. STRUCTURAL MEMBERS SHALL NOT BE CUT. DRILLED, OR NOTCHED WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE STRUCTURAL ENGINEER AND THE DIVISION OF THE STATE ARCHITECT.

MOUNTING OVER OBSTRUCTION DETAIL



NOTE:

1. THIS DETAIL APPLIES TO MOUNTING OF ANY MECHANICAL AND ELECTRICAL DEVICE WHICH CONTAINS AN OPERABLE PART THAT IS ADJUSTABLE BY THE OCCUPANT. THIS DOES NOT APPLY TO SENSORS OR CONTROLS THAT ARE ONLY ADJUSTABLE THROUGH THE BUILDING AUTOMATION SYSTEM (IE: TEMPERATURE AND HUMIDITY SENSORS).

UL LISTINGS NOTE

ALL ELECTRICAL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BE LISTED BY UNDERWRITER'S LABORATIES (UL) AND BEAR THEIR LABEL OR LISTED AND CERTIFIED BY A NATIONALLY RECOGNIZED TESTING AUTHORITY.

ALL EQUIPMENT/DEVICES INSTALLED RECESSED IN FIRE RATED CEILINGS OR WALLS SHALL BE ENCLOSED WITH AN APPROVED UL LISTED ENCLOSURE CARRYING THE SAME FIRE RATING AS THE CEILING OR WALL.

LEAF ENGINEERS
A PBK COMPANY
LEAFENGINEERS.com
ONTARIO
3110 E. Guasti Road, Suite 300
Ontario, CA 91761
916-682-9494 P
916-682-0990 F

NMUSD Estancia HS Locker Rooms
2323 Placentia Ave.
Costa Mesa, CA 92627
100% CONSTRUCTION DOCUMENT

KEY PLAN — PLAN NORTH — TRUE NORTH

Engineer
REGISTERED PROFESSIONAL ENGINEER MATTHEW R. SICOTTE E 20162 ELECTRICAL STATE OF CALIFORNIA
12/31/2022

Architect

CLIENT
NMUSD
PROJECT NUMBER
P2101400ME
DATE
02/08/2021
REVISIONS

#	DESCRIPTION	DATE

100% CONSTRUCTION DOCUMENT

ELECTRICAL GENERAL NOTES, SYMBOLS & ABBREVIATIONS

E0.01

ELECTRICAL SPECIFICATIONS

DIVISION 26

PART 1 GENERAL ELECTRICAL SPECIFICATIONS

1.0 WORK INCLUDED:

A. THIS SPECIFICATION SHALL APPLY TO ALL PHASES OF WORK HEREIN AFTER SPECIFIED, SHOWN ON DRAWINGS, OR AS REQUIRED TO PROVIDE A COMPLETE INSTALLATION OF ELECTRICAL SYSTEMS FOR THIS PROJECT. WORK REQUIRED UNDER THIS SPECIFICATION, IS NOT LIMITED TO JUST THE ELECTRICAL DRAWINGS - REFER TO ARCHITECTURAL, STRUCTURAL, LANDSCAPE, AND MECHANICAL/PLUMBING DRAWINGS, AS WELL AS ALL OTHER DRAWINGS APPLICABLE TO THIS PROJECT, WHICH DESIGNATE THE SCOPE OF WORK TO BE ACCOMPLISHED. THE INTENT OF THE DRAWINGS AND SPECIFICATIONS IS TO PROVIDE A COMPLETE AND OPERABLE ELECTRICAL SYSTEM THAT INCLUDES ALL DOCUMENTS THAT ARE A PART OF THE CONTRACT.

1. WORK INCLUDED. FURNISH LABOR, MATERIAL, SERVICES AND SKILLED SUPERVISION NECESSARY FOR THE CONSTRUCTION, ERECTION, INSTALLATION, CONNECTIONS, TESTING, AND ADJUSTMENT OF ALL CIRCUITS AND ELECTRICAL EQUIPMENT SPECIFIED HEREIN, OR SHOWN 0R NOTED ON DRAWINGS, AND ITS DELIVERY TO THE OWNER COMPLETE IN ALL RESPECTS READY FOR USE

1. THE ELECTRICAL WORK INCLUDES INSTALLATION OR CONNECTION OF CERTAIN MATERIALS AND EQUIPMENT FURNISHED BY OTHERS. VERIFY INSTALLATION DETAILS, INSTALLATION AND ROUGH- IN LOCATIONS FROM THE ACTUAL EQUIPMENT OR FROM THE EQUIPMENT SHOP DRAWINGS.

B. ELECTRICAL DRAWINGS. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC, AND ARE INTENDED TO CONVEY THE SCOPE OF WORK, INDICATING INTENDED GENERAL ARRANGEMENT OF EQUIPMENT, CONDUIT AND OUTLETS. FOLLOW DRAWINGS IN LAYING OUT WORK AND VERIFY SPACES FOR INSTALLATION OF MATERIALS AND EQUIPMENT BASED ON ACTUAL DIMENSIONS OF EQUIPMENT FURNISHED.

1.1 QUALITY ASSURANCE

A. DESIGN, MANUFACTURE, TESTING AND METHOD OF INSTALLATION OF ALL APPARATUS AND MATERIALS FURNISHED UNDER REQUIREMENTS OF THESE SPECIFICATIONS SHALL CONFORM TO LATEST PUBLICATIONS OR STANDARD RULES OF THE FOLLOWING.

- INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS - IEEE
- NATIONAL ELECTRICAL MANUFACTURERS' ASSOCIATION - NEMA
- UNDERWRITERS' LABORATORIES, INC. - UL
- NATIONAL FIRE PROTECTION ASSOCIATION - NFPA
- FEDERAL SPECIFICATIONS - FED. SPEC.
- AMERICAN SOCIETY FOR TESTING AND MATERIALS - ASTM
- AMERICAN NATIONAL STANDARDS INSTITUTE - ANSI
- NATIONAL ELECTRICAL CODE - NEC
- NATIONAL ELECTRICAL SAFETY CODE - NESC
- INSULATED CABLE ENGINEER S ASSOCIATION - ICEA
- AMERICAN INSTITUTE OF STEEL CONSTRUCTION - AISC
- STATE AND MUNICIPAL CODES IN FORCE IN THE SPECIFIC PROJECT AREA
- OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)
- ELECTRONICS INDUSTRIES ASSOCIATION /TELECOMMUNICATIONS INDUSTRY ASSOCIATION (EIA/TIA)
- CALIFORNIA ELECTRICAL CODE
- LOCAL AUTHORITY HAVING JURISDICTION PUBLISHED ELECTRICAL STANDARDS

B. PERFORM WORK IN ACCORDANCE WITH THE CALIFORNIA ELECTRICAL CODE, APPLICABLE BUILDING ORDINANCES, AND OTHER APPLICABLE CODES, HEREINAFTER REFERRED TO AS THE "CODE". THE CONTRACTOR SHALL COMPLY WITH THE CODE INCLUDING LOCAL AMENDMENTS AND INTERPRETATIONS WITHOUT ADDED COST TO THE OWNER. WHERE CONTRACT DOCUMENTS EXCEED MINIMUM REQUIREMENTS, THE CONTRACT DOCUMENTS TAKE PRECEDENCE. WHERE CONFLICTS OCCUR, THE MOST STRINGENT SHALL APPLY AND SHALL BE PART OF THE BASE BID.

1. COMPLY WITH ALL REQUIREMENTS FOR PERMITS, LICENSES, FEES AND ALL CODES. THE CONTRACTOR, AT CONTRACTOR'S EXPENSE, SHALL OBTAIN ALL PERMITS, LICENSES, FEES, SPECIAL SERVICE COSTS, INSPECTIONS AND ARRANGEMENTS REQUIRED FOR WORK UNDER THIS CONTRACT, UNLESS OTHERWISE SPECIFIED.
2. COMPLY WITH REQUIREMENTS OF THE APPLICABLE UTILITY COMPANIES SERVING THIS PROJECT. MAKE ALL ARRANGEMENTS WITH UTILITY COMPANIES FOR PROPER COORDINATION OF WORK.

1.2 GENERAL REQUIREMENTS

A. GUARANTEE: FURNISH A WRITTEN GUARANTEE FOR A PERIOD OF ONE-YEAR FROM DATE OF ACCEPTANCE.

B. WHEREVER A DISCREPANCY IN QUANTITY OR SIZE OF CONDUIT, WIRE, EQUIPMENT, DEVICES, CIRCUIT BREAKERS, ETC., (ALL MATERIALS), ARISES ON THE DRAWINGS AND/OR IN THE 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 ENSURE COMPLETE AND OPERABLE SYSTEMS AS REQUIRED BY THE OWNER AND ENGINEER.

C. 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 THE PROJECT'S STRUCTURAL ENGINEER.
3. FOR PENETRATIONS OF CONCRETE SLABS OR CONCRETE FOOTINGS, THE WORK SHALL BE AS DIRECTED IN THE CONCRETE SECTION OF SPECIFICATIONS.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PATCHING AND REPAIRING SURFACES WHERE HE IS REQUIRED TO PENETRATE FOR WORK UNDER THIS CONTRACT.
5. PENETRATIONS SHALL BE SEALED TO 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.

D. 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(S) SHALL BE MADE AND ALLOWANCES INCLUDED FOR ALL NECESSARY EQUIPMENT TO COMPLETE ALL PARTS OF THE DRAWINGS AND SPECIFICATIONS.

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 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 CONDUIT ONLY FOR LOW VOLTAGE WIRING REQUIRED FOR CONTROL OF MECHANICAL AND PLUMBING EQUIPMENT DESCRIBED IN THIS OR OTHER PARTS OF THE CONTRACT DOCUMENTS. INSTALL ALL CONTROL HOUSINGS AND BACK BOXES REQUIRED FOR INSTALLING CONDUIT AND WIRE TO THE CONTROLS.

C. INSTALL SEPARATE CONDUITS BETWEEN EACH HEATING, VENTILATING AND AIR CONDITIONING SENSING DEVICE AND ITS CONTROL PANEL AND/OR CONTROL MOTOR. BEFORE INSTALLING ANY CONDUIT FOR HEATING, VENTILATING AND AIR CONDITIONING CONTROL WIRING, VERIFY THE EXACT REQUIREMENTS FROM THE CONTROL DIAGRAMS PROVIDED WITH THE EQUIPMENT MANUFACTURER'S SHOP DRAWINGS.

1.4 TESTING AND ADJUSTMENT

A. UPON COMPLETION OF ALL ELECTRICAL WORK, THIS CONTRACTOR SHALL TEST ALL CIRCUITS, SWITCHES, LIGHT FIXTURES, LIGHTING CONTROL / DIMMING SYSTEMS INCLUDING DISTRIBUTED SYSTEMS, UPSS, GENERATORS, TVSSS, LIGHTING INVERTERS, TRANSFER SWITCHES, MOTORS, CIRCUIT BREAKERS, MOTOR STARTER(5) AND THEIR AUXILIARY CIRCUITS AND ANY OTHER ELECTRICAL ITEMS TO ENSURE 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(S) SHALL BE TESTED FOR CONTINUITY AND CIRCUIT INTEGRITY. ADJUSTMENTS SHALL BE MADE FOR CIRCUITS NOT COMPLYING WITH TESTING CRITERIA.

D. ALL TEST REPORTS, INCLUDING COPIES OF ANY REQUIRED ENERGY CODE ACCEPTANCE FORMS (E.G. CA TITLE 24 ACCEPTANCE FOR CODE COMPLIANCE FORMS) SHOULD BE SUBMITTEO TO THE ENGINEER AT COMPLETION OF PROJECT.

1.5 IDENTIFICATION

A. NAMEPLATES SHALL BE PROVIDED FOR UNIT SUBSTATIONS, SWITCHGEAR, SWITCHBOARDS, DISTRIBUTION BOARDS, DISTRIBUTION PANELS, PANEL BOARDS, MOTOR CONTROL CENTERS, TRANSFORMERS, TRANSFER SWITCHES, CONTACTORS, STARTERS, DISCONNECT SWITCHES, ENCLOSED CIRCUIT BREAKERS/SWITCHES, INVERTERS, UPSS, PDUS, ROCS, LIGHTING CONTROL PANELS, DIMMING PANELS, DOOR RELEASING SYSTEM PANELS, FIRE ALARM/CENTRAL MONITORING TERMINAL CABINETS/POWER SUPPLIES/CONTROL PANELS, AND ALL LOW VOLTAGE SYSTEM TERMINAL A CONTROL CABINETS. NAMEPLATE INSCRIPTIONS SHALL BE IDENTICAL TO THE EQUIPMENT DESIGNATIONS INDICATED IN PLANS AND SPECIFICATIONS.
ALL CIRCUIT BREAKERS/FUSES IN SWITCHGEAR, SWITCHBOARDS, DISTRIBUTION BOARDS, DISTRIBUTION PANELS, UPS OUTPUT CIRCUIT BREAKERS, PDU OUTPUT CIRCUIT BREAKERS AND MOTOR CONTROL CENTERS SHALL HAVE INDIVIDUAL NAMEPLATES LOCATED IMMEDIATELY ADJACENT TO THE RESPECTIVE DEVICE. NAMEPLATE INSCRIPTION SHALL IDENTIFY THE DOWNSTREAM EQUIPMENT OR DEVICE SERVED BY THE CIRCUIT BREAKER OR FUSE.

B. IDENTIFICATION NAMEPLATES, U.N.O, SHALL BE LAMINATED 1/8" THICK MICARTA WITH BEVELED EDGES AND ENGRAVED WHITE LETTERS 3/8" HIGH, MINIMUM, ON 1-1/2" HIGH BLACK BACKGROUND FOR SINGLE LINE OF TEXT. WHERE TY/O LINES OF TEXT ARE REQUIRED, PROVIDE MIN. 2" HIGH NAMEPLATE. WHERE THREE LINES OF TEXT ARE REQUIRED, PROVIDE MIN. 2.5" HIGH NAMEPLATE. LABELS SHALL BE BLACK FOR NORMAL POWER SYSTEMS AND RED FOR SYSTEMS CONNECTED TO EMERGENCY POWER.

C. IDENTIFICATION NAMEPLATES FOR SWITCHGEAR, SWITCHBOARDS, DISTRIBUTION BOARDS, DISTRIBUTION PANELS, PANEL BOARDS A MOTOR CONTROL CENTERS SHALL BE ATTACHED WITH SWITCHGEAR MANUFACTURER-PROVIDED SCREWS VIA SWITCHGEAR MANUFACTURER FACTORY PRE-DRILLED HOLES. A FACTORY OPTION TO RIVET IDENTIFICATION NAMEPLATES TO THE EQUIPMENT IS ONLY ACCEPTABLE IF SCREW-FASTENED NAMEPLATES ARE NOT AN AVAILABLE OPTION FROM THE SWITCHGEAR MANUFACTURER. FIELD DRILLING OR OTHER MECHANICAL ATTACHMENT METHODS THAT CHANGE/VOID THE NEMA OR NRTL RATING OF THE ENCLOSURE ARE STRICTLY FORBIDDEN.

1.6 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.

1.7 RECORD DRAWINGS.

A. DRAWINGS OF RECORD: THE CONTRACTOR SHALL PROVIDE AND KEEP UP-TO - DATE, A COMPLETE RECORD SET OF DRAWINGS. THESE SHALL BE CORRECTED DAILY AND SHOW EVERY CHANCE 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. AT COMPLETION OF PROJECT, THE CONTRACTOR SHALL TRANSFER ALL FIELD AS-BUILT INFORMATION TO AUTOCAD ELECTRONIC DRAWINGS IN DWG FORMAT OR EQUAL.

1.8 SHOP DRAWINGS/SUBMITTALS

A. SHOP DRAWINGS/SUBMITTALS 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.

B. THE SHOP DRAWINGS/SUBMITTALS SUBMITTED SHALL BE MARKED WITH THE NAME OF THE PROJECT, NUMBERED CONSECUTIVELY AND BEAR THE APPROVAL OF THE CONTRACTOR AS EVIDENCE THAT THE CONTRACTOR HAS CHECKED THE DRAWINGS. ANY DRAWINGS SUBMITTED WITHOUT THIS APPROVAL WILL BE RETURNED TO THE CONTRACTOR FOR RESUBMISSION.

C. 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 THE CONTRACTOR'S LETTER OF TRANSMITTAL. IF THE SUBSTITUTION IS ACCEPTED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER ADJUSTMENT THAT MAY BE CAUSED BY THE SUBSTITUTION. SAMPLES SHALL BE SUBMITTED WHEN REQUESTED.

D. ONLY PRODUCTS LISTED AS "EQUAL" WITHIN THE CONTRACT DOCUMENTS, ALONG WITH FORMALLY APPROVED "SUBSTITUTIONS" WILL BE REVIEWED. PRODUCTS NOT CONFORMING TO THESE ITEMS WILL NOT BE REVIEWED AND WILL BE RETURNED TO THE CONTRACTOR FOR RE-SUBMITTAL.

E. SHOP DRAWINGS SHALL BE SUBMITTED ON THE FOLLOWING BUT NOT LIMITED TO:

- SWITCHGEAR, SWITCHBOARDS, DISTRIBUTION BOARDS, MOTOR CONTROL CENTERS, PANELBOARDS, AND BUS DUCTS; COMPLETE WITH OVERCURRENT DEVICE INFORMATION.
- TRANSFORMERS
- FIRE ALARM SYSTEM/CENTRAL MONITORING SYSTEM
- WIRING DEVICES.
- PULLBOXES AND UNDERGROUND VAULTS
- TERMINAL CABINETS
- POWER POLES AND FLOOR BOXES
- ARC FLASH, SHORT-CIRCUIT A COORDINATION STUDIES
- ALL OTHER PRODUCTS CALLED OUT ON DRAWINGS THAT CALL FOR SHOP DRAWING SUBMITTAL.

1.9 MAINTENANCE, SERVICING, INSTRUCTION MANUALS AND WIRING DIAGRAMS

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 ITEMS OR EQUIPMENT:

- FIRE ALARM SYSTEM
- TRANSFORMERS
- SWITCHGEAR, SWITCHBOARDS, DISTRIBUTION BOARDS, MOTOR CONTROL CENTERS, PANELBOARDS, AND BUS DUCTS; COMPLETE WITH OVERCURRENT DEVICE INFORMATION.

B. ALL WIRING OIAGRAMS SHALL SPECIFICALLY COVER THE SYSTEM SUPPLIED. TYPICAL DRAWINGS WILL NOT BE ACCEPTED. FOUR (4) COPIES SHALL BE PRESENTED TO THE OWNER.

1.10 INTERRUPTION OF SERVICES/SERVICE SHUTDOWN

A. ANY INTERRUPTION OF ELECTRICAL SERVICES, ELECTRICAL CIRCUITS, ELECTRICAL FEEDERS, SIGNAL SYSTEMS, COMMUNICATION SYSTEMS, FIRE ALARM SYSTEMS, ETC. REQUIRED TO PERFORM WORK SHALL MEET THE SPECIFIC PRIOR-APPROVAL REQUIREMENTS OF THE OWNER. SUCH WORK SHALL BE SCHEDULED WITH THE OWNER TO BE PERFORMED AT THE OWNER'S CONVENIENCE.

B. INTERRUPTIONS/OUTAGES OF ANY OF THE OWNER'S SYSTEMS AND SERVICES MENTIONED ABOVE SHALL BE SCHEDULED TO OCCUR DURING OTHER THAN THE OWNER'S NORMAL BUSINESS HOURS. ANY OVERTIME COSTS SHALL BE BORNE BY THE CONTRACTOR.

C. SEE ORAWINGS FOR ANY AODITIONAL REQUIREMENTS REGARDING OUTAGES, INTERRUPTION AND ANY TEMPORARY SERVICES REQUIRED.

PART 2 PRODUCTS

2.1 MATERIALS

A. MATERIALS AND EQUIPMENT: ALL ELECTRICAL MATERIALS AND EQUIPMENT, INCLUDING CUSTOM -MADE EQUIPMENT, SHALL BE NEW AND SHALL BE LISTED BY UNDERWRITER'S LABORATORIES (UL) AND BEAR THEIR LABEL OR BE LISTED AND CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LAB (NRTL) THAT IS ALSO RECOGNIZED BY THE LOCAL AUTHORITY-HAVING-JURISDICTION (AHJ).

B. CONDUIT:

1. GALVANIZED RIGID CONDUIT (GRC) SHALL BE FULL WEIGHT THREADED TYPE 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. INTERMEDIATE METAL CONDUIT (IMC), SHALL BE HOT-DIPPED GALVANIZED IN ACCORDANCE WITH UL 1242 AND MEETING FEDERAL SPECIFICATION WWC -581 (LATEST REVISION).
3. ELECTRICAL METALLIC TUBING (EMT) SHALL BE ZINC-COATED STEEL WITH BAKED ENAMEL OR PLASTIC FINISH ON INSIDE SURFACES EXCEPT AS NOTED BELOW. EMT SHALL BE DIPPED IN A CHROMIC ACID BATH TO CHEMICALLY FORM A CORROSION-RESISTANT PROTECTIVE COATING OF ZINC CHROMATE OVER GALVANIZED SURFACE.
4. FLEXIBLE METAL CONDUIT SHALL BE CONSTRUCTED OF HOT- DIPPED GALVANIZED STEEL STRIPS WOUND SPIRALLY WITH INTERLOCKING EDGES TO PROVIOE GREATEST FLEXIBILITY WITH MAXIMUM STRENGTH. INTERIOR SURFACES SHALL BE SMOOTH AND OFFER MINIMUM DRAG TO PULLING IN CONDUCTORS. USED ONLY AS DIRECTED IN WRITING BY THE ENGINEER WITH THE EXCEPTION OF 400 HZ FEEDERS AND 400 HZ BRANCH CIRCUITS WHICH SHALL BE RUN IN FLEXIBLE ALUMINUM CONDUIT.
5. 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 CONNECTIONS ONLY UNLESS OTHERWISE NOTED ON DRAWINGS.
6. FACTORY ASSEMBLED, OR OFF-SITE ASSEMBLED WIRING SYSTEMS (SUCH AS METAL CLAD (MC) CABLE, TYPE AC CABLE, TYPE NM CABLE, TYPE BX CABLE, ETC) SHALL NOT BE USED.
7. MINIMUM SIZE CONDUIT ABOVE GRADE SHALL BE 3/4" MINIMUM AND 1 " MINIMUM FOR BELOW GRADE.
8. NONMETALLIC FLEXIBLE TUBING (ENT) SHALL NOT BE USED.
9. NON-METALLIC CONDUIT:
 a. POLYVINYL CHLORIDE (PVC) RIGID CONDUIT, SCHEDULE 40, TYPE II FOR UNDERGROUND INSTALLATION ONLY WITH SOLVENT WELDED JOINTS, CONFORMING TO UNOERWRITERS LABORATORIES, INC. (U.L.) REQUIREMENTS, LISTED FOR EXPOSED AND DIRECT BURIAL APPLICATION.
 b. CONDUIT AND FITTINGS SHALL BE PRODUCED BY THE SAME MANUFACTURER.

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 FITTINGS 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 CONDUCTORS 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. U.N.O. ALL INTERIOR EMT FITTINGS, CONNECTORS AND COUPLINGS INSTALLED IN CONCEALED LOCATIONS, AREAS NOT CONSIDERED TO BE WET OR DAMP LOCATIONS BY THE AHJ, OR AREAS NOT SUBJECT TO PHYSICAL DAMAGE, SHALL BE STEEL, ZINC OR CADMIUM PLATED, THREADLESS, COMPRESSION, STEEL LOCKING RING TYPE WITH INSULATED THROAT.
5. ALL INTERIOR AND EXTERIOR EMT FITTINGS, CONNECTORS AND COUPLINGS, SHALL BE RAINTITE-LISTED, STEEL, ZINC OR CADMIUM PLATED, THREADLESS, COMPRESSION, STEEL LOCKING RING TYPE WITH INSULATED THROAT. IF RAINTITE -LISTED, EMT FITTINGS, CONNECTORS AND COUPLINGS ARE UNAVAILABLE FOR A GIVEN TRADE SIZE OR IF CONDUIT IS INSTALLED IN AN AREA SUBJECT TO DAMAGE - PROVIDE RIGID METALLIC OR INTERMEDIATE METALLIC CONDUITS, FITTINGS, CONNECTORS AND COUPLINGS AS REQUIRED.
6. FLEXIBLE STEEL CONDUIT CONNECTORS SHALL BE A MALLEABLE IRON CLAMP OR SQUEEZE TYPE OR STEEL TVYIST- IN TYPE WITH INSULATED THROAT. THE FINISH SHALL BE ZINC OR CADMIUM PLATING.
7. CONDUIT UNIONS SHALL BE "ERICKSON" COUPLINGS, OR APPROVED EQUAL. THE USE OF RUNNING THREADS WILL NOT BE PERMITTED.

D. 600 VOLT CONDUCTORS - WIRE AND CABLE:

1. ALL CONDUCTORS SHALL BE COPPER. PROVIDE STRANDED CONDUCTOR FOR #10 AWG AND LARGER OR WHEN MAKING FLEXIBLE CONNECTIONS TO VIBRATING MACHINERY. USE COMPRESSION "FORK" TYPE CONNECTORS OR TRANSITION TO SOLID CONDUCTORS WHEN CONNECTING TO SWITCHES, RECEPTACLES, ETC.
2. TYPE THHN/THWN- 2 THERMOPLASTIC, 600 VOLT, UL APPROVED, DRY AND WET LOCATIONS RATED AT 90 DEGREES CELSIUS, FOR CONDUCTORS OF ALL SIZES FROM }12 AWG UP TO AND INCLUDING 1000 KCMIL. RHH/RHW INSULATION IS ALLOWED ONLY TO PROVIDE AN ELECTRICAL CIRCUIT PROTECTIVE SYSTEM TO COMPLY WITH CEC, ARTICLES 695 AND 700.
3. 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.
4. 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.
5. SYSTEMS CONDUCTOR COLOR CODING:
 a. POWER 20B/ 120V, 3PH, 4W:
  1) PHASE A = BLACK
  2) PHASE B = RED
  3) PHASE C = BLUE
  4) NEUTRAL = WHITE
  5) SWITCHLEGS = PURPLE (SWITCHLEGS SHALL ALSO BE IDENTIFIED SEPARATELY BY NUMERICAL TAGS)
  6) TRAVELERS = PURPLE WITH BLACK STRIPE.
 b. POWER 480/277V, 3PH, 4W:
  1) PHASE A = BROWN
  2) (2) PHASE B = ORANGE
  3) (3) PHASE C = YELLOW
  4) NEUTRAL = GRAY
  5) SWITCHLEGS = PURPLE (SWITCHLEGS SHALL ALSO BE IDENTIFIED SEPARATELY BY NUMERICAL TAGS)
  6) TRAVELERS = PURPLE WITH BLACK STRIPE.
 c. GROUND CONDUCTORS: GREEN
 d. ISOLATED GROUND CONDUCTORS: GREEN WITH CONTINUOUS YELLOW STRIPE.
 e. FIRE ALARM SYSTEM: AS RECOMMENDED BY THE MANUFACTURER.
6. ALL COLOR - COOING FOR #12 THRU #6 AWG CONDUCTOR SHALL BE AS IDENTIFIED ABOVE. CONDUCTORS #4 AWG AND LARGER SHALL BE IDENTIFIED WITH UTILIZING PHASE TAPE AT EACH TERMINATION.
7. NO CONDUCTORS CARRYING 120 VOLT OR MORE SHALL BE SMALLER THAN #12 AWG.
8. ALUMINUM CONDUCTORS SHALL NOT BE USED.
9. WIRE-PULLING COMPOUNDS USED AS LUBRICANTS IN INSTALLING CONDUCTORS IN RACE\DAYS SHALL ONLY BE "POLY\WATER J". NO OIL, GREASE, GRAPHITE, OR SIMILAR SUBSTANCES MAY BE USED. PULLING OF#1/0 OR LARGER CONDUCTORS SHALL BE DONE WITH AN APPROVED CABLE PULL MACHINE. OTHER METHODS; E.G. USING VEHICLES, AND BLOCK AND TACKLE TO INSTALL CONDUCTORS ARE NOT ACCEPTABLE.

E. JUNCTION AND PULLBOXES:

1. FOR INTERIOR DRY LOCATIONS, BOXES SHALL BE GALVANIZED ONE-PIECE DRAWN STEEL, KNOCKOUT TYPE, WITH REMOVABLE, MACHINE SCREW SECURED COVERS.
2. FOR OUTSIDE, DAMP OR SURFACE LOCATIONS, BOXES SHALL BE HEAVY CAST ALUMINUM OR CAST IRON WITH REMOVABLE, GASKETED, NON-FERROUS MACHINE SCREW SECURED COVERS.
3. FOR IN-GRADE APPLICATIONS, JUNCTION AND PULL BOXES SHALL BE PRE-CAST CONCRETE MANUFACTURED BY BROOKS-JENSEN, OR UTILITY VAULT CO.
4. ALL BOXES SHALL BE SIZED FOR THE NUMBER AND SIZES OF CONDUCTORS AND CONDUITS ENTERING THE BOX AND EQUIPPED WITH PLASTER RINGS WHERE REQUIRED.
5. ALL BOXES LOCATED IN TRAFFIC AREAS SHALL BE TRAFFIC RATED.

F. TRENCHING AND BACKFILLING: CONTRACTOR SHALL BE RESPONSIBLE FOR TRENCHING AND BACKFILLING.

PART 3 EXECUTION

3.1 PREPARATION AND INSTALLATION

A. INSTALLATION OF CONDUIT AND OUTLET BOXES:

1. ALL CONDUIT INSTALLED IN THE DRY WALLS OR CEILINGS OF A BUILDING SHALL BE STEEL TUBE (EMT), ALUMINUM TUBE (EMT), OR INTERMEDIATE METAL CONDUIT (IMC). FLEXIBLE CONDUIT SHALL NOT BE USED IN LIEU OF EMT, IMC OR RIGID CONDUIT EXCEPT AS NOTED HEREIN.
2. GALVANIZED RIGID CONDUIT (GRC) OR INTERMEDIATE METAL CONDUIT (IMC) SHALL BE USED AS FOLLOWS:
 - WHEN NOTED ON THE DRAWINGS
 - WHEN CONSIDERED EXPOSED TO DAMAGE BY THE LOCAL AHJ
 - WHEN INSTALLED IN WET OR DAMP LOCATIONS AND OF A TRADE SIZE
 - WHERE LISTED -RAINTITE FITTINGS, CONNECTORS, COUPLINGS ETC ARE
 - UNAVAILABLE
 - WHEN REQUIRED BY CEC ARTICLE 517.13
 - WHEN INSTALLED IN CONCRETE AND MASONRY. THE USE OF ENT IN CMU WALLS AND PARKING STRUCTURES MAY BE ALLOWED ONLY AS DIRECTED IN WRITING BY THE ENGINEER. REQUEST FOR ENT SUBSTITUTION MUST BE MADE PRIOR TO BID AND IN ACCORDANCE WITH PRE-BID SUBSTITUTION REQUEST REQUIREMENTS OF THESE SPECIFICATIONS.
3. INTERMEDIATE METAL CONDUIT (IMC), IS APPROVED FOR USE IN ALL LOCATIONS AS APPROVED FOR GRC OR EMT ANO IN ACCORDANCE WITH NEC, OR CEC WHERE ADOPTED, ARTICLE 342.
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. INCLUDE A SEPARATE INSULATED GREEN GROUND CONDUCTOR SIZED PER CEC IN EACH CONDUIT. OTHER USES OF FLEXIBLE CONDUIT SHALL BE ALLOWED ONLY AS APPROVED IN WRITING BY THE ENGINEER.
5. FLEXIBLE LIQUIDTIGHT CONDUIT SHALL BE INSTALLED IN LIEU OF THE FLEXIBLE STEEL; WHERE REQUIRED BY CEC, IN DAMP AND WET LOCATION, WHERE EXPOSED TO WEATHER, IN REFRIGERATED AREA (65 DEG. F OR LESS), AND/OR BETWEEN SEISMIC JOINTS. ALL ROTATING ELECTRICAL EQUIPMENT SHALL BE SUPPLIED WITH FLEXIBLE, LIQUID-TIGHT CONDUIT WITH APPROPRIATE SLACK AND SHALL NOT EXCEED THIRTY-SIX (36) INCHES. INCLUDE A SEPARATE INSULATED GREEN GROUND CONDUCTOR SIZED PER CEC IN EACH CONDUIT. OTHER USES OF LIQUIDTIGHT FLEXIBLE CONDUIT SHALL BE ALLOWED AS APPROVED IN WRITING BY THE ENGINEER ON A CASE BY CASE BASIS.
6. RIGID METALLIC CONDUIT INSTALLED UNDERGROUND OR EMBEDDED IN CONCRETE SHALL BE 1" TRADE SIZE MINIMUM AND SHALL BE WRAPPED WITH 20 MIL POLYVINYL CHLORIDE PLASTIC TAPE. PVC CONDUIT INSTALLED UNDERGROUND OR EMBEDDED IN CONCRETE SHALL BE 1" MINIMUM TRADE SIZE.
7. WHERE REQUIRED FOR PROVIDING AN ELECTRICAL CIRCUIT PROTECTIVE SYSTEM TO COMPLY WITH CEC, ARTICLES 695 AND 700, UTILIZE UL LISTED 2-HOUR FIRE-RATED RHH/RHW CONDUCTORS IN CONDUIT.
8. CONDUIT SHALL BE RUN SO AS NOT TO INTERFERE WITH OTHER PIPING, FIXTURES OR EQUIPMENT.
9. THE ENDS OF ALL CONDUITS SHALL BE CUT SQUARE, CAREFULLY REAMED OUT TO FULL SIZE AND SHALL BE SHOULDERED IN FITTING.
10. 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.
11. WHERE CONDUIT IS UNDERGROUND, UNDER SLABS OR GRADE, EXPOSED TO THE WEATHER, OR IN WET LOCATIONS, MAKE JOINTS LIQUID TIGHT AND GAS TIGHT.
12. ALL METAL CONDUIT IN MASONRY AND CONCRETE AND WHERE CONCEALED UNDER FLOOR SUBS SHALL HAVE JOINTS PAINTED WITH THREAD COMPOUND PRIOR TO MAKEUP.
13. PVC CONDUIT SHALL NOT BE USED ABOVE GRADE.
14. WHERE CONDUCTORS ENTER A RACEWAY OR 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.
15. WHERE CONDUIT EXTENDS THROUGH ROOF TO EQUIPMENT ON ROOF AREA, THIS CONTRACTOR SHALL PROVIDE FLASHING MATERIAL COMPATIBLE WITH THE ROOFING SYSTEM AS REQUIRED BY THE R ROOFING SPECIFICATIONS 0R AS REQUIRED BY THE OWNER'S ROOF WARRANTY. THIS FLASHING SHALL BE DELIVERED TO THE ROOFING CONTRACTOR FOR INSTALLATION. THE ACTUAL LOCATION OF ALL SUCH ROOF PENETRATIONS AND OUTLETS SHALL BE VERIFIED WITH ARCHITECT/OWNER. CONTRACTOR SHALL VERIFY TYPE OF FLASHING PRIOR TO BID AND INCLUDE ALL COSTS.
16. ALL CONDUIT SHALL BE SUPPORTED AT INTERVALS NOT LESS THAN 6'-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. FLEXIBLE CONDUIT SUPPORTS SHALL NOT EXCEED 4'-6" ON CENTER.
17. 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.
18. NAIL-IN CONDUIT SUPPORTS, ONE-PIECE SET SCREW TYPE CONDUIT CLAMPS OR PERFORATED IRON FOR SUPPORTING CONDUIT SHALL NOT BE USED.
19. SEISMIC CONDUIT SUPPORT:
 a. ALL CONDUIT SHALL BE SUPPORTED IN SUCH A MANNER THAT IT IS SECURELY ATTACHED TO THESTRUCTURE 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
1/2" to 3"	6'-0"
3-1/2" to 4"	8'-0"

20. 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.
21. OPEN KNOCKOUTS IN OUTLET BOXES ONLY WHERE REQUIRED FOR INSERTING CONDUIT.
22. LOCATE WALL OUTLET OF THE SAME TYPE AT SAME LEVEL IN ALL ROOMS, EXCEPT WHERE OTHERWISE NOTED.
23. OUTLET BOXES ON METAL STUDS SHALL BE ATTACHED TO METAL HANGERS, TACK WELDED OR BOLTED TO STUDS; ON WOOD STUDS ATTACHMENT SHALL BE WITH WOOD SCR £MS, NAILS NOT ACCEPTABLE.
24. RECESSED BOXES SHALL NOT BE MOUNTED BACK-TO-BACK IN ANY WALL; MINIMUM OFFSET SHALL BE 24 INCHES.
25. JUNCTION BOXES THAT DO NOT CONTAIN ANY DEVICE(S) SHALL BE LOCATED IN STORAGE ROOMS, ELECTRICAL CLOSETS, OR ABOVE ACCESSIBLE CEILINGS, NOT IN HARD LID CEILINGS OR OTHER FORMS OF INACCESSIBLE CEILINGS. PLACE BOXES WHICH MUST BE EXPOSED TO PUBLIC VIEW IN A LOCATION APPROVED BY THE OWNER'S PROJECT MANAGER. PROVIDE COVERS OR PLATES TO MATCH ADJACENT SURFACES AS APPROVED BY THE OWNER'S PROJECT MANAGER.
26. SURFACE MOUNTED PULL BOXES, TERMINAL CABINETS, JUNCTION BOXES, PANEL BOARDS ETC., SHALL BE ATTACHED TO WALLS USING APPROPRIATE SCREWS, FASTENERS, BACKING PLATES, STUD BLOCKING ETC., AS DETAILED ON ARCHITECTURAL AND/OR STRUCTURAL DRAWINGS. IF ARCHITECTURAL AND/OR STRUCTURAL DRAWINGS ARE NOT PROVIDED ON THE PROJECT, CONTRACTOR SHALL PROVIDE ALL NECESSARY MOUNTING HARDWARE AND BACKING SUPPORT TO COMPLY WITH LOCAL BUILDING CODE REQUIREMENTS AND ANY ADDITIONAL REQUIREMENTS IMPOSED BY THE LOCAL AUTHORITY-HAVING-JURISDICTION.
27. EXCEPT WHERE BELOW GRADE, SLEEVES SHALL BE INSTALLED WHERE CONDUIT PASSES THROUGH MASONRY OR CONCRETE WALLS AND SHALL BE 24 GAUGE GALVANIZED STEEL NO MORE THAN 1/2" GREATER IN DIAMETER THAN THE OUTSIDE DIAMETER OF THE CONDUIT. WHEN LOCATED IN NON-RATED STRUCTURES, CAULK CONDUIT SLEEVE WITH STONE WOOL. WHEN LOCATED IN FIRE RATED STRUCTURES, PROVIDE U.L. LISTED FIRE STOPPING SYSTEM. SEE FIRE STOPPING SECTION OF THIS SPECIFICATION FOR ADDITIONAL REQUIREMENTS.
28. ALL BOXES SHALL BE COVERED WITH OUTLET BOX PROTECTOR, OR SIMILAR DEVICE/METHOD TO KEEP DIRT/DEBRIS FROM ENTERING BOX, CONDUIT OR PANELS. IF DIRT/DEBRIS DOES NOT IN, IT SHALL BE REMOVED PRIOR TO PULLING WIRES.
29. 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.
30. ALL CONDUIT ENTRIES TO OUTDOOR MOUNTED PANELS, CABINETS, BOXES, ETC., SHALL BE MADE USING MYERS "SCRU-TITE" HUBS SERIES ST.
31. PROVIDE NYLON OR A 1/8-INCH O.D. POLYETHYLENE ROPE, RATED AT 250 POUNDS TENSILE STRENGTH, IN ALL CONDUITS MORE THAN 5 FEET IN LENGTH LEFT EMPTY FOR FUTURE USE. NOT LESS THAN 5 FEET OF ROPE SHALL BE LEFT AT EACH END OF THE CONDUIT. TAG ALL LINES WITH A PLASTIC TAG AT EACH END INDICATING THE TERMINATION/STUB LOCATION OF THE OPPOSITE END OF THE CONDUIT.
32. ALL MULTIPLE CONDUIT RUNS WITHIN SUSPENDED CEILINGS SHALL BE SUSPENDED FROM BUILDING STRUCTURE BY MEANS OF UNISTRUT HANGERS/RACK. CONDUIT SHALL NOT BE ALLOWED TO LAY ON CEILING OR BE SUPPORTED FROM CEILING SUSPENSION WIRES OR OTHER SUSPENSION SYSTEM. SUPPORT CONDUIT TO STRUCTURE ABOVE SUSPENDED CEILINGS 8" MINIMUM ABOVE CEILING TO ALLOW REMOVAL OF CEILING TILE. MAINTAIN TWO INCH CLEARANCE ABOVE RECESSED LIGHT FIXTURES.
33. ALL EXPOSED CONDUITS AND SUPPORT HARDWARE SHALL BE PAINTED TO MATCH THE FINISH OF THE WALL OR CEILING TO WHICH IT IS SUPPORTED.
34. WHERE CONDUITS OR WIREWAYS CROSS SEISMIC JOINTS, PROVIDE APPROVED FLEXIBLE CONDUIT CONNECTION OR APPROVED EXPANSION/DEFLECTION FITTING TO ALLOW FOR DISPLACEMENT OF CONDUIT IN ALL THREE AXES. CONNECTION SHALL ALLOW FOR MOVEMENT IN ACCORDANCE WITH DESIGN OF SEISMIC JOINT. NON-FLEXIBLE RACEWAYS CROSSING EXPANSION JOINTS OR OTHER AREAS OF POSSIBLE STRUCTURAL MOVEMENT SHALL MAKE PROVISION FOR 3-WAY MOVEMENT AT SUCH POINTS BY MEANS OF EXPANSION/DEFLECTION FITTINGS. FITTINGS SHALL BE INSTALLED IN THE CENTER OF THEIR AXES OF MOVEMENT AND SHALL NOT BE DEFLECTED TO MAKE PART OF A CONDUIT BEND, OR COMPRESSED OR EXTENDED TO COMPENSATE FOR INCORRECT CONDUIT LENGTH. INSTALL FLEXIBLE CONDUIT CONNECTION (5) OR APPROVED EXPANSION/DEFLECTION FITTING(S) COMPLETE WITH GROUND JUMPERS. WHERE NECESSARY, PROVIDE APPROVED EXPANSION JOINTS TO ALLOW FOR THERMAL EXPANSION AND CONTRACTION OF CONDUIT (5). INSTALL EXPANSION JOINTS COMPLETE WITH GROUND JUMPERS.
35. SEAL ALL CONDUITS WHERE TERMINATION IS SUBJECT TO MOISTURE OR WHERE CONDUIT PENETRATES EXTERIOR WALL, FLOOR OR ROOF, IN REFRIGERATED AREAS, CLASSIFIED (HAZARDOUS AREAS) AND AS INDICATED ON THE DRAWINGS.
36. EXCEPT AS OTHERWISE INDICATED ON THE DRAWINGS OR ELSEWHERE IN THESE SPECIFICATIONS, BENDS IN FEEDER AND BRANCH CIRCUIT CONDUIT 2 INCHES OR LARGER SHALL HAVE A RADIUS OR CURVATURE OF THE INNER EDGE, EQUAL TO NOT LESS THAN TEN (10) TIMES THE INTERNAL DIAMETER OF THE CONDUIT. EXCEPT WHERE SWEEPING VERTICALLY INTO A BUILDING WHERE SWEEP RADIUS EQUALS TEN (10) TIMES CONDUIT DIAMETER, UNDERGROUND COMMUNICATIONS AND BUILDING INTERCONNECT CONDUITS 3 INCHES OR LARGER SHALL HAVE A MINIMUM 12'-6" RADIUS OR CURVATURE OF THE INNER EDGE. FOR THE SERVING UTILITIES, RADIUS BENDS SHALL BE MADE PER THEIR RESPECTIVE SPECIFICATIONS.
37. TAG ALL EMPTY CONDUITS AT EACH ACCESSIBLE END WITH A PERMANENT TAG IDENTIFYING THE PURPOSE OF THE CONDUIT, FOOTAGE END-TO-END, AND THE LOCATION OF THE OTHER END. IN WET, CORROSIVE OUTDOOR OR UNDERGROUND LOCATIONS, USE BRASS, BRONZE, OR COPPER 16 GAUGE TAGS SECURED TO CONDUIT ENDS WITH #16 OR LARGER GALVANIZED WIRE. INSCRIBE ON THE TAGS, WITH STEEL PUNCH DIES, CLEAR AND COMPLETE IDENTIFYING INFORMATION.
38. THE FOLLOWING ADDITIONAL REQUIREMENTS SHALL APPLY TO UNDERGROUND CONDUITS:
 a. UNDERGROUND CONDUIT SHALL BE SCHEDULE 40 PVC (POLYVINYL CHLORIDE) UNLESS OTHERWISE INDICATED ELSEWHERE IN THESE SPECIFICATIONS OR AS REQUIRED PER CEC, ARTICLE 517. 13.
 b. FOR ALL COMMUNICATIONS CONDUITS 2" AND LARGER AND FEEDERS 100 AMPS OR GREATER, PROVIDE WITH A MINIMUM 3" INCH, (2,000 LB) CONCRETE ENVELOPE, 2" INCH MINIMUM SEPARATION BETWEEN CONDUITS, INSTALLED AT DEPTH OF NOT LESS THAN 24" BELOW GRADE. (PROVIDE CONCRETE ENCASEMENT AND/OR GREATER MINIMUM CONDUIT DEPTH AS REQUIRED BY THE UTILITY COMPANIES.) CONDUIT SEPARATION WITHIN A DUCT BANK SHALL BE MAINTAINED USING PLASTIC SPACERS LOCATED AT 5'-0" INTERVALS. WHERE POWER AND COMMUNICATION CONDUITS ARE RUN IN A COMMON TRENCH, A 12 INCH MINIMUM SEPARATION SHALL BE MAINTAINED BETWEEN POWER AND COMMUNICATION CONDUITS OR AS REQUIRED BY UTILITY COMPANIES.
 c. IN ALL CASES, WHERE ANY CONDUIT(S) PASS UNDER A BUILDING SLAB OR FOOTING, THE ELECTRICAL CONTRACTOR WILL PROVIDE A BENTONITE CLAY OR CONCRETE BARRIER THAT CONFORMS TO THE HEIGHT AND WIDTH OF THE TRENCH EXCAVATION AND IS A MINIMUM OF 18" THICK. IN ALL CASES, WHERE CONDUIT(S) PASS THRU A SLEEVE IN A FOOTING OR OTHER FOUNDATION ELEMENT, THE ELECTRICAL CONTRACTOR WILL PROVIDE A BENTONITE CLAY OR CONCRETE BARRIER BETWEEN THE SLEEVE AND THE CONDUIT(S) SURROUNDING THE CON0UIT(S) FOR THE ENTIRE DEPTH OF THE SLEEVE. THE BARRIER IS REQUIRED TO PREVENT PASSAGE OF MOISTURE UNDER OR THRU THE SLAB OR FOOTING VIA THE TRENCH OR SLEEVE.
 d. WHERE UNDERGROUND CONDUIT PASSES UNDER A BUILDING SLAB, CONCRETE ENCASEMENT MAY NOT BE REQUIRED, EXCEPT AS REQUIRED ABOVE, CONTACT THE ENGINEER FOR WRITTEN DIRECTION PRIOR TO OMITTING ANY ENCASEMENT.
 e. UNDERGROUND CONDUITS, WHICH TERMINATE INSIDE BUILDING(S) BELOW GRADE, SUCH AS IN A BASEMENT LEVEL, OR WHICH SLOPE SO THAT WATER MIGHT FLOW INTO INTERIOR BUILDING SPACES, SHALL BE SEALED AT THE POINT OF PENETRATION WITH A MODULAR CONDUIT SEAL (LINK-SEAL OR EQUAL BY ROX SYSTEMS). CONDUIT/CONDUIT SEALING SYSTEM PENETRATIONS OF WATERPROOFING MEMBRANES/SYSTEMS ON EXISTING STRUCTURES SHALL BE COMPLETELY RESTORED AS REQUIRED TO MAINTAIN MEMBRANE/SYSTEM MANUFACTURER AND INSTALLER WARRANTEE FOR THE INSTALLATION. ALL CONDUITS SHALL BE PROVIDED WITH A 4? SLOPE AWAY FROM BUILDINGS. ALL CONDUITS SHALL BE INSTALLED SUCH THAT THE WATER CANNOT ACCUMULATE IN THE CONDUIT AND SUCH THAT WATER DRAINS INTO THE NEAREST MANHOLE, PULL BOX OR VAULT AND NOT INTO THE FACILITY. IN INSTANCES WHERE GRADE CHANGES OR ELEVATION DIFFERENCES PREVENT SLOPING OF CONDUIT AWAY FROM A BUILDING INTO THE NEAREST MANHOLE, PULL BOX OR VAULT OR WHERE ACCUMULATION OF WATER IN A MANHOLE, PULL BOX OR VAULT MAY RESULT IN WATER TRAVELING INTO THE FACILITY, CONDUITS SHALL BE SEALED INTERNALLY AT EACH END OF EACH CONDUIT USING CONDUIT SEALING BUSHING, SIZED AS REQUIRED FOR THE CONDUCTORS CONTAINED WITHIN THE CONDUIT (O- Z GEDNEY #CSBG 100PSIG WITHSTAND OR EQUAL). IN ALL CASES, INSTALL PLUGS OR CAPS IN SPARE (EMPTY) CONDUITS AT BOTH ENDS OF EACH CONDUIT (JACKMOON OR EQUAL) PREVENTING BOTH WATER AND GAS FROM ENTERING THE FACILITY VIA THE CONDUITS.
 f. INCLUDE A SEPARATE INSULATED GREEN GROUND CONDUCTOR SIZED PER CEC, IN EACH UNDERGROUND ELECTRICAL FEEDER/BRANCH CIRCUIT.
 g. ALL UNDERGROUND CONDUITS WITH CIRCUITS RATED AT 40 AMPS OR GREATER AND ALL UNDERGROUND COMMUNICATIONS CONDUITS SHALL BE PROVIDED WITH A METALLIC MARKER TAPE LOCATED 12 INCHES BELOW THE FINISHED GRADE.
 h. WHERE UNDERGROUND CONDUITS SWEEP INTO/THRU SLABS, UTILIZE PVC 90 DEGREE SWEEPS THAT TRANSITION, VIA FEMALE PVC ADAPTER TO GRC COUPLING MOUNTED FLUSH IN SLAB. GRC COUPLINGS SHALL BE 1/2 LAP TAPED WITH 20 MIL TAPE. IF THE DISTANCE OF THE CONDUIT RUN BETH/EEN A SWEEP AND THE NEXT CONNECTING SWEEP, PULLBOX, VAULT OR MANHOLE EXCEEDS 150 FT THEN THE SWEEP SHALL BE CONCRETE ENCASED. EXCEPTIONS:
 a. COMMUNICATIONS CONDUITS SHOWN TERMINATING AT A FINISHED FLOOR SHALL HAVE AN ADDITIONAL 4" HIGH GRC NIPPLE EQUIPPED WITH A BUSHING, REMOVABLE CONDUIT PLUG, LABELING TAG AND PULL ROPE. TIE OFF PULL ROPE TO CONDUIT PLUG.
 b. UTILITY CONDUIT SWEEPS SHALL BE INSTALLED PER THE REQUIREMENTS OF THE RESPECTIVE UTILITY COMPANY.
 i. ALL PVC CONDUIT SHALL BE GLUED FOR A WATER AND GAS TIGHT INSTALLATION. THE CONTRACTOR SHALL USE APPROPRIATE SOLVENT ON ALL JOINTS PRIOR TO GLUING CONDUIT AND FITTINGS TOGETHER.

B. INSTALLATION OF 600-VOLT CONDUCTORS:

1. ALL ELECTRICAL WIRE, INCLUDING SIGNAL CIRCUITS, SHALL BE INSTALLED IN CONDUIT.
2. ALL CIRCUITS AND FEEDER WIRES FOR ALL SYSTEMS SHALL BE CONTINUOUS FROM OVERCURRENT PROTECTIVE DEVICE OR SWITCH TO TERMINAL OR FARTHEST OUTLET. NO JOINTS SHALL BE MADE EXCEPT IN PULL, JUNCTION OR OUTLET BOXES, OR IN PANEL OR SWITCHBOARD GUTTERS.
 a. UTILIZE PREINSULATED "WINGED" SPRING TYPE CONNECTORS, PM COMPANY AS REQUIRED FOR SPLICES AND TAPS IN CONDUCTORS {6 AWG AND SMALLER. WHEN A SPRING CONNECTOR IS USED IN AN UNDERGROUND ENVIRONMENT OR WHEN SUBJECT TO MOISTURE, UTILIZE A 3M COMPANY EPOXY RESIN CONNECTOR SEALING PACK TO SEAL THE SPRING CONNECTOR.
 b. WIRES #4 AWG AND LARGER AWG SHALL BE JOINED TOGETHER AS FOLLOWS:
 1. WHEN LOCATED IN AN UNDERGROUND ENVIRONMENT OR WHEN SUBJECT TO MOISTURE, THE SPLICE SHALL BE MADE WITH COMPRESSION CONNECTOR AND SEALED BY A 3M, OR EQUAL, PST COLO SHRINK CONNECTOR INSULATOR.
 2. WHEN LOCATED IN AN INTERIOR ENVIRONMENT, THE SPLICE SHALL BE MADE WITH AN ILSCO OR EQUAL DUAL RATED, INSULATED SPLICER -REDUCER CONNECTOR OR MULTI-TAP CONNECTOR-LISTED FOR USE WITH 75/90 DECREE CELSIUS RATED CONDUCTORS.
 3. CONNECTIONS TO BUSBAR SHALL BE MADE WITH DUAL-RATED COPPER/ALUMINUM ONE-PIECE COMPRESSION LUGS. PARALLELED CONDUCTOR CONNECTIONS SHALL BE BY MECHANICAL LUGS.
 THOROUGHLY CLEAN ALL CONDUIT AND WIRE-WAYS AND SEE THAT ALL PARTS ARE PERFECTLY DRY BEFORE PULLING ANY WIRES.
3. INSTALL UL APPROVED FIXTURE WIRE FROM ALL LIGHTING FIXTURE LAMP SOCKETS INTO FIXTURE OUTLET OR JUNCTION BOX.
4. FOR 20 AMPERE BRANCH CIRCUIT WIRING, INCREASE #12 CONDUCTORS TO #10 FOR 120 VOLT CIRCUITS LONGER THAN 100 FEET AND FOR 277 VOLT CIRCUITS LONGER THAN 150 FEET, MINIMUM. SEE DRAWING SCHEDULE FOR ADDITIONAL INFORMATION.
5. CONDUCTOR SUPPORT. PROVIDE CONDUCTOR SUPPORTS AS REQUIRED BY CODES AND RECOMMENDED BY CABLE MANUFACTURER. WHERE REQUIRED, PROVIDE CABLE SUPPORTS IN VERTICAL CONDUITS AND PROVIDE LOWER END OF CONDUIT WITH A VENTILATOR.

C. GROUNDING/BONDING:

1. PROVIDE GROUNDING AND BONDING FOR ENTIRE ELECTRIC INSTALLATION AS SHOWN ON PLANS, AS LISTED HEREIN AND AS REQUIRED BY APPLICABLE CODES. INCLUDED, BUT NOT LIMITED TO, ARE ITEMS THAT REQUIRE GROUNDING/BONDING:
 a. CONDUIT, RACEWAYS AND CABLE TRAYS.
 b. NEUTRAL OR IDENTIFIED CONDUCTORS OF INTERIOR WIRING SYSTEM.
 c. PANELBOARDS, DISTRIBUTION BOARDS, SWITCHGEAR AND SWITCHBOARDS.
 d. NON -CURRENT CARRYING METAL PARTS OF FIXED EQUIPMENT.
 e. TELEPHONE DISTRIBUTION EQUIPMENT.
 f. METAL PIPING INSTALLED IN OR ATTACHED TO A BUILDING/STRUCTURE.
 g. METALLICALLY ISOLATED STRUCTURAL STEEL.
2. IN MULTI-OCCUPANCY BUILDINGS, CONTRACTOR SHALL BOND METAL WATER PIPING SYSTEMS INSTALLED IN, UNDER OR ATTACHED TO A BUILDING AND/OR STRUCTURE SERVING INDIVIDUAL OCCUPANCIES WHERE THE PIPING SYSTEM(S) ARE METALLICALLY ISOLATED FROM EACH OTHER. PER CEC, ART. 250. 104(A)(2) & (4), THE BONDING CONDUCTOR SHALL BE SIZED PER TABLE 250.122 AND CONNECTED TO THE SWITCHBOARD/PANELBOARD SERVING THAT SUITE/OCCUPANCY.
3. GROUNDING SYSTEM CONNECTION:
 a. COMPRESSION CONNECTORS SHALL BE UNPLATED COPPER, MANUFACTURED BY BURNDY, OR APPROVED EQUAL, DESIGNED SPECIFICALLY FOR THE INTENDED CONNECTION.
 b. EXOTHERMIC WELD-TYPE CONNECTORS SHALL BE 'CADWELD' MANUFACTURED BY ERICO PRODUCTS, OR APPROVED EQUAL, DESIGNED SPECIFICALLY FOR THE INTENDED CONNECTION.
 c. MECHANICAL CONNECTORS SHALL NOT BE USED.
4. PROVIDE SEPARATE GREEN EQUIPMENT GROUND CONDUCTOR IN ALL ELECTRICAL RACEWAYS, TO EFFECTIVELY GROUND ALL FIXTURES, PANELS, CONTROLS, MOTORS, DISCONNECT SWITCHES, EXTERIOR LIGHTING STANDARDS, AND NON-CURRENT CARRYING METALLIC ENCLOSURES. USE BONDING JUMPERS, GROUNDING BUSHINGS, LUGS, BUSSES, ETC., FOR THIS PURPOSE. CONNECT THE EQUIPMENT GROUND TO THE BUILDING SYSTEM GROUND. USE THE SAME SIZE EQUIPMENT GROUND CONDUCTORS AS PHASE CONDUCTORS, UP THROUGH #10 AWG. USE CEC TABLE 250.122 FOR CONDUCTOR SIZE WITH PHASE CONDUCTORS #8 AND LARGER, IF NOT SHOWN ON THE DRAWINGS.
5. CLEAN THE CONTACT SURFACES OF ALL GROUND CONNECTIONS PRIOR TO MAKING CONNECTIONS.
6. DUCTWORK. PROVIDE A FLEXIBLE GROUND STRAP, NO. 6 AWG EQUIVALENT, AT EACH FLEXIBLE DUCT CONNECTION AT EACH AIR HANDLER, EXHAUST FAN, AND SUPPLY FAN, AND INSTALL TO PRECLUDE VIBRATION.
7. MOTORS. CONNECT THE GROUND CONDUCTOR TO THE CONDUIT WITH AN APPROVED GROUNDING BUSHING, AND TO THE METAL FRAME WITH A BOLTED SOLDERLESS LUG. BOLTS, SCREWS AND WASHERS SHALL BE BRONZE OR CADMIUM PLATED STEEL.
8. BUILDING GROUNDING SYSTEM RESISTANCE TO GROUND SHALL NOT EXCEED 25 OHMS.

D. 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.

E. FIRESTOPPING:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL MATERIAL, LABOR, EQUIPMENT, AND SERVICES, IN CONJUNCTION WITH THE SELECTION AND INSTALLATION OF A COMPLETE AND FULLY FUNCTIONING AND CODE COMPLIANT UL-LISTED FIRE STOP ASSEMBLY/SYSTEM(S) AS REQUIRED BY PROJECT CONDITIONS.
2. EACH FIRE STOP ASSEMBLY/SYSTEM SHALL HAVE AN "F" AND/OR "T" RATING AS REQUIRED BY EACH CONDITION REQUIRING FIRE STOPPING. EACH FIRE STOP ASSEMBLY/SYSTEM SHALL HAVE A CURRENT U.L. LISTING, AS INDICATED IN THE LATEST EDITION OF THE U.L. FIRE RESISTANCE DIRECTORY. CONTRACTOR SHALL VERIFY ACCEPTABILITY OF ALL FIRE STOPPING METHODS AND SYSTEM SELECTIONS WITH THE AUTHORITY HAVING JURISDICTION PRIOR TO INSTALLATION. THE CONTRACTOR SHALL INSTALL EACH FIRESTOP ASSEMBLY/SYSTEM IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.
3. EACH FIRE STOP ASSEMBLY/SYSTEM SHALL BE LABELED WITH FIRE STOP MANUFACTURER - FURNISHED LABEL ON EACH SIDE OF THE FIRE STOPPING SYSTEMS DEPICTING UL NUMBER, ETC.

END OF SECTION

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KEY PLAN
PLAN NORTH TRUE NORTH

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12/31/2022

Architect

CLIENT	
NMUSD	
PROJECT NUMBER	P2101400ME
DATE	02/08/2021

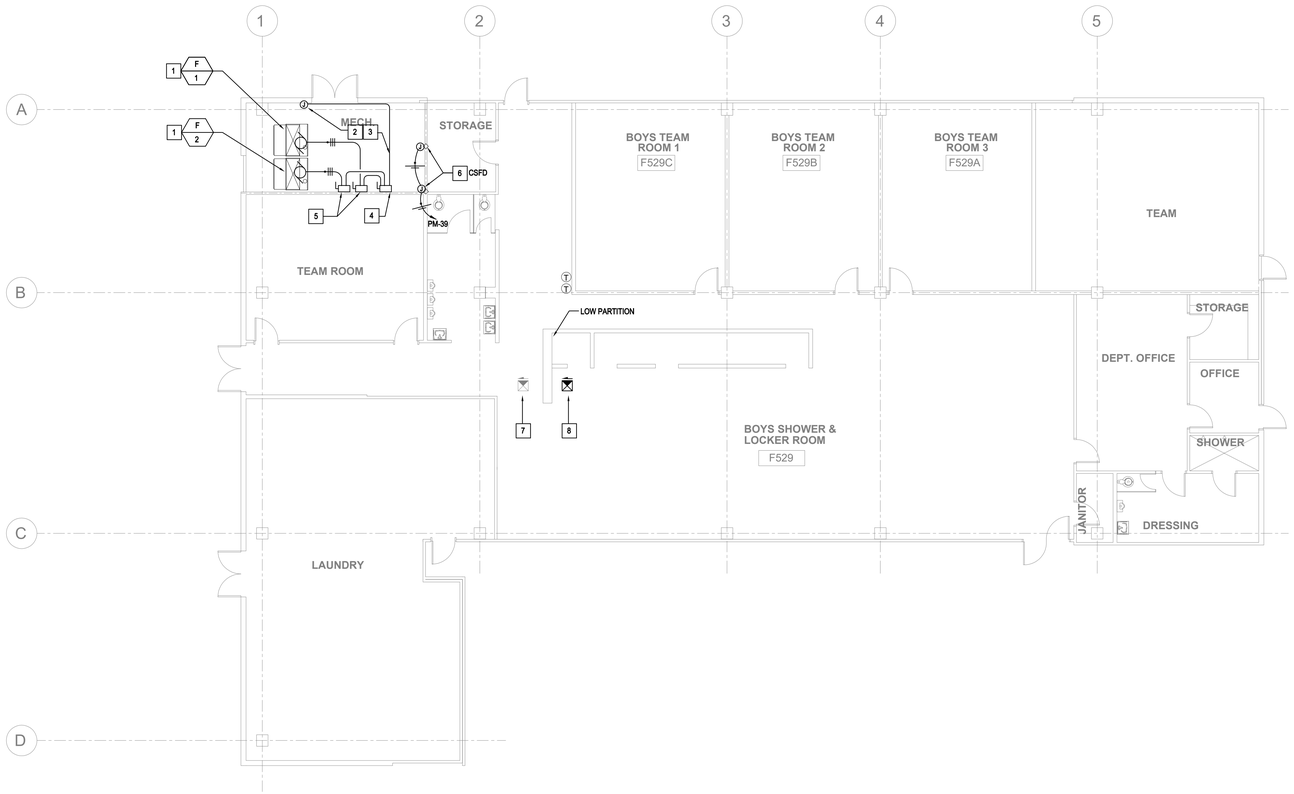
REVISIONS

#	DESCRIPTION	DATE

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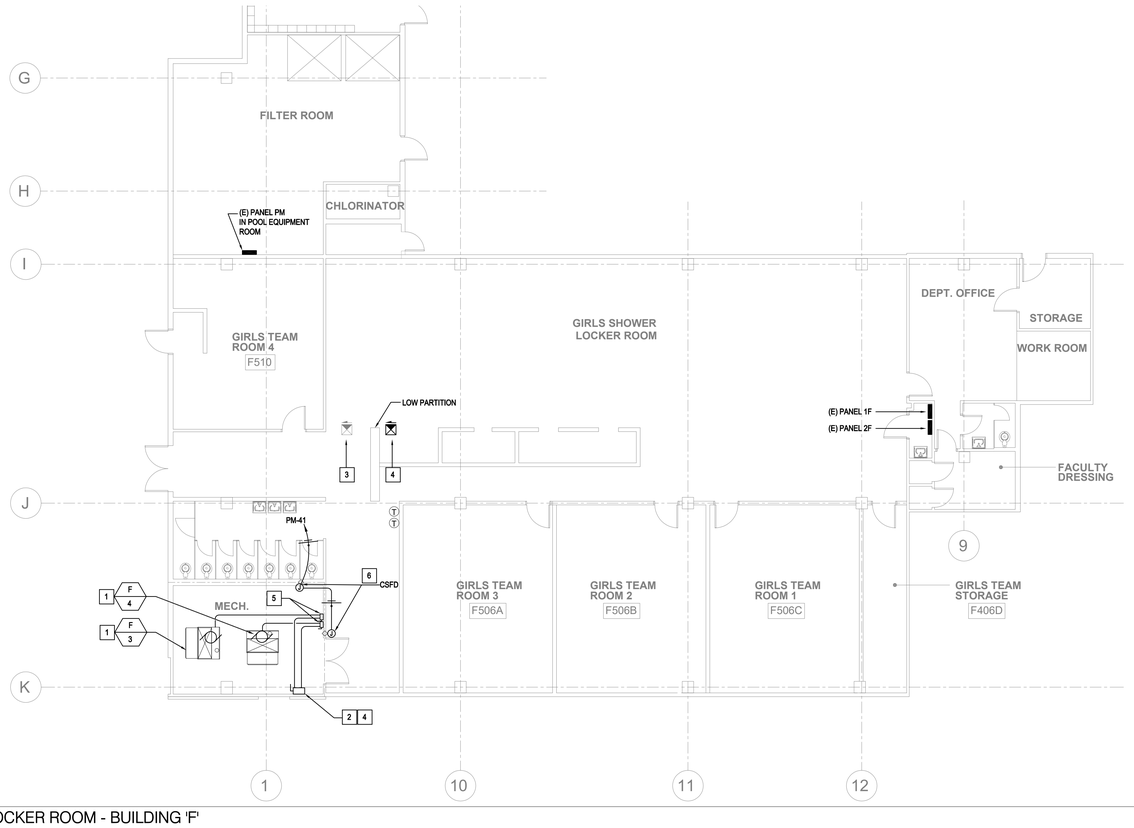
ELECTRICAL SPECIFICATIONS

E0.02



2 BOYS LOCKER ROOM - BUILDING F

1/8" = 1'-0"



1 GIRLS LOCKER ROOM - BUILDING 'F'

1/8" = 1'-0"

KEY NOTES

1. EXISTING MECHANICAL EQUIPMENT TO BE REPLACED WITH NEW, REFER TO MECHANICAL PLANS. CONTRACTOR TO DISCONNECT EXISTING BRANCH CIRCUIT WIRING FROM UNIT AND TERMINATE AT THE DISCONNECT LOCATED ON THE WALL.
2. APPROXIMATE LOCATION OF EXISTING DISCONNECT AND STARTER TO BE DEMOLISHED AND TO BE REPLACED WITH NEW DISCONNECT.
3. CONTRACTOR TO RELOCATE EXISTING WIREWAY, FEEDERS, SWITCHES, AND ALL OTHER EQUIPMENT ON THIS WALL TO THE NEW LOCATION AS SHOWN. INTERCEPT ALL FEEDERS AND BRANCH CIRCUIT WIRING AND PROVIDE PULLBOXES SIZED PER CEC. CONTRACTOR TO FIELD VERIFY EXISTING WIRING AND CONDUIT AND MATCH. EXTEND ALL WIRING TO THE NEW LOCATION AS SHOWN.
4. PROVIDE NEW 480V, 30AMP, 3-POLE, NON-FUSED DISCONNECT WITH DOUBLE LUGS, TO REPLACE EXISTING DISCONNECT/STARTER. PROVIDE SEPARATE FEED FROM DISCONNECT TO EACH UNIT WITH 3#12, #12G, 3/4"C. EACH UNIT HAS A 3-HORSEPOWER MOTOR WITH 4.4 FULL LOAD AMPS. EXISTING UPSTREAM FEEDER FROM THE LINE SIDE OF DISCONNECT HAS 3#12, #12G WHICH IS ADEQUATE AND SHALL REMAIN.
5. PROVIDE NEW 480V, 30AMP, 3-POLE DISCONNECT WITH 15AMP FUSES. COORDINATE EXACT MOUNTING LOCATION WITH NEW AND EXISTING EQUIPMENT WITHIN THE MECHANICAL ROOM. LOCATION SHALL COMPLY WITH CEC AND ALL APPLICABLE LOCAL CODE CLEARANCES AND REQUIREMENTS. ROUTE 3#12, #12G, 3/4"C FROM FUSED DISCONNECT TO THE NEW UNIT.
6. PROVIDE NEW 120V/20AMP CIRCUIT FROM PANEL 'PM' LOCATED IN POOL EQUIPMENT ROOM FOR POWER TO NEW COMBINATION SMOKE/FIRE DAMPER. COORDINATE EXACT DAMPER LOCATION WITH MECHANICAL CONTRACTOR. UTILIZE SPACES #39 AND #41 IN PANE AND PROVIDE 20A/1P BREAKER WITH RED LOCK-ON COVER AND LABEL AS 'FIRE ALARM'. CIRCUIT WITH 2#12, #12G, IN 3/4" CONDUIT.
7. CONTRACTOR TO RELOCATE EXISTING EXIT SIGN TO ALLOW INSTALLATION OF NEW OVERHEAD DUCTWORK, REFER TO MECHANICAL SHEET M2.01.
8. PROPOSED LOCATION FOR RELOCATED EXIT SIGN. CONTRACTOR TO REWORK AND EXTEND EXISTING CIRCUIT AS REQUIRED.

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Architect

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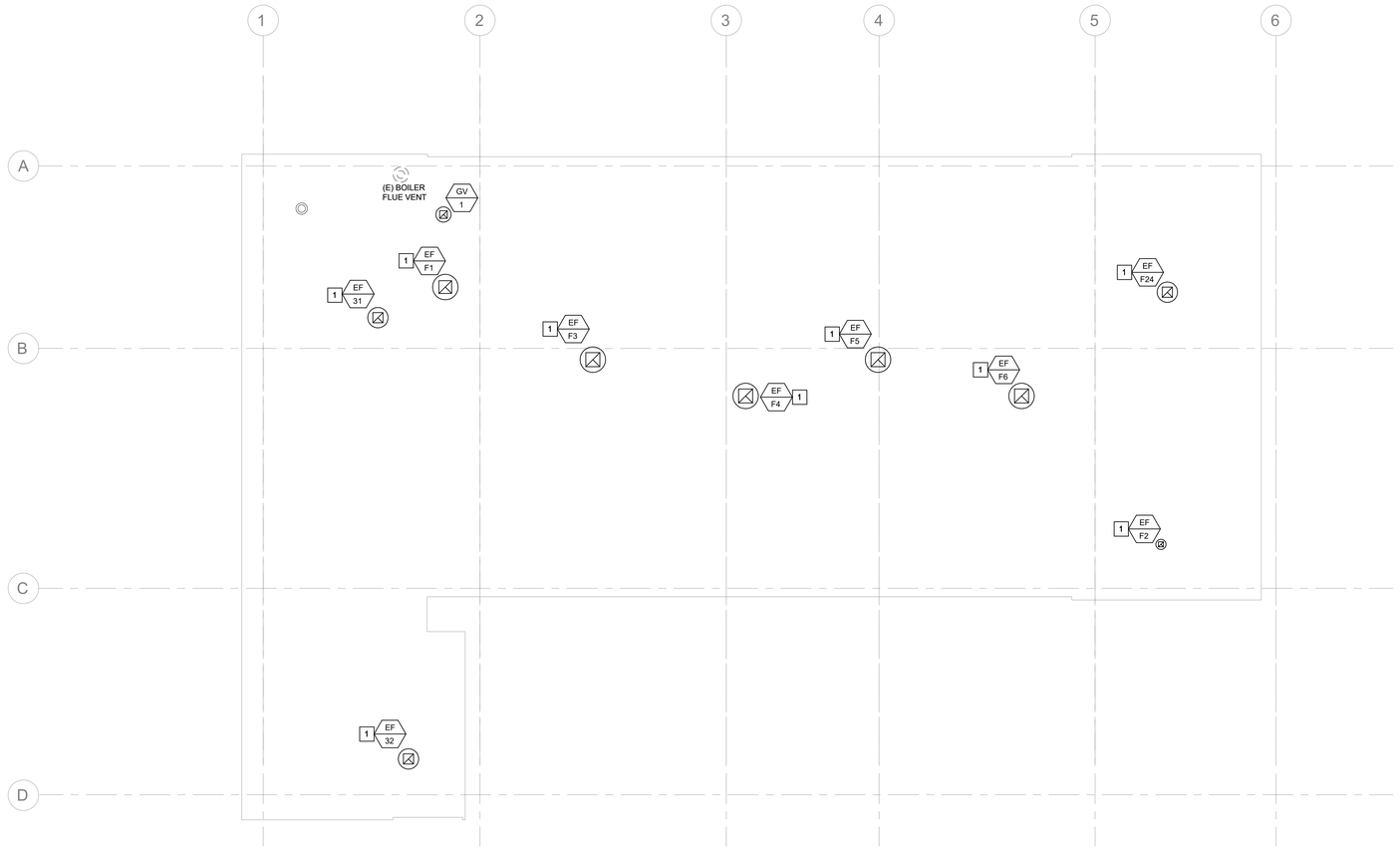
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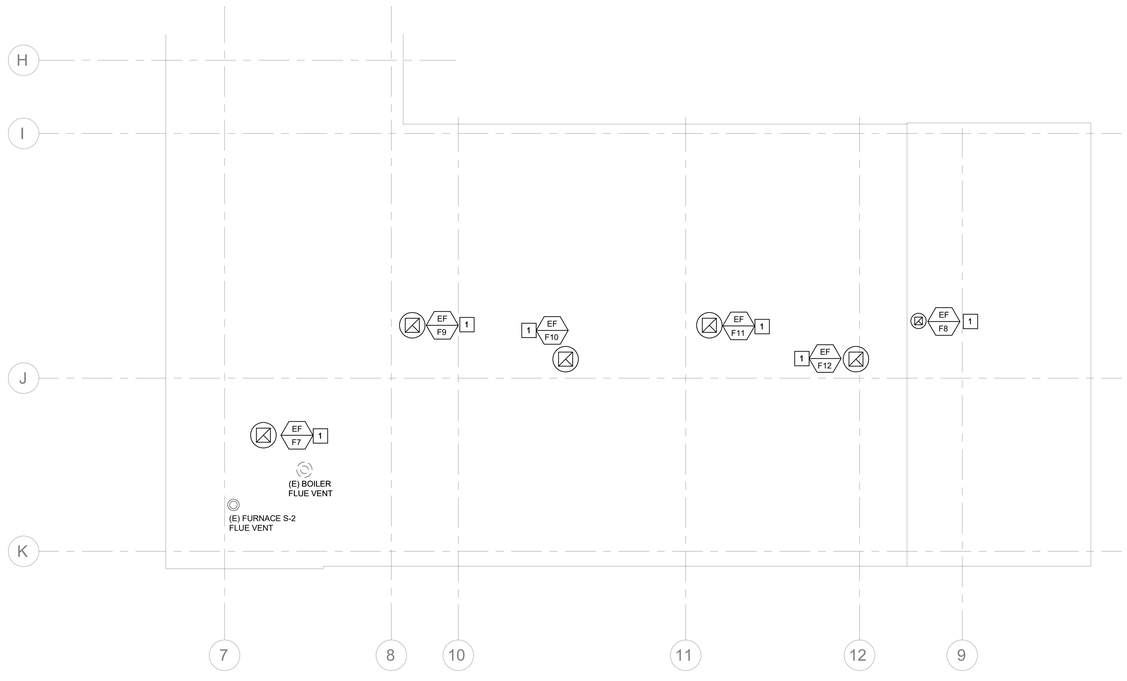
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ELECTRICAL FLOOR PLANS

E2.01



2 ROOF PLAN -BOYS LOCKER - BUILDING F
1/8" = 1'-0"



1 ROOF PLAN -GIRLS LOCKER - BUILDING F
1/8" = 1'-0"

KEY NOTES

1 EXISTING MECHANICAL EQUIPMENT TO BE REPLACED WITH NEW, REFER TO MECHANICAL PLANS. CONTRACTOR TO DISCONNECT EXISTING BRANCH CIRCUIT WIRING. CONTRACTOR SHALL LABEL AND DOCUMENT CIRCUIT FOR FUTURE USE. RE-USE EXISTING CIRCUIT AND EXTEND TO THE REPLACEMENT UNITS. RE-USE EXISTING LOCAL DISCONNECT. COORDINATE WITH MECHANICAL CONTRACTOR ABOUT THE NEW UNIT'S ELECTRICAL REQUIREMENTS AND INFORM ELECTRICAL ENGINEER IF THERE IS ANY DISCREPANCY.

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KEY PLAN
PLAN NORTH
TRUE NORTH

Engineer



12/31/2022

Architect

CLIENT	NMUSD
PROJECT NUMBER	P2101400ME
DATE	02/08/2021

REVISIONS

#	DESCRIPTION	DATE

100% CONSTRUCTION DOCUMENT

ELECTRICAL ROOF PLANS

E3.01

TITLE 24 NOTES

THE FOLLOWING SHALL BE REQUIRED WHETHER OR NOT SPECIFICALLY SHOWN OR MENTIONED IN DRAWINGS AND/OR SPECIFICATIONS:

1. EQUIPMENT SHALL MEET EFFICIENTY REQUIREMENTS OF TABLES 110.2-A THROUGH 110.2-K.
2. ALL AIR-COOLED, UNITARY, DX UNITS (PACKAGED, SPLIT-SYSTEM, HEAT PUMPS AND VRF) WITH ECONOMIZERS SHALL BE EQUIPPED WITH FAULT DETECTION AND DIAGNOSTICS SYSTEMS.
3. PIPE INSULATION FOR SPACE CONDITIONING AND SERVICE WATER-HEATING WITH FLUID TEMPERATURES LISTED IN TABLE 120.3-A SHALL HAVE INSULATION LEVELS AS SPECIFIED IN SUBSECTION (A) AND (B).
4. MECHANICAL HEATING AND COOLING 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, AS CALCULATED ACCORDING TO THE REQUIREMENTS OF SECTION 140.4(B).
5. HVAC MOTORS FOR FANS THAT ARE LESS THAN 1 HP AND 1/12 HP OR GREATER SHALL BE ECM OR HAVE A MINIMUM MOTOR EFFICIENCY OF 70%. MOTORS SHALL ALSO HAVE MEANS TO ADJUST MOTOR SPEED FOR BALANCING OR REMOTE CONTROL.
6. ELECTRIC RESISTANCE HEATING SYSTEMS ARE NOT PROVIDED FOR SPACE HEATING.
7. IN DRIER CLIMATES AND WHEN LARGE OUTDOOR AIR FRACTIONS ARE REQUIRED, EVAPORATIVE PRE-COOLING PACKAGES WERE EVALUATED TO PRE-COOL OUTSIDE AIR AND COOL THE AIR FLOWING OVER THE DX CONDENSING UNIT.
8. ZONE EACH AIR HANDLER TO SERVE ONLY AREAS WITH COMMON LOADS TO ALLOW MORE AGGRESSIVE CONTROL STRATEGIES AND IMPROVE COMFORT. HAVE DIFFERENT AHU'S SERVING CORE VS. PERIMETER AREAS.
9. THE DESIGN ACCOMMODATES PARTIAL OCCUPANCY ENERGY SAVINGS WHEN THE OWNER'S REQUIREMENTS OR NARRATIVE DESCRIBE ANY POSSIBLITY OF PARTIAL OCCUPANCY, BY ZONING AIR HANDLERS BY FLOOR OR BY PART OF A FLOOR, OR BY INCORPORATING CONTROLLED FLOOR DAMPERS, OR VAV AIR TERMINALS GOING TOTALLY SHUT WHEN NOT OCCUPIED, ETC.
10. EACH ZONE IS CONTROLLED BY AN INDIVIDUAL THERMOSTATIC CONTROL. CONTROLS SHALL BE CAPABLE OF SETTING TEMPERATURES TO 55 DEG F FOR HEATING AND 85 DEG F FOR COOLING AND PROVIDE A TEMPERATURE DEADBAND OF AT LEAST 5 DEG F IF CONTROLLING BOTH HEATING AND COOLING.
11. EACH SPACE CONDITIONING SYSTEM SHALL BE EQUIPPED WITH CONTROLS TO SHUT THE SYSTEM OFF DURING PERIODS OF NONUSE AND WILL TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN SETBACK AND SETUP TEMPERATURES WHILE KEEPING VENTILATION DAMPERS CLOSED.
12. SYSTEMS SERVING MULTIPURPOSE ROOMS LESS THAN 100 SF AND CLASSROOMS, CONFERENCE, AUDITORIUM OR MEETING CENTER ROOMS GREATER THAN 750 SF SHALL HAVE OCCUPANCY SENSORS THAT INTERFACE WITH HVAC CONTROLS TO AUTOMATICALLY SETUP THE COOLING SETPOINT BY 2F OR MORE AND AUTOMATICALLY RESET THE MINIMUM REQUIRED VENTILATION RATE. THESE OCCUPANT SENSOR VENTILATION CONTROL DEVICES MUST MEET THE REQUIREMENTS OF SECTION 120.1(C)5.
13. OUTDOOR AIR SUPPLY AND EXHAUST EQUIPMENT SHALL BE INSTALLED WITH DAMPERS THAT AUTOMATICALLY CLOSE UPON ZFFAN SHUTDOWN.
14. HVAC SYSTEMS WITH DDC TO THE ZONE LEVEL SHALL BE PROGRAMMED TO ALLOW CENTRALIZED DEMAND SHED FOR NON-CRITICAL ZONES.
15. ZONE CONTROLS PREVENT REHEATING, RECOOLING AND SIMULTANEOUS PROVISIONS OF HEATING AND COOLING TO THE SAME ZONE.
16. EACH WALL MOUNTED THRMOSTAT SHALL BE LOCATED AWAY FROM POTENTIAL SOURCES THAT WOULD ADVERSELY AFFECT THE READING (CLOSE TO COPIERS, DIRECT SUNLIGHT, BELOW OR ABOVE A SUPPLY AIR DIFFUSER OR CONVECTOR, ETC.). ANY THERMOSTATS MOUNTED ON EXTERIOR WALLS SHALL BE INSTALLED IN SEALED AND INSULATED JUNCTION BOXES.
17. CORNER OFFICE SHALL ALWAYS HAVE THEIR OWN THERMOSTATS, AIR TERMINAL BOXES OR FIN-TUBE RADIATORS.
18. CONTROL SEQUENCES SHALL BE LISTED FOR EQUIPMENT OPERATED BY STAND-ALONE PACKAGED CONTROLS. UNOCCUPIED SEQUENCES SHALL BE INCLUDED.
19. CONTROL SEQUENCES SHALL BE PROVIDED FOR EACH PIECE OF EQUIPMENT LISTED IN THE EQUIPMENT SCHEDULE THAT IS MONITORED OR CONTROLLED BY THE BUILDING AUTOMATION SYSTEM (BAS). UNOCCUPIED SEQUENCES SHALL BE INCLUDED.
20. OUTSIDE AIR TEMPERATURE SENSORS SHALL BE IN A COMMERCIALLY DESIGNED SOLAR SHIELD LOCATED ON A NORTH WALL OR SOME OTHER LOCATION OUT OF DIRECT SUNLIGHT AND AWAY FROM BUILDING EXHAUST OR HEAT REJECTION EQUIPMENT.
21. THE OUTDOOR AIR-VENTILATION RATE AND AIR-DISTRIBUTION ASSUMPTIONS MADE IN THE DESIGN OF THE VENTILATING SYSTEM ARE CLEARLY IDENTIFIED ON THE PLANS.
22. EACH SPACE IS DESIGNED TO HAVE NATURAL VENTILATION OR MECHANICAL VENTILATION THAT IS NO LESS THAN THE LARGER OF CONDITIONED FLOOR AREA TIMES THE REQUIREMENTS IN TABLE 120.1-A OR 15 CFM TIMES THE EXPECTED NUMBER OF OCCUPANTS.
23. THE MINIMUM AND MAXIMUM OUTDOOR AIR RATES FOR EACH AIR HANDLER ARE LISTED ON THE EQUIPMENT SCHEDULES.
24. THE OUTDOOR AIR-VENTILATION RATES ARE BASED ON PLANNED OWNER OCCUPANCY AS DEFINED IN OWNER'S DESIGN INTENT AND ARE NOT BASED ON MAXIMUM EGRESS OCCUPANCY RATES.
25. HVAC SYSTEMS THAT HAVE AN ECONOMIZER, SERVE A SPACE WITH A DESIGN OCCUPANT DENSITY GREATER THAN OR EQUAL TO 25 PEOPLE PER 1000 SF, AND ARE EITHER A SINGLE ZONE SYSTEM WITH ANY CONTROLS OR MULTIPLE ZONE SYSTEM WITH DDC CONTROLS TO THE ZONE LEVEL MUST HAVE DEMAND CONTROL VENTILATION CONTROLS. THE FOLLOWING MUST BE MET:
   A. CO2 SENSORS INSTALLED IN EACH ROOM SERVED BY SYSTEMS WITH DCV CONTROLS.
   B. CO2 SENSORS ARE LOCATED BETWEEN 3 FT AND 6 FT ABOVE THE FLOOR.
   C. CO2 CONCENTRATIONS MAINTAINED AT LESS THAN OR EQUAL TO 600 PPM PLUS OUTDOOR PPM.
   D. DURING HOURS OF EXPECTED OCCUPANCY, CONTROLS MAINTAIN THE SYSTEM VENTILATION RATE.
26. EACH COOLING FAN SYSTEM THAT HAS A DESIGN MECHANICAL COOLING CAPACITY OVER 54,000 BTU/H SHALL HAVE AN AIR ECONOMIZER OR A WATER ECONOMIZER. AIR ECONOMIZERS MUST COMPLY WITH THE HIGH LIMIT SHUTOFF CONTROLS SHOWN IN TABLE 140.4-B.
27. INTEGRATED ECONOMIZER CONTROLS SHALL BE SET UP SUCH THAT PARTIAL COOLING IS PROVIDED BY THE ECONOMIZER EVEN WHEN ADDITIONAL MECHANICAL COOLING ID REQUIRED.
28. ECONOMIZER DAMPERS SHALL BE DRIVEN BY DIRECT DRIVE ACTUATORS RATHER THAN ROD LINKAGES, WHICH CAN BE A MAJOR CAUSE OF ECONOMIZER MALFUNCTION.
29. BAROMETRIC RELIEF IS USED, IF POSSIBLE. IF NOT, RELIEF FANS (RATHER THAN RETURN FANS) SHALL BE USED IN MOST CASES.
30. OUTDOOR AND RETURN AIR SENSORS SHALL BE PROPERLY SELECTED, PROPERLY LOCATED TO PROVIDE ACCURATE AND REPEATABLE MEASUREMENTS FOR CONTROLLING ECONOMIZER OPERATION. AVERAGING SENSORS COVER THE ENTIRE DUCT OR COIL FACE AREAS.
31. ALL AIR DISTRIBUTION SYSTEM DUCTS AND PLENUMS MUST BE INSTALLED, SEALED AND INSULATED AS REQUIRED BY 120.4(A).
32. DUCT SEALING LEAKAGE RATES SHALL BE NO MORE THAN 6% OF AIR FLOW FOR NEW DUCT SYSTEMS AND NO MORE THAN 15% OF AIR FLOW FOR ALTERED EXISTING DUCT SYSTEMS.
33. DUCT SHALL UTILIZE LOW STATIC PRESSURE DESIGN. IDENTIFY THE MOST RESTRICTIVE BRANCH FROM THE FAN TO THE LAST AIR TERMINAL UNIT. IDENTIFY POSSIBLE MEANS OF SIGNIFICANTLY REDUCING THE PRESSURE DROP. BRANCH DUCT SYSTEMS SHALL DESIGNED FOR EQUAL PRESSURE DROP, WHEN POSSIBLE.
34. DUCT BRANCHES WITH SIGNIFICANTLY DIFFERING STATIC PRESSURE REQUIREMENTS SHALL HAVE VOLUME CONTROL STRATEGICALLY PLACED TO AID IN TAB WORK.
35. FAN SHALL DISCHARGE INTO DUCT SECTIONS THAT REMAIN STRAIGHT FOR AS LONG AS POSSIBLE (IDEALLY 10 DUCT DIAMETERS) TO REDUCE FAN INEFFICIENCIES FROM SYSTEM EFFECTS.
36. DUCT VELOCITIES SHALL GENERALLY BE BELOW 2,000 FPM FOR DUCTS IN CEILING PLENUMS, 1500 FPM FOR EXPOSED DUCTS AND 3500 FPM IN MECHANICAL ROOMS AND NON-NOISE SENSITIVE SHAFTS AND DO NOT REDUCE ANY DUCT SIZES LISTED ON PLANS.
37. DUCT FRICTION RATES SHALL GENERALLY BE LESS THAN O.25" WC PER 100 LINEAL FEET NEARER THE FAN, 0.15 TO 0.20" IN THE MAIN DUCTS AND 0.08 TO 0.12" WC/100' NEARER THE END OF THE SYSTEM. DESIGNS OVER THESE RATES SHALL BE QUESTIONED. VERY ENERGY EFFICIENT DESIGN CAN LOWER THESE VALUES BY UP TO 40%.
38. CONTRACTOR SHOP DRAWINGS SHALL BE SUFFICIENTLY DETAILED TO ENSURE THAT DISTRIBUTION SYSTEM DESIGN INTENT IS ADEQUATELY CONVEYED TO MATCH PLANS. IF SUFFICIENT DETAIL IS NOT INCLUDED IN DRAWINGS, INSTALLATIONS MAY RESULT IN SIGNIFICANTLY HIGHER PRESSURE DROPS AND HENCE HIGHER ENERGY CONSUMPTION AND OTHER OPERATING ISSUES.
39. ACCEPTANCE REQUIREMENTS ARE CLEARLY IDENTIFIED IN CONSTRUCTION DOCUMENTS.
40. COMMISSIONING MEASURES OR REQUIREMENTS ARE REFLECTED IN THE CONSTRUCTION DOCUMENTS.
41. REQUIREMENTS FOR FUNCTIONAL PERFORMANCE TESTS ARE REFLECTED IN THE CONSTRUCTION DOCUMENTS.
42. COOLING SYSTEMS IDENTIFIED IN TABLE 140.4-D SHALL HAVE FAN CONTROLS TO VARY THE INDOOR FAN AIRFLOW AS A FUNCTION OF LOAD:
   A. DX AND CHILLED WATER COOLING SYSTEMS THAT CONTROL CAPACITY BASED ON OCCUPIED SPACE TEMPERATURE SHALL HAVE A MINIMUM OF 2 STAGES OF CONTROL.
   B. SYSTEMS THAT CONTROL SPACE TEMPERATURE BY MODULATING AIRFLOW TO THE SPACE SHALL HAVE PROPORTIONAL FAN CONTROL.
   C. SYSTEMS WITH AIR SIDE ECONOMIZER SHALL HAVE A MINIMUM OF 2 SPEEDS OF FAN CONTROL DURING ECONOMIZER OPERATION.
43. FAN CABINET ENCLOSURE AND INTERNAL COMPONENTS SHALL BE ELECTED TO MINIMIZE PRESSURE DROP, E.G. FACE VELOCITY IS LESS THAN 500 FPM, LOW PRESSURE DROP COILS, FILTERS, ETC.
44. FAN WHEEL SHALL BE SELECTED FOR EFFICIENT OPERATION, E.G. LARGER DIAMETER ROTATING AT LOWER SPEED.
45. SYSTEMS THAT SERVE MULTIPLE ZONES SHALL HAVE CONTROLS THAT AUTOMATICALLY RESET SUPPLY AIR TEMPERATURE. ZONES WITH HIGH INTERNAL LOADS WITH NEAR CONSTANT AIRFLOW SHALL BE DESIGNED FOR THE ELEVATED RESET SUPPLY AIR TEMPERATURE. RESET CONTROLS SHALL BE IN RESPONSE TO BUILDING LOADS OR TO OUTDOOR AIT TEMPERATURE AND SHALL BE AT LEAST 25% OF THE DIFFERENCE BETWEEN SUPPLY AIR AND DESIGN ROOM AIR TEMPERATURE. CONTROL SEQUENCES ARE IDENTIFIED IN CONSTRUCTION DOCUMENTS.
46. SAT RESET SHALL BE ESTABLISHED WITH AN AGGRESSIVE RESET SCHEDULE OF 10F, E.G. 55F DURING WARM WEATHER AND 65F DURING COOL WEATHER.

GENERAL NOTES

1. ALL WORK SHALL COMPLY WITH CURRENT CALIFORNIA CODE OF REGULATIONS TITLE 24, ALL OTHER APPLICABLE CODES AND REGULATIONS, SMACNA AND ASHRAE GUIDELINES, AND LOCAL CODES.
2. ALL HVAC EQUIPMENT SHALL BE COMPLIANT WITH EFFICIENCY STANDARDS PER TITLE-24, PART 6.
3. ALL FRESH AIR INTAKES SHALL BE AT LEAST 10 FEET IN A HORIZONTAL DIRECTION FROM ALL EXHAUST, FLUE, FUEL BURNING APPLIANCE AND PLUMBING VENT OUTLETS. FOR GAS/ELECTRIC AIR CONDITIONING UNITS WHERE THE CODE REQUIRED CLEARANCES ARE NOT MET, A FACTORY FLUE GAS DEFLECTOR AND EXTENSION SHALL BE USED TO MINIMIZE THESE CLEARANCES. CONTRACTOR SHALL DETERMINE LOCATIONS WHERE REQUIRED PRIOR TO BID. THIS SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
4. AIR FILTERS SHALL BE STATE FIRE MARSHAL APPROVED AND LISTED. PREFORMED FILTERS HAVING COMBUSTIBLE FRAMING SHALL BE TESTED AS A COMPLETE ASSEMBLY. AIR FILTERS IN ALL OCCUPANCIES SHALL BE PER TITLE-24 PART 6 AND APPLICABLE ASHRAE REQUIREMENTS. FILTERS SHALL BE ACCESSIBLE
5. REVIEW THESE PLANS AND SPECIFICATIONS PRIOR TO BID. REVIEW PLANS AND SPECIFICATIONS OF OTHER RELATED TRADES INCLUDING ARCHITECTURAL, STRUCTURAL, ELECTRICAL, AND FIRE PROTECTION.
6. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS AS THESE ARE PART OF THE CONTRACT DOCUMENTS. WHERE A CONFLICT OCCURS BETWEEN THIS SPECIFICATION AND OTHER SPECIFICATIONS ISSUED AS A PART OF THE CONTRACT DOCUMENTS, THE MORE STRINGENT REQUIREMENT SUPERCEDES.
7. THESE DRAWINGS ARE DIAGRAMMATIC ONLY AND NOT INTENDED TO INDICATE ALL REQUIRED OFFSETS, BENDS, ELBOWS, TRANSITIONS, FITTINGS AS REQUIRED TO CONFORM TO THE BUILDING STRUCTURE, CLEARANCE INSIDE CEILINGS, AVOIDANCE OF OBSTRUCTIONS, AND MAINTAINING HEAD CLEARANCE.
8. COORDINATE INSTALLATION WITH ALL OTHER TRADES PRIOR TO INSTALLATION OF EQUIPMENT OR MATERIALS, INCLUDING BUT NOT LIMITED TO, STRUCTURAL, ARCHITECTURAL, ELECTRICAL, AND PLUMBING.
9. COORDINATE THE LOCATIONS OF ALL CEILING DIFFUSERS, REGISTERS, AND GRILLES WITH THE ARCHITECTURAL REFLECTIVE CEILING PLANS, ELECTRICAL LIGHTING LAYOUT, AND ARCHITECTURAL ROOM ELEVATIONS. THE ARCHITECT AND ENGINEER SHALL BE IMMEDIATELY NOTIFIED OF ANY CONFLICTS PRIOR TO FABRICATION AND INSTALLATION.
10. COORDINATE THE LOCATION OF ALL ROOF OPENINGS AND THE LOCATIONS OF ALL ROOF MOUNTED EQUIPMENT WITH THE STRUCTURAL AND ARCHITECTURAL WEIGHTS FOR PLATFORM AND CURB SIZES, FOR ROOF AND WALL PENETRATION DETAILS AND REQUIREMENTS, SEE ARCHITECTURAL AND STRUCTURAL DRAWINGS. REQUIRED PLATFORMS AND FLASHINGS FOR MECHANICAL EQUIPMENT SHALL BE AS INDICATED ON THE STRUCTURAL AND ARCHITECTURAL PLANS, UNLESS NOTED OTHERWISE.
11. HIRE A TEST AND BALANCE AGENCY TO PERFORM THE TESTING PROCEDURES, REQUIRED BY THE MECH-2A THROUGH MECH-11A CERTIFICATE OF ACCEPTANCE FORMS, AS APPLICABLE FOR ALL NEWLY INSTALLED HEATING AND COOLING SYSTEMS. THE CONTRACTOR AND TEST AND BALANCE AGENCY ARE RESPONSIBLE FOR OBTAINING THE CERTIFICATE OF ACCEPTANCE FORMS REQUIRED BY THE IOR. THE TEST AND BALANCE AGENCY SHALL BE WELL VERSED WITH ALL THE REQUIREMENTS OF THESE CERTIFICATE OF ACCEPTANCE FORMS, AND SHALL COORDINATE AND WORK WITH THE EQUIPMENT AND CONTROLS INSTALLERS TO COMPLY WITH THESE REQUIREMENTS IN A TIMELY MANNER WITHIN THE PROJECT SCHEDULE. THE AIR BALANCE CONTRACTOR SHALL BE A MEMBER OF AABC (ASSOCIATED AIR BALANCE COUNCIL).
12. PAINT ALL EXPOSED DUCTWORK, DUCT SUPPORTS, ACCESSORIES, REGISTERS, GRILLES, DIFFUSERS, AND APPURTENANCES, 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 ARCHITECT WILL SELECT FROM STANDARD COLORS OR FINISHES AVAILABLE. 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 EQUIPMENT.
13. PROVIDE ALL LABOR, MATERIAL, INSURANCE, EQUIPMENT, INSTALLATION, CONSTRUCTION TOOLS, TRANSPORTATION, AND OTHER WORK AS REQUIRED. FOR A COMPLETE AND PROPERLY OPERATING MECHANICAL SYSTEM.
14. ALL MATERIALS SHALL BE NEW AND OF THE SAME MANUFACTURER FOR EACH CLASS OR GROUP OF EQUIPMENT. EQUIPMENT SHALL BE LISTED AND APPROVED BY UNDERWRITER 'S LABORATORIES, AND SHALL BEAR THE INSPECTION LABEL WHERE SUBJECT TO SUCH APPROVAL. MATERIALS SHALL MEET WITH THE APPROVAL OF THE GOVERNING BODIES HAVING JURISDICTION. MATERIALS SHALL BE MANUFACTURED AND INSTALLED IN ACCORDANCE WITH APPLICABLE STANDARDS ESTABLISHED BY THE LATEST EDITION OF CMC, CBC U.L., SMACNA AND ASHRAE GUIDELINES. INSTALL PER MANUFACTURERS ' RECOMMENDATIONS, AND INSTALLATION INSTRUCTIONS.
15. OBTAIN AND PAY FOR ALL NECESSARY BUILDING PERMITS AND VARIANCES. COORDINATE TEMPORARY CONSTRUCTION REQUIREMENTS WITH ALL TRADES PRIOR TO CONSTRUCTION. INCLUDE ALL COSTS IN THE BID.
16. IF THE CONTRACTOR PROPOSES ALTERNATE EQUIPMENT OR MATERIAL, THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN ALL DSA APPROVALS, PAY ALL RELATED FEES AND OBTAIN APPROVAL FROM OWNER & ENGINEER OF RECORD. PROVIDE TITLE-24 COMPLIANCE CERTIFICATION AND ALL ASSOCIATED FEES REQUIRED. COORDINATE SUBMITTED EQUIPMENT WITH OTHER TRADES. INCLUDE IN THE SHOP DRAWINGS THE EQUIPMENT SUBMITTED FOR APPROVAL WITH A DIFFERENT PHYSICAL SIZE OR ARRANGEMENT FROM THAT SHOWN.
17. PROVIDE SHOP DRAWINGS PER PROJECT SCHEDULE REQUIREMENTS FOR ALL INSTALLED AND FABRICATED PARTS AND SYSTEMS. IF SHOP DRAWINGS ARE NOT PROVIDED TO THE ENGINEER FOR REVIEW, AND ANY CONFLICTS OCCUR BETWEEN TRADES, DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WORK NECESSARY TO RESOLVE THE CONFLICT AND BEAR ALL COSTS INCURRED FOR ALL REVISIONS, AT NO ADDITIONAL COST TO THE DISTRICT. THE DISTRICT AND ENGINEER SHALL BE NOTIFIED IMMEDIATELY PRIOR TO FABRICATION AND INSTALLATION OF ALL WORK THAT CAUSES CONFLICTS BETWEEN TRADES.
18. PROVIDE ALL MANUFACTURER 'S PRODUCT DATA CLEARLY INDICATING MODEL NUMBERS, CAPACITIES, CONSTRUCTION, ELECTRICAL INFORMATION, AND OPTIONAL ACCESSORIES, PER PROJECT SCHEDULE AND PRIOR TO THE START OF WORK. THESE SHALL BE REVIEWED BY THE MECHANICAL ENGINEER PRIOR TO PURCHASING.
19. SUBMIT TO THE OWNER ALL BROCHURES, OPERATING MANUALS, CATALOGS, SHOP DRAWINGS, "AS-BUILTS", ETC. AT THE COMPLETION OF THE JOB. PROVIDE THE OWNER WITH COMPLETE MECHANICAL "AS—BUILTS" INDICATING FINAL EQUIPMENT LOCATIONS, DUCTWORK AND PIPE ROUTING, ETC.
20. OBTAIN APPROVAL FROM THE OWNER ON ALL ADDENDA AND CHANGE ORDERS PRIOR TO DOING THE WORK.
21. INSTALL ALL EQUIPMENT, ACCESSORIES, AND MATERIAL IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND RECOMMENDATIONS.
22. PROVIDE FIRESTOPPING FOR PIPE AND DUCT PENETRATIONS THROUGH RATED WALLS. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES AS NECESSARY PRIOR TO INSTALLATION.
23. ANY MATERIAL EXPOSED WITHIN A PLENUM OR DUCT MUST HAVE A FLAME SPREAD INDEX OF NOT MORE THAN 25, AND A SMOKE DEVELOPED RATING OF NOT MORE THAN 50, AND A MOLD/HUMIDITY RESISTANCE PER U.L. 181.
24. ALL EQUIPMENT, DUCTS, PIPING, AND OTHER DEVICES AND MATERIALS OUTSIDE OF THE BUILDING OR OTHERWISE EXPOSED TO THE WEATHER SHALL BE COMPLETELY WEATHERPROOFED.
25. LOCATE ALL EQUIPMENT SUCH THAT CODE REQUIRED ACCESS IS MAINTAINED, INCLUDING N.E.C. REQUIREMENTS. ACCESS PANELS WHERE REQUIRED, SHALL BE COORDINATED WITH ARCHITECT, AND PROVIDED BY FACTORY OR BE FIELD-PROVIDED. FOR ATTIC EQUIPMENT, G.C. TO PROVIDE A CATWALK & LIGHT PER CMC FOR ATTIC EQUIPMENT.
26. 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 WHERE THEY ARE LOCATED IN. MINIMUM ACCESS PANEL SIZES SHALL BE AS FOLLOWS: 1) HAND ACCESS: 12"x12" MIN. 2) BODY ACCESS: 30"x30" MIN.
27. ALL EQUIPMENT WITH MOVING PARTS SHALL BE PROVIDED WITH FLEXIBLE DUCT AND PIPE CONNECTIONS.
28. LABEL ALL EQUIPMENT AS TO THE SPACE IT SERVES. SEE SPECIFICATIONS FOR IDENTIFICATION STANDARDS. LABEL DUCT SMOKE DETECTOR LOCATIONS (AT CEILING) AS TO THE EQUIPMENT IT SERVES.
29. A/C UNITS PROVIDED WITH ECONOMIZER CYCLE DAMPERS SHALL HAVE OSA DAMPERS SET UP TO CLOSE AUTOMATICALLY ON FAN SHUT DOWN.
30. 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.
31. DRAWINGS ARE FOR REFERENCE ONLY. CONTRACTOR TO FIELD VERIFY EXISTING CONDITION PRIOR TO BID DATE.
32. OWNER RETAINS SALVAGE RIGHTS, PROVIDE A MINIMUM OF 72 HOURS NOTICE PRIOR TO REMOVAL OF ROOF TOP UNITS AND EXHAUST FANS.
33. PATCH AND SEAL ALL SLAB, ROOF AND WALL OPENINGS WITH LIKE MATERIAL WHERE MECHANICAL EQUIPMENT ONCE PENETRATED.
34. REMOVE EXISTING AND PROVIDE ALL NEW DUCT AND PIPE HANGER SUPPORTS WHERE DUCT AND PIPE IS BEING REPLACED.
35. PROVIDE ALL NEW PIPE SUPPORTS WHERE PIPING IS SCHEDULED TO BE REPLACED.
36. OUTDOOR REFRIGERANT PIPING TO BE INSULATED AND ALUMINUM WRAPPED.
37. CONTRACTOR IS RESPONSIBLE FOR COMPLETE AND OPERABLE SYSTEM.
38. ALL MECHANICAL EQUIPMENTS, PIPES AND DUCTS SHALL BE SUPPORTED AND BRACED PER THE CURRENT CALIFORNIA BUILDING CODE. ALL MECHANICAL COMPONENTS SHALL BE ABLE TO RESIST THE EFFECTS OF SEISMIC FORCES.
39. MECHANICAL WORK SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL CODES AND REGULATIONS.
40. CONTRACTOR SHALL PROTECT EXISTING BUILDING INFRASTRUCTURE DURING CONSTRUCTION FROM OUTDOOR ELEMENT. IF DAMAGED, CONTRACTOR SHALL REPLACE DAMAGED BUILDING COMPONENTS WITH NEW AT NO ADDITIONAL COST TO THE OWNER.
41. ALL DUCTWORK SHALL BE FABRICATED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF THE SMACNA LOW PRESSURE DUCT CONSTRUCTION STANDARDS.
42. ALL DUCT JOINTS SHALL BE MADE WITH MASTIC SEALANT, SHEET METAL SCREWS AND TAPED AIR TIGHT WITH HARDCAST OR EQUIV., MINIMUM 2-1/2" WIDTH.
43. WHERE BRACING DETAILS ARE NOT SHOWN ON THE DRAWINGS OR IN THE GUIDELINES, THE FIELD INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE ARCHITECT, MECHANICAL ENGINEER AND DSA FIELD ENGINEER.
44. A COPY OF THE GUIDELINES PUBLISHED BY SMACNA AND APPROVED BY DSA SHALL BE PROVIDED BY THE CONTRACTOR AND KEPT ON THE JOB AT ALL TIMES.
45. CONTRACTOR SHALL COORDINATE ALL DUCTWORK ROUTING WITH WORK OF OTHER TRADES AND MAKE ANY OFFSET AS REQUIRED TO AVOID CONFLICT WITH PIPING, LIGHT FIXTURES, TRUSSES, ETC.
46. COORDINATE ALL EQUIPMENT VOLTAGES WITH ELECTRICAL PRIOR TO ORDERING ANY EQUIPMENT.

CAL GREEN NOTES

1. TESTING AND ADJUSTING. TESTING AND ADJUSTING OF SYSTEMS SHALL BE REQUIRED FOR NEW BUILDING LESS THAN 10,000 SQUARE FEET OR NEW SYSTEMS TO SERVE AN ADDITION OR ALTERATION SUBJECT TO SECTION 303.1
2. SYSTEMS. DEVELOP A WRITTEN PLAN OF PROCEDURES FOR TESTING AND ADJUSTING SYSTEMS. SYSTEMS TO BE INCLUDED FOR TESTING AND ADJUSTING SHALL INCLUDE, AS APPLICABLE TO THE PROJECT:
   A. HVAC SYSTEMS AND CONTROLS.
   B. INDOOR AND OUTDOOR LIGHTING AND CONTROLS.
   C. WATER HEATING SYSTEMS.
   D. RENEWABLE ENERGY SYSTEMS.
   E. LANDSCAPE IRRIGATION SYSTEMS.
   F. WATER REUSE SYSTEMS.
3. PROCEDURES. PERFORM TESTING AND ADJUSTING PROCEDURES IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND APPLICABLE STANDARDS ON EACH SYSTEM.
   A. HVAC BALANCING. IN ADDITION TO TESTING AND ADJUSTING, BEFORE A NEW SPACE-CONDITIONING SYSTEM SERVING A BUILDING OR SPACE IS OPERATED FOR NORMAL USE, BALANCE THE SYSTEM IN ACCORDANCE WITH THE PROCEDURES DEFINED BY THE TESTING ADJUSTING AND BALANCING BUREAU NATIONAL STANDARDS; THE NATIONAL ENVIRONMENTAL BALANCING BUREAU PROCEDURAL STANDARDS; ASSOCIATED AIR BALANCE COUNCIL NATIONAL STANDARDS OR AS APPROVED BY THE ENFORCING AGENCY.
4. REPORTING. AFTER COMPLETION OF TESTING, ADJUSTING AND BALANCING, PROVIDE A FINAL REPORT OF TESTING SIGNED BY THE INDIVIDUAL RESPONSIBLE FOR PERFORMING THESE SERVICES.
5. OPERATION AND MAINTENANCE (O & M) MANUAL. PROVIDE THE BUILDING OWNER OR REPRESENTATIVE WITH DETAILED OPERATING AND MAINTENANCE INSTRUCTIONS AND COPIES OF GUARANTIES/WARRANTIES FOR EACH SYSTEM. O & M INSTRUCTIONS SHALL BE CONSISTENT WITH OSHA REQUREMENTS IN CCR, TITLE 8, SECTION 5142, AND OTHER RELATED REGULATIONS.
   A. INSPECTIONS AND REPORTS. INCLUDE A COPY OF ALL INSPECTION VERIFICATIONS AND REPORTS REQUIRED BY THE ENFORCING AGENCY.
6. TEMPORARY VENTILATION. THE PERMANENT HVAC SYSTEM SHALL ONLY BE USED DURING CONSTRUCTION IF NECESSARY TO CONDITION THE BUILDING WITHIN THE REQUIRED TEMPERATURE RANGE FOR MATERIAL AND EQUIPMENT INSTALLATION. IF THE HVAC SYSTEM IS USED DURING CONSTRUCTION, USE RETURN AIR FILTERS WITH A MINIMUM REPORTING VALUE (MERV) OF 8, BASED ON ASHRAE 52.2-1999 OR AN AVERAGE EFFICIENCY OF 30 PERCENT BASED ON ASHRAE 52.1-1992. REPLACE ALL FILTERS IMMEDIATELY PRIOR TO OCCUPANCY, OR, IF THE BUILDING IS OCCUPIED DURING ALTERATIONS, AT THE CONCLUSION OF CONSTRUCTION.
7. 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 VENTILATION EQUIPMENT, ALL DUCT AND OTHER RELATED AIR DISTRIBUTION OMPONENT OPENINGS SHALL BE COVERED WITH WRAP, 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.
8. 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 PROVIDE 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 15-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 DESIGN AIR FLOW.
   B. EXISTING MECHANICAL EQUIPMENT.
9. OZONE DEPLETION AND GREENHOUSE GAS REDUCTIONS. INSTALLATIONS OF HVAC, REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT SHALL COMPLY WITH SECTIONS 5.508.1.1 AND 5.508.1.2.
   C. CHLOROFLOUROCARBONS (CFCS). INSTALL HVAC, REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT THAT DO NOT CONTAIN CFCS.
   D. HALONS. INSTALL HVAC REFRIGERATION AND FIRE SUPPRESSION EQUIPMENT THAT DO NOT CONTAIN HALONS.
10. ADHESIVES, ADHESIVE BONDING PRIMERS, ADHESIVE PRIMERS, SEALANTS, SEALANT PRIMERS AND CAULKS SHALL COMPLY WITH LOCAL OR REGIONAL AIR POLLUTION CONTROL OR AIR QUALITY MANAGEMENT DISTRICT RULES WHERE APPLICABLE, OR SCAQMD RULE 1168 VOC LIMITS, AS SHOWN IN TABLES 5.504.4.1

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 CHAPTER 13, 26 AND 30:

1. ALL PERMANENT EQUIPMENT AND COMPONENTS.
2. TEMPORARY, MOVABLE OR MOBILE EQUIPMENT THAT IS PERMANENTLY ATTACHED (e.g. HARD WIRED) TO THE BUILDING UTILITY SERVICES SUCH AS ELECTRIC, GAS OR WATER. "PERMANENTLY ATTACHED" SHALL INCLUDE ALL ELECTRICAL CONNECTIONS EXCEPT PLUGS FOR 110/220 VOLT RECEPTACLES HAVING A 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:

1. COMPONENTS WEIGHING LESS THAN 400 POUNDS AND HAVE A CENTER OF MASS LOCATED 4 FEET OR LESS ABOVE THE ADJACENT FLOOR OR ROOF LEVEL THAT DIRECTLY SUPPORT THE COMPONENT.
2. COMPONENTS WEIGHING LESS THAN 20 POUNDS, OR IN THE CASE OF DISTRIBUTED SYSTEMS, LESS THAN 5 POUND 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 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 13.6.5, 13.6.6, 13.6.7, 13.6.8; AND 2019 CBC, SECTION 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 FOR2013 CBC OR LATER), COPIES OF THE BRACING SYSTEM INSTALLATION GUIDE OR MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO START OF AND DURING THE HANGING AND BRACING OF DISTRIBUTION SYSTEMS. THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

MECHANICAL PIPING (MP), MECHANICAL DUCTS (MD), PLUMBING PIPING (PP), ELECTRICAL DISTRIBUTION SYSTEMS (E):

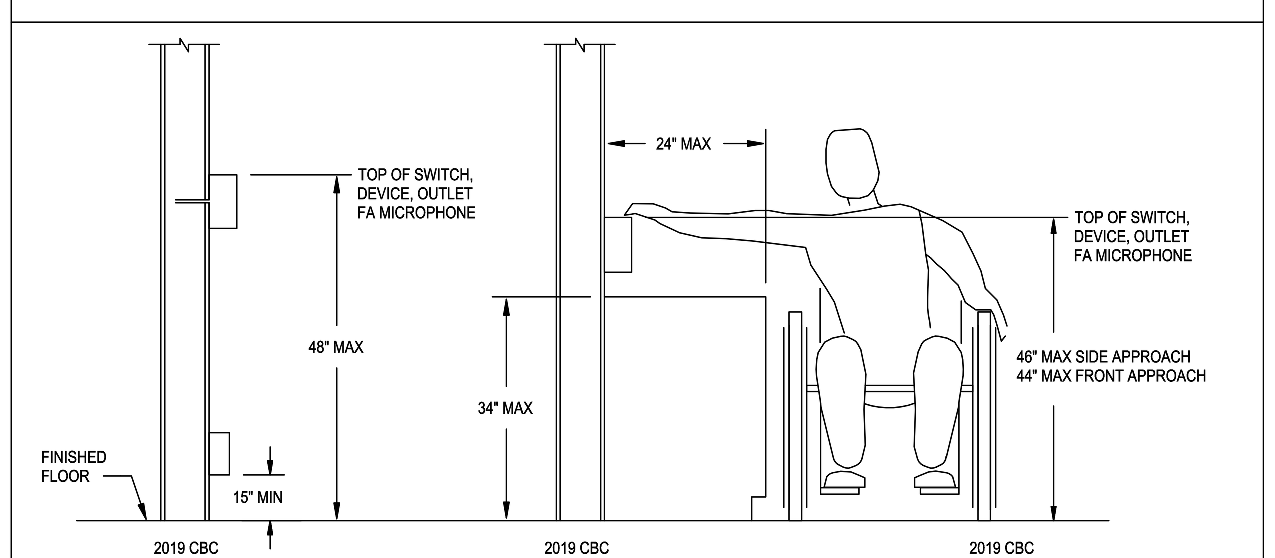
MP ☒ MD ☐ PP ☐ E ☐ OPTION 1: DETAILED ON THE APPROVED DRAWINGS WITH PROJECT SPECIFIC NOTES & DETAILS.

MP ☐ MD ☐ PP ☐ E ☐ OPTION 2: SHALL COMPLY WITH THE APPLICABLE OSHPD PRE-APPROVAL (OPM #) #____________.

MECHANICAL LEGEND

SYMBOL	DESCRIPTION
-	KEY NOTES
-	DEMOLITION KEY NOTES
1 / M-2	DETAIL DESIGNATION DETAIL NUMBER SHEET NO. WHERE SHOWN
AC / 1	EQUIPMENT DESIGNATION UNIT ABBREVIATION NUMBER
A 10X10-3 120 F/S	GRILLE DESIGNATION NECK SIZE & BLOW FIRE/SMOKE DAMPER WHERE REQ'D CFM
- / -	SECTION CALLOUT
	POINT OF CONNECTION
	POINT OF DISCONNECTION
	NEW LINEWORK
	EXISTING LINEWORK
	DEMOLITION LINEWORK
16"x12"	SHEET METAL DUCT
16"x12"	HIDDEN SHEET METAL DUCT
16"x12"	INTERNALLY INSULATED SHEET METAL DUCT
	DIRECTION OF FLOW
	STANDARD BRANCH FOR SUPPLY AND RETURN
	ROUND ELBOW DOWN
	ROUND ELBOW UP
	RECTANGULAR TO ROUND TRANSITION
8"	FLEXIBLE DUCT
FC	FLEX CONNECTION
BDD	BACK DRAFT DAMPER
FD	FIRE DAMPER
F/S	COMBINATION FIRE AND SMOKE DAMPER
M	MOTORIZED DAMPER
	SUPPLY DIFFUSER: 2-WAY/3-WAY/4-WAY
	GRILLE: RETURN/EXHAUST
	1'x2' RETURN AIR GRILLE
	2'x2' RETURN AIR GRILLE
UP / DN	SUPPLY AIR DUCT SECTION
UP / DN	RETURN AIR DUCT SECTION
UP / DN	EXHAUST AIR DUCT SECTION
	POWER OR GRAVITY ROOF VENTILATOR - EXHAUST
	POWER OR GRAVITY ROOF VENTILATOR - SUPPLY
UC	UNDERCUT DOOR
TG	TRANSFER GRILLE OR LOUVER
DG	DOOR GRILLE OR LOUVER
D / X	DX COOLING COIL
H / C	HEATING COIL
	DAMPER, OPPOSED BLADE
	DAMPER, PARALLEL BLADE
	FILTER
	HUMIDIFIER
	LOUVER
AD	ACCESS DOOR OR ACCESS PANEL (AP) IN DUCTWORK
1" 2"	STATIC PRESSURE CHANGE TAG
2"	STATIC PRESSURE TAG
	TURNING VANES (RECTANGULAR)
	DRAIN, FUNNEL
	CENTRIFUGAL FAN
	ANALOG SIGNAL
	DIGITAL SIGNAL
	ELECTRIC LEAD
	INSTRUMENT CAPILLARY TUBING
	ELECTRONIC 3-WAY VALVE
	ELECTRONIC 2-WAY VALVE
	DDC INPUT
	DDC OUTPUT
	LOCALLY MOUNTED INSTRUMENT
C02	CARBON DIOXIDE SENSOR
DPS	DIFFERENTIAL PRESSURE SENSOR
FM	FLOW METER
FS	AIRFLOW SENSOR
HS	RELATIVE HUMIDITY SENSOR
TS	TEMPERATURE SENSOR
TS	AVERAGING TEMPERATURE SENSOR
	METAL DUCT
R	EMS CO2 SENSOR
T	THERMOSTAT
PS	PRESSURE SWITCH
SD	SMOKE DETECTOR
SP	STATIC PRESSURE SENSOR
RS	REFRIGERANT SENSOR
D	DEW POINT SENSOR
H	SPACE HUMIDITY SENSOR
S	SWITCH
▲	FIRE WALL PENETRATION
(E)	EXISTING
(N)	NEW

MOUNTING OVER OBSTRUCTION DETAIL



NOTE:

1. THIS DETAIL APPLIES TO MOUNTING OF ANY MECHANICAL AND ELECTRICAL DEVICE WHICH CONTAINS AN OPERABLE PART THAT IS ADJUSTABLE BY THE OCCUPANT. THIS DOES NOT APPLY TO SENSORS OR CONTROLS THAT ARE ONLY ADJUSTABLE THROUGH THE BUILDING AUTOMATION SYSTEM (IE: TEMPERATURE AND HUMIDITY SENSORS).

DRAWING INDEX

SHEET	DESCRIPTION
MP0.01	MECHANICAL PLUMBING SYMBOLS AND ABBREVIATIONS
MP0.02	TITLE 24
MP0.03	TITLE 24
MP0.04	MECHANICAL SPECIFICATIONS
MP0.05	PLUMBING SPECIFICATIONS
MP1.00	MECHANICAL PLUMBING SITE PLAN
MP2.01	MECHANICAL PLUMBING FLOOR PLANS
MP2.01D	MECHANICAL PLUMBING FLOOR PLAN DEMOLITION
MP3.01	MECHANICAL PLUMBING ROOF PLANS
MP3.01D	MECHANICAL PLUMBING ROOF PLANS DEMOLITION
MP4.01	MECHANICAL PLUMBING SCHEDULES
MP5.01	MECHANICAL PLUMBING DETAILS
MP5.02	MECHANICAL PLUMBING DETAILS
MP5.03	MECHANICAL PLUMBING DETAILS

ABRREVIATIONS

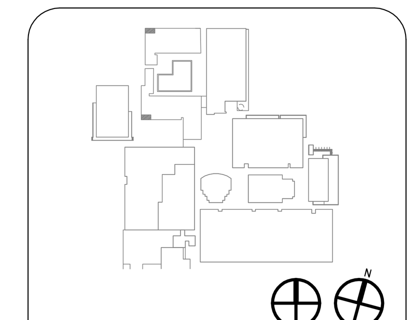
ABBREVIATION	DESCRIPTION
(N)	NEW
AAV	AUTOMATIC AIR VENT
ABV	ABOVE
AC	AIR CONDITIONING UNIT
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
AI	ANALOG INPUT
ALUM	ALUMINUM
AO	ANALOG OUTPUT
AP	ACCESS PANEL
B	BOILER
BDD	BACK DRAFT DAMPER
BEL	BELOW
BFC	BELOW FINISHED CEILING
BFP	BACK FLOW PREVENTER
BG	BLAST GATE
BHP	BREAK HORSEPOWER
BLDG	BUILDING
BOB	BOTTOM OF BEAM
BOP	BOTTOM OF PIPE
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
CI	CAST IRON
CL	CENTER LINE
CLG	CEILING
CO	CLEANOUT
COL	COLUMN
CP	CONDENSATE PUMP
CT	COOLING TOWER
CU	CONDENSING UNIT
CV	CONSTANT VOLUME BOX
D	DRAIN
DB	DRY BULB
DEG	DEGREES
DI	DIGITAL INPUT
DIA	DIAMETER
DL	DOOR LOUVER
DN	DOWN
DO	DIGITAL OUTPUT
DP	DIFFERENATIAL PRESSURE
DS	DUCT SILENCER
DX	DIRECT EXPANSION
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EFF	EFFICIENCY
EGC	EGGCRATE GRILLE
EJ	EXPANSION JOINT
EL	ELEVATION
EQ	EQUAL
ER	EXHAUST REGISTER
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EWC	ELECTRIC WATER COOLER
EXIST / (E)	EXISTING
FA	FREE AREA
FC	FAN COIL UNIT
FD	FIRE DAMPER
FG	FILTER GRILLE
FLA	FULL LOAD AMPS
FLR	FLOOR
FOB	FLAT ON BOTTOM
FOT	FLAT ON TOP
FP	FIRE PUMP
FPI	FINS PER INCH
FPM	FEET PER MINUTE
FS	FLOW SWITCH
FT	FEET / FOOT
FX	FLEXIBLE CONNECTION
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HB	HOSE BIBB
HD	HEAD
HOA	HANDS OFF AUTO
HP	HEAT PUMP
HP	HORSEPOWER
HT	HEIGHT
HV	HEATING AND VENTILATING UNIT
HWC	HOT WATER CONVERTER
HWP	HOT WATER PUMP
HWR	HEATING HOT WATER RETURN
HWS	HEATING HOT WATER SUPPLY
HZ	HERTZ
IC	MOTOR STATUS
ICW	INDUSTRIAL COLD WATER
ID	INSIDE DIAMETER
IN	INCHES
IW	INDIRECT WASTE
KW	KILOWATTS
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LD	LINEAR DIFFUSER
LF	LINEAR FEET
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPS
MH	MANHOLE
MIN	MINIMUM
MOCP	MAXIMUM OVERLOAD CIRCUIT PROTECTION
MOD	MOTOR OPERATED DAMPER
MTD	MOUNTED
MUA	MAKE-UP AIR UNIT
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
OAT	OUTSIDE AIR TEMPERATURE
OBD	OPPOSED BLADE DAMPER
OC	ON CENTER
OD	OUTSIDE DIAMETER
OSA	OUTSIDE AIR
PBD	PARALLEL BLADE DAMPER
PD	PRESSURE DROP
PERF	PERFORATED
PH	PHASE
PR	PRESSURE RELIEF
PS	PRESSURE SWITCH
PSID	POUNDS PER SQUARE INCH DIFFERENTIAL
PSIG	POUNDS PER SQUARE INCH GAUGE
PT	PRESSURE TRANSMITTER
PTAC	PACKAGED TERMINAL AIR CONDITIONER
PVC	POLYVINYL CHLORIDE
RA	RETURN AIR
RAR	RETURN AIR GRILLE
RD	ROOF DRAIN
RF	RETURN FAN
RG	RETURN AIR GRILLE
RH	RELATIVE HUMIDITY
RHC	REHEAT COIL
RLA	RATED LOAD AMPS
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SAG	SUPPLY AIR GRILLE
SD	SMOKE DAMPER
SF	SUPPLY FAN
SI	SPEED INDICATOR
SK	SPEED CONTROL
SMBH	SENSIBLE MBH
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SS	STAINLESS STEEL
STD	STANDARD
TAD	TRANSFER AIR DUCT
TEFC	TOTALLY ENCLOSED FAN COOLED
TEMP	TEMPERATURE
TG	TRANSFER GRILLE
TI	TEMPERATURE INDICATOR
TMBH	TOTAL MBH
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UC	UNDERCUT
UH	UNIT HEATER
UON	UNLESS OTHERWISE NOTED
V	VOLTS
VA	DAMPER/VALVE ACTUATOR
VAV	VARIABLE AIR VOLUME UNIT
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VP	VELOCITY PRESSURE
VTR	VENT THROUGH ROOF
W/	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER COLUMN
WG	WATER GAUGE
WT	WEIGHT
°F	DEGREES FAHRENHEIT

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NMUSD Estancia HS Locker Rooms

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Costa Mesa, CA 92627

100% CONSTRUCTION DOCUMENT



KEY PLAN

PLAN NORTH TRUE NORTH

Engineer

REGISTERED PROFESSIONAL ENGINEER
THOMAS PRESTON
No. M37275
Exp. Date 03-31-21
MECHANICAL
STATE OF CALIFORNIA

Architect

CLIENT	NMUSD
PROJECT NUMBER	P2101400ME
DATE	02/08/2021

REVISIONS

#	DESCRIPTION	DATE

100% CONSTRUCTION DOCUMENT

MECHANICAL PLUMBING SYMBOLS AND ABBREVIATIONS

MP0.01

STATE OF CALIFORNIA
Mechanical Systems
NRCC-MCH-E (Created 09/2020) CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-MCH-E
Project Name: ESTANCIA HS BOYS/GIRLS LOCKERS FURNACE REPLACEMENT	Report Page: Page 1 of 11
Project Address: 2323 PLACENTIA AVE, COSTA MESA 92627	Date Prepared: 2021-02-05

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.

A. GENERAL INFORMATION

01	Project Location (city)	COSTA MESA	04	Total Conditioned Floor Area	11,000
02	Climate Zone	6	05	Total Unconditioned Floor Area	0
03	Occupancy Types Within Project:		06	# of Stories (Habitable Above Grade)	1

☐ Office (B) ☐ Retail (M) ☐ Non-refrigerated Warehouse (S)
☐ Hotel/ Motel Guest Rooms (R-1) ☑ School (E) ☐ Healthcare Facility (I)
☐ High-Rise Residential (R-2/R-3) ☐ Relocatable Class Bldg (E) ☐ Other (Write In):

[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 (existing to remain, altered or new)	☐ Cooling Towers	☑ Ductwork (existing to remain, altered or new)
	☐ 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		02		03		04		05		06		07		08	09
System Summary §110.1, §110.2, §140.4	AND	Pumps §140.4(k)	AND	Fans/ Economizers §140.4(c), §140.4(e)	AND	System Controls §110.2, §120.2, §140.4(f)	AND	Ventilation §120.1	AND	Terminal Box Controls §140.4(d)	AND	Distribution §120.3, §140.4(l)	AND	Cooling Towers §110.2(e)2	**Compliance Results**
(See Table F)		(See Table G)		(See Table H)		(See Table I)		(See Table J)		(See Table K)		(See Table L)		(See Table M)	
Yes	AND		AND	Yes	AND	Yes	AND	Yes	AND		AND	Yes	AND		**COMPLIES**
Mandatory Measures Compliance (See Table Q for Details)															**COMPLIES**

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with unedltable 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)

Table Instructions: Complete the following equipment schedules to show compliance with mandatory requirements found in §110.1 and §110.2(c) 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	02	03	04	05	06	07	08	09	10	11
				Equipment Sizing per Mechanical Schedule (kBtu/h) §140.4 (a&b)						
				Heating Output[2,3]		Cooling Output[2,3]			Load Calculations[3,4]	
Name or Item Tag	Equipment Category per Tables 110.2	Equipment Type per Tables 110.2 & Title 20	Smallest Size Available[1] §140.4(a)	Per Design (kBtu/h)	Rated (kBtu/h)	Supp. Heating Output (kBtu/h)	Sensible Per Design (kBtu/h)	Rated (kBtu/h)	Total Heating Load (kBtu/h)	Total Sensible Cooling Load (kBtu/h)
F-1,2,3,4	Furnace/ Unit heater	Warm-air central furnace, gas-fired	Yes	200	200	800	0	0	525	0

[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).*
Table Continued

Dry System Equipment Efficiency (other than Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP))

01	02	03	04	05	06	07	08	09
		Heating Mode				Cooling Mode		
Name or Item Tag	Size Category (Btu/h)	Rating Condition (°F)	Efficiency Unit	Min Efficiency Required per Tables 110.2/ Title 20	Design Efficiency	Efficiency Unit	Min Efficiency Required per Tables 110.2/ Title 20	Design Efficiency
F-1,2,3,4	≥225,000		Et	0.8	0.8			

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 only process loads are exempt from these requirements and do not need to be included in Table H.

System Name: Furnace **Economizer:**[1] NA: System operates @ 100% OSA **Economizer Controls:** **System Fan Type:** Constant Volume

01	02	03	04	05	06	07	08
Fan Name or Item Tag	Fan Function	Qty	Maximum Design Supply Airflow (CFM)	HP Unit[2]	Design HP	Fan Power Pressure Drop Adjustment - Table 140.4-B	
						Device	Design Airflow through Device (CFM)
F-1,2,3,4	Supply	8	2,000	Nameplate HP	1		
						Calculated Adjustment (in H_2O)	
Total System Design Supply Airflow (CFM):		16,000	Total System Design (B)HP:		8	**Maximum System Fan Power (B)HP:**	17.6

[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

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.

01	02	03	04	05	06	07	08	09
System Name	System Zoning	Conditioned Floor Area Being Served (ft²)	Thermostats §110.2(b) & (c)[1], §120.2(a) or §141.0(b)2E	Shut-Off Controls §120.2(e)	Isolation Zone Controls §120.2(g)	Demand Response §110.12 and §120.2(b)	Supply Air Temp. Reset §140.4(f)	Window Interlocks per §140.4(n)
BOYS LOCKER RO	single zone	≤ 25,000 ft²	Setback Thermostat	EMCS	EMCS	EMCS	NA: Single Zone	NA: No operable windows
GIRLS LOCKER RO	single zone	≤ 25,000 ft²	Setback Thermostat	EMCS	EMCS	EMCS	NA: Single Zone	NA: No operable windows

[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 Nonresidential or Hotel/Motel spaces
	☐	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.

Nonresidential and Hotel/ Motel Ventilation Systems

04		05		06		07
System Name: BOYS/GIRLS LOCKER ROOM		System Design OA CFM Air Flow[1]:	16,000	System Design Transfer Air CFM:	0	Air Filtration per §120.1(c) and §141.0(b)2[2]
						Provided per §141.0(b)2c (alteration)

Table Continued

Table Continued

08	09	10	11	12	13	14	15	16	
	Mechanical Ventilation Required per §120.1(c)3[1]					Exh. Vent. per §120.1(c)4		DCV or Occupant Sensor Controls per §120.1(d)3, §120.1(d)5 & §120.2(e)3[4]	
Space Name or Item Tag	Occupancy Type[4]	Conditioned Floor Area (ft²)	# of showerheads / toilets	# of people[5]	Required Min OA CFM	Required Minimum CFM	Provided per Design CFM		
F-1,2,3,4	Locker room (athletic facility)	11,000		100	1,650	5,500	8,000	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type

17	Total System Required Min OA CFM	1,650	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

L. DISTRIBUTION (DUCTWORK AND PIPING)

Table Instructions: Complete the following tables to show compliance with mandatory pipe insulation requirements found in §120.3 and prescriptive requirements found in §140.4(l) for duct leakage testing.

Duct Leakage Sealing

The answers to the questions below apply to the following duct system(s):	F-1,2,3,4	Duct leakage testing triggered for these systems?	No

Table Continued

Table Continued

11	No	The scope of the project includes only duct systems serving healthcare facilities.
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.
13	No	The space conditioning system serves less than 5,000 ft² of conditioned floor area.
14	No	The combined surface area of the ducts in the following locations is more than 25% of the total surface area of the entire duct system:
	☐	Outdoors
	☐	In a space directly under a roof that has a U-factor greater than the U-factor of the ceiling, or if the roof does not meet the requirements of §140.3(a)1b or if the roof has fixed vents or openings to the outside/ unconditioned spaces
	☐	In an unconditioned crawlspace
	☐	In other unconditioned spaces
15	No	The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.
17		Duct system shall be sealed in accordance with the California Mechanical Code.

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	Systems To Be Field Verified	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	Systems To Be Field Verified	Field Inspector Pass	Field Inspector Fail
◉	○	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 (CO_2) 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-Call Internal Melt, Ice-on-Call 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		☐	☐

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*	☐	☐

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NMUSD Estancia HS Locker Rooms
2323 Placentia Ave.
Costa Mesa, CA 92627
100% CONSTRUCTION DOCUMENT



KEY PLAN
PLAN NORTH
TRUE NORTH

Engineer

REGISTERED PROFESSIONAL ENGINEER
Jeffrey Scott Hall
No. M31275
Date: 03-31-21
CALIFORNIA
STATE OF CALIFORNIA

Architect

CLIENT
NMUSD
PROJECT NUMBER
P2101400ME
DATE 02/08/2021
REVISIONS

#	DESCRIPTION	DATE

100% CONSTRUCTION DOCUMENT

TITLE 24

MP0.02

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created 09/2020) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: ESTANCIA HS BOYS/GIRLS LOCKERS FURNACE REPLACEMENT	Report Page:	Page 10 of 11
Project Address: 2323 PLACENTIA AVE, COSTA MESA 92627	Date Prepared:	2021-02-05

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	MP-0.1

STATE OF CALIFORNIA

Mechanical Systems

NRCC-MCH-E (Created) — CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: ESTANCIA HS BOYS/GIRLS LOCKERS FURNACE REPLACEMENT	Report Page:	Page 11 of 11
Project Address: 2323 PLACENTIA AVE, COSTA MESA 92627	Date Prepared:	2021-02-05

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Maher Dandachi	Documentation Author Signature:
Company: LEAF Engineers	Signature Date: 02/05/2021
Address: 3110 East Guasti Road, Suite 300	CEA/ HERS Certification Identification (if applicable):
City/State/Zip: Ontario, CA 91761	Phone: 909-390-3111

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: Tom Preston	Responsible Designer Signature:
Company : LEAF Engineers	Date Signed: 02/05/2021
Address: 3110 East Guasti Road, Suite 300	License: M37275
City/State/Zip: Ontario, CA 91761	Phone: 909-390-3111

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2323 Placentia Ave.
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100% CONSTRUCTION DOCUMENT



Engineer

Architect

CLIENT
NMUSD

PROJECT NUMBER
P2101400ME

DATE 02/08/2021

REVISIONS

#	DESCRIPTION	DATE

100% CONSTRUCTION DOCUMENT

TITLE 24

MP0.03

SECTION 23 00 00

GENERAL MECHANICAL PROVISIONS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS:

A. THE FOREGOING GENERAL AND SPECIAL CONDITIONS SHALL FORM A PART OF THIS DIVISION WITH THE SAME FORCE AND EFFECT AS THOUGH REPEATED HEREIN. THE PROVISIONS OF THIS SECTION SHALL APPLY TO ALL THE SECTIONS OF DIVISION 23.

1.02 CODES AND REGULATIONS:

A. ALL WORK AND MATERIALS SHALL BE IN FULL ACCORDANCE WITH CURRENT RULES AND REGULATIONS OF APPLICABLE CODES. NOTHING IN THESE DRAWINGS OR SPECIFICATIONS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES. SHOULD THE DRAWINGS OR SPECIFICATIONS CALL FOR MATERIAL OR METHODS OF CONSTRUCTION OF A HIGHER QUALITY OR STANDARD THAN REQUIRED BY THESE CODES, THE SPECIFICATIONS SHALL GOVERN. APPLICABLE CODES AND REGULATIONS ARE:

1. CALIFORNIA CODE OF REGULATIONS - CCR:
   a. TITLE 8, INDUSTRIAL RELATIONS.
   b. TITLE 24, BUILDING STANDARDS.
2. CALIFORNIA BUILDING CODE - CBC.
3. CALIFORNIA MECHANICAL CODE - CMC.
4. CALIFORNIA PLUMBING CODE - CPC.
5. CALIFORNIA GREEN BUILDING CODE.
6. AIR DIFFUSION COUNCIL - ADC.
7. AMERICAN GAS ASSOCIATION - AGA.
8. AIR MOVING AND CONDITIONING ASSOCIATION - AMCA.
9. AMERICAN NATIONAL STANDARDS INSTITUTE - ANSI.
10. AIR CONDITIONING AND REFRIGERATION INSTITUTE - ARI.
11. AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR CONDITIONING ENGINEERS - ASHRAE.
12. AMERICAN SOCIETY OF MECHANICAL ENGINEERS - ASME.
13. AMERICAN SOCIETY FOR TESTING AND MATERIALS - ASTM.
14. AMERICAN WATER WORKS ASSOCIATION - AWWA.
15. CALIFORNIA ELECTRICAL CODE - CEC.
16. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION - NEMA.
17. NATIONAL FIRE PROTECTION ASSOCIATION - NFPA.
18. SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION - SMACNA.
19. UNDERWRITERS' LABORATORY - UL.
20. OCCUPATIONAL SAFETY AND HEALTH ACT - OSHA.

1.03 PERMITS AND FEES:

A. THE CONTRACTOR SHALL TAKE OUT ALL PERMITS AND ARRANGE FOR ALL TESTS IN CONNECTION WITH HIS WORK AS REQUIRED BY LOCAL ORDINANCES. ALL CHARGES ARE TO BE INCLUDED IN THE WORK. PERMITS FOR EQUIPMENT CONNECTED TO A PARTICULAR SYSTEM ARE TO BE CONSIDERED AS A PART OF THE WORK INCLUDED UNDER EACH SYSTEM; FOR EXAMPLE, PERMITS FOR ELECTRIC MOTOR CONNECTION ARE PART OF ELECTRICAL WORK, PERMITS FOR DOMESTIC WATER OR GAS CONNECTIONS ARE PART OF PLUMBING WORK. ALL CHARGES FOR SERVICE CONNECTIONS, METERS, ETC. BY UTILITY COMPANIES OR DISTRICTS SHALL BE INCLUDED IN THE WORK.

1.04 COORDINATION OF WORK:

A. LAYOUT OF MATERIALS, EQUIPMENT AND SYSTEMS IS GENERALLY DIAGRAMMATIC UNLESS SPECIFICALLY DIMENSIONED. THE ACTUAL LOCATIONS OF ALL MATERIALS, PIPING, DUCTWORK, EQUIPMENT, SUPPORTS, ETC. SHALL BE CAREFULLY PLANNED, PRIOR TO INSTALLATION OF ANY WORK, TO AVOID ALL INTERFERENCE'S WITH EACH OTHER, OR WITH STRUCTURAL, ELECTRICAL OR ARCHITECTURAL ELEMENTS. VERIFY THE PROPER VOLTAGE AND PHASE OF ALL EQUIPMENT WITH THE ELECTRICAL PLANS. ALL CONFLICTS SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER PRIOR TO THE INSTALLATION OF ANY WORK OR THE ORDERING OF ANY EQUIPMENT.

1.05 GUARANTEE:

A. GUARANTEE SHALL BE IN ACCORDANCE WITH THE GENERAL CONDITIONS. THESE SPECIFICATIONS MAY EXTEND THE PERIOD OF THE GUARANTEE FOR CERTAIN ITEMS. WHERE SUCH EXTENSIONS ARE CALLED FOR, OR WHERE ITEMS ARE NORMALLY PROVIDED WITH GUARANTEE PERIODS IN EXCESS OF THAT CALLED FOR IN THE GENERAL CONDITIONS, THE CERTIFICATE OF GUARANTEE SHALL BE FURNISHED TO THE OWNER THROUGH THE ENGINEER.

1.06 EXAMINATION OF SITE:

A. THE CONTRACTOR SHALL EXAMINE THE SITE, COMPARE IT WITH PLANS AND SPECIFICATIONS, AND SHALL HAVE SATISFIED HIMSELF AS TO THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. NO ALLOWANCE SHALL SUBSEQUENTLY BE MADE IN HIS BEHALF FOR ANY EXTRA EXPENSE TO WHICH HE MAY BE PUT DUE TO FAILURE OR NEGLECT ON HIS PART TO MAKE SUCH AN EXAMINATION.

1.07 SUBMITTALS:

A. SUBMIT SHOP DRAWINGS IN ACCORDANCE WITH DIVISION 01.

B. SHOP DRAWINGS: WITHIN 30 DAYS OF CONTRACT AWARD, THE CONTRACTOR SHALL SUBMIT SIX COPIES OF SHOP DRAWINGS FOR ALL MATERIALS, EQUIPMENT, ETC. PROPOSED FOR USE ON THIS PROJECT. MATERIAL AND EQUIPMENT SHALL NOT BE ORDERED OR INSTALLED UNTIL WRITTEN REVIEW IS PROCESSED BY THE ENGINEER. ANY ITEM OMITTED FROM THE SUBMITTAL SHALL BE PROVIDED AS SPECIFIED WITHOUT SUBSTITUTION. ALL SHOP DRAWINGS MUST COMPLY WITH THE FOLLOWING:

1. SHOP DRAWINGS ARE REQUIRED FOR ALL MATERIAL AND EQUIPMENT ITEMS AND SHALL INCLUDE MANUFACTURER'S NAME AND CATALOG NUMBERS, DIMENSIONS, CAPACITIES, PERFORMANCE CURVES, AND ALL OTHER CHARACTERISTICS AND ACCESSORIES AS LISTED IN THE SPECIFICATIONS OR ON THE DRAWINGS. DESCRIPTIVE LITERATURE SHALL BE CURRENT FACTORY BROCHURES AND SUBMITTAL SHEETS. CAPACITIES SHALL BE CERTIFIED BY THE FACTORY.
2. ALL SHOP DRAWINGS SHALL BE SUBMITTED AT ONE TIME IN A NEAT AND ORDERLY FASHION IN A SUITABLE BINDER WITH TITLE SHEET INCLUDING PROJECT, ENGINEER, AND CONTRACTOR; TABLE OF CONTENTS; AND INDEXED TABS DIVIDING EACH GROUP OF MATERIALS OR ITEM OF EQUIPMENT. ALL ITEMS SHALL BE MARKED WITH THE SPECIFICATION PARAGRAPH NUMBER FOR WHICH THEY ARE PROPOSED. ALL EQUIPMENT SHALL ALSO BE IDENTIFIED BY THE MARK NUMBER AS INDICATED ON THE DRAWINGS.
3. ALL CAPACITIES, CHARACTERISTICS, AND ACCESSORIES CALLED FOR IN THE SPECIFICATIONS OR ON THE DRAWINGS SHALL BE HIGHLIGHTED, CIRCLED OR UNDERLINED ON THE SHOP DRAWINGS. CALCULATIONS AND OTHER DETAILED DATA INDICATING HOW THE ITEM WAS SELECTED SHALL BE INCLUDED FOR ITEMS THAT ARE NOT SCHEDULED. DATA MUST BE COMPLETE ENOUGH TO PERMIT DETAILED COMPARISON OF EVERY SIGNIFICANT CHARACTERISTIC WHICH IS SPECIFIED, SCHEDULED, OR DETAILED.

C. SUBSTITUTIONS: MANUFACTURERS AND MODEL NUMBERS LISTED IN THE SPECIFICATIONS OR ON THE DRAWINGS REPRESENT THE STANDARD OF QUALITY AND THE FEATURES DESIRED. UNLESS OTHERWISE NOTED, ALTERNATE MANUFACTURERS MAY BE SUBMITTED FOR REVIEW BY THE ENGINEER. CALCULATIONS AND OTHER DETAILED DATA INDICATING HOW THE ITEM WAS SELECTED SHALL BE INCLUDED. THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY THAT SUBSTITUTED ITEMS OR PROCEDURES WILL MEET THE SPECIFICATIONS AND JOB REQUIREMENTS AND SHALL BE RESPONSIBLE FOR THE COST OF REDESIGN AND MODIFICATIONS TO THE WORK CAUSED BY THESE ITEMS.

D. REVIEW: SUBMITTALS WILL BE REVIEWED FOR GENERAL CONFORMANCE WITH THE DESIGN CONCEPT, BUT THIS REVIEW DOES NOT GUARANTEE QUANTITY SHOWN, NOR DOES IT SUPERSEDE THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ALL MATERIALS, EQUIPMENT AND INSTALLATION IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS. THE CONTRACTOR SHALL AGREE THAT SHOP DRAWING SUBMITTALS PROCESSED BY THE ENGINEER ARE NOT CHANGE ORDERS; THAT THE PURPOSE OF SHOP DRAWING SUBMITTALS BY THE CONTRACTOR IS TO DEMONSTRATE TO THE ENGINEER THAT THE CONTRACTOR UNDERSTANDS THE DESIGN CONCEPT; THAT HE DEMONSTRATES HIS UNDERSTANDING BY INDICATING WHICH EQUIPMENT AND MATERIAL HE INTENDS TO FURNISH AND INSTALL AND BY DETAILING THE FABRICATION AND INSTALLATION METHODS HE INTENDS TO USE. THE CONTRACTOR SHALL AGREE THAT IF DEVIATIONS, DISCREPANCIES OR CONFLICTS BETWEEN SHOP DRAWINGS AND DESIGN DRAWINGS AND SPECIFICATIONS ARE DISCOVERED EITHER PRIOR TO OR AFTER SHOP DRAWING SUBMITTALS ARE PROCESSED BY THE ENGINEER, THE DESIGN DRAWINGS AND SPECIFICATIONS SHALL CONTROL AND SHALL BE FOLLOWED.

1.08 OPERATION AND MAINTENANCE INSTRUCTIONS:

A. SUBMIT ONE ELECTRONIC PDF COPY FOR REVIEW AND AFTER APPROVED SUBMIT THREE HARD COPIES OF THE OPERATION AND MAINTENANCE INSTRUCTIONS AND WIRING DIAGRAMS FOR ALL EQUIPMENT AND PARTS LISTS FOR ALL EQUIPMENT, ETC. SHALL BE SUBMITTED TO THE ENGINEER. ALL INSTRUCTIONS SHALL BE CLEARLY IDENTIFIED BY MARKING THEM WITH THE SAME DESIGNATION AS THE EQUIPMENT ITEM TO WHICH THEY APPLY (E.G. AC-1). ALL WIRING DIAGRAMS SHALL AGREE WITH REVISED SHOP DRAWINGS AND INDICATE THE EXACT FIELD INSTALLATION. ALL INSTRUCTIONS SHALL BE SUBMITTED AT THE SAME TIME AND SHALL BE BOUND IN A SUITABLE BINDER WITH TABS DIVIDING EACH TYPE OF EQUIPMENT (E.G. FANS, MOTORS, ETC.). EACH BINDER SHALL BE LABELED INDICATING "OPERATING AND MAINTENANCE INSTRUCTIONS, PROJECT TITLE, CONTRACTOR, DATE" AND SHALL HAVE A TABLE OF CONTENTS LISTING ALL ITEMS INCLUDED.

B. VERBAL: THE CONTRACTOR SHALL VERBALLY INSTRUCT THE OWNER'S MAINTENANCE STAFF IN THE OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND SYSTEMS. THE CONTROLS CONTRACTOR SHALL PRESENT THAT PORTION OF THE INSTRUCTION THAT APPLIES TO THE CONTROL SYSTEM. THE ENGINEER'S OFFICE SHALL BE NOTIFIED 96 HOURS PRIOR TO THIS MEETING.

C. POSTED: THE CONTRACTOR SHALL PREPARE OPERATION INSTRUCTIONS FOR ALL SYSTEMS WHICH SHALL BE TYPEWRITTEN, REVIEWED BY THE ENGINEER, AND MOUNTED UNDER GLASS ADJACENT TO THE APPROPRIATE TEMPERATURE CONTROL PANEL. THESE INSTRUCTIONS SHALL INCLUDE APPLICABLE TEMPERATURE CONTROL DIAGRAMS.

D. ACKNOWLEDGMENT: THE CONTRACTOR SHALL PREPARE A LETTER INDICATING THAT ALL OPERATION AND MAINTENANCE INSTRUCTIONS (PRINTED, VERBAL AND POSTED) HAVE BEEN GIVEN TO THE OWNER, TO THE OWNER'S SATISFACTION. THIS LETTER SHALL BE ACKNOWLEDGED (SIGNED) BY THE OWNER AND SUBMITTED TO THE ENGINEER.

1.09 RECORD DRAWINGS:

A. THE CONTRACTOR SHALL MAINTAIN A SET OF PRINTS FOR THE PROJECT AS A RECORD OF ALL CONSTRUCTION CHANGES MADE. AS THE WORK PROGRESSES, THE CONTRACTOR SHALL MAINTAIN A RECORD OF ALL DEVIATIONS IN THE WORK FROM THAT INDICATED ON THE DRAWINGS. FINAL LOCATION OF ALL UNDERGROUND WORK SHALL BE RECORDED BY DEPTH FROM FINISHED GRADE AND BY OFFSET DISTANCE FROM PERMANENT SURFACE STRUCTURES, I.E. BUILDINGS, CURBS AND WALKS. IN ADDITION, THE WATER, GAS, UNDER-FLOOR DUCTS, ETC. WITHIN THE BUILDING SHALL BE RECORDED BY OFFSET DISTANCES FROM BUILDING WALLS. THE ORIGINAL DRAWINGS WILL BE MADE AVAILABLE TO THE CONTRACTOR FROM WHICH HE SHALL HAVE A SET OF REPRODUCIBLE DRAWINGS MADE. THE CONTRACTOR SHALL THEN TRANSFER THE CHANGES, NOTATIONS, ETC. FROM THE MARKED-UP PRINTS TO THE REPRODUCIBLE DRAWINGS. THE RECORD DRAWINGS (MARKED-UP PRINTS AND REPRODUCIBLES) SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW (AS AN ALTERNATIVE, THE MARKED-UP PRINTS MAY BE PHOTOCOPIED FULL SIZE ON REPRODUCIBLE STOCK).

PART 2 - PRODUCTS

2.01 PROTECTIVE COATING FOR UNDERGROUND PIPING:

A. ALL FERROUS PIPE BELOW GRADE (EXCEPT CAST IRON) SHALL HAVE A FACTORY APPLIED PROTECTIVE COATING OF EXTRUDED HIGH DENSITY POLYETHYLENE, 35 TO 70 MILS TOTAL THICKNESS, X-TRU COAT, SCOTCHKOTE. ALL FITTINGS AND AREAS OF DAMAGED COATING SHALL BE COVERED WITH TWO LAYER DOUBLE WRAP OF 10 MIL POLYVINYL TAPE TO TOTAL THICKNESS OF 40 MILS. MANVILLE CORPORATION. PROTECTIVE COATING SHALL BE EXTENDED 6" ABOVE SURROUNDING GRADE.

2.02 CONCRETE ANCHORS:

A. CONCRETE ANCHORS SHALL COMPLY WITH CBC 1901A.3. STEEL STUD WITH EXPANSION ANCHOR REQUIRING A DRILLED HOLE; POWDER DRIVEN ANCHORS ARE NOT ACCEPTABLE. MINIMUM CONCRETE EMBEDMENT SHALL BE 4-1/2 DIAMETERS. MINIMUM SPACING SHALL BE 10 DIAMETERS CENTER-TO-CENTER AND 5 DIAMETERS FROM CENTER TO EDGE OF CONCRETE. MAXIMUM ALLOWABLE STRESSES FOR TENSION AND SHEAR SHALL BE 80% OF THE TEST REPORT VALUES "WITH SPECIAL INSPECTION". ANCHORS SHALL BE HILTI, PHILIPS - OR APPROVED EQUAL.

2.03 SEISMIC RESTRAINTS:

A. ALL MECHANICAL SYSTEMS (ALL EQUIPMENT, PIPING, ETC.) SHALL BE PROVIDED WITH SEISMIC RESTRAINTS IN ACCORDANCE WITH "GUIDELINES FOR SEISMIC RESTRAINT OF MECHANICAL SYSTEMS" DATED 2006 BY SMACNA.

2.04 SYSTEM IDENTIFICATION:

A. ABOVE GRADE PIPING: PROVIDE MARKERS ON PIPING WHICH IS EITHER EXPOSED OR CONCEALED IN ACCESSIBLE SPACES. FOR PIPING SYSTEMS, OTHER THAN DRAIN AND VENT LINES, INDICATE THE FLUID CONVEYED OR ITS ABBREVIATION, EITHER BY PREPRINTED MARKERS OR STENCILED MARKING, AND INCLUDE ARROWS TO SHOW THE DIRECTION OF FLOW. COMPLY WITH ANSI A13.1 FOR COLORS. LOCATE MARKERS AT ENDS OF LINES, NEAR MAJOR BRANCHES AND OTHER INTERRUPTIONS INCLUDING EQUIPMENT IN THE LINE, WHERE LINES PASS THROUGH FLOOR, WALLS OR CEILINGS OR OTHERWISE PASS INTO INACCESSIBLE SPACES, AND AT 50' MAXIMUM INTERVALS ALONG EXPOSED PORTION OF LINES. MARKING OF SHORT BRANCHES AND REPETITIVE BRANCHES FOR EQUIPMENT CONNECTIONS IS NOT REQUIRED.

B. EQUIPMENT: ALL EQUIPMENT SHALL BE IDENTIFIED WITH A PLASTIC LAMINATED, ENGRAVED NAMEPLATE WHICH BEARS THE UNIT MARK NUMBER AS INDICATED ON THE DRAWINGS (E.G. AC-1). PROVIDE 1/2" HIGH LETTERING, WHITE ON BLACK BACKGROUND. NAMEPLATES SHALL BE PERMANENTLY SECURED TO THE UNIT.

C. VALVES: PROVIDE VALVE TAGS ON ALL VALVES OF EACH PIPING SYSTEM, EXCLUDING CHECK VALVES, VALVES WITHIN EQUIPMENT, SHUT-OFF VALVES AT EQUIPMENT AND OTHER REPETITIVE TERMINAL UNITS. PROVIDE BRASS TAGS OR PLASTIC LAMINATE TAGS. PREPARE AND SUBMIT A TAGGED VALVE SCHEDULE, LISTING EACH VALVE BY TAG NUMBER, LOCATION AND PIPING SERVICE. MOUNT IN GLAZED FRAME WHERE DIRECTED.

D. CONTROLS: LABEL ALL PANELS, THERMOSTATS AND BY-PASS TIMERS WITH PLASTIC LAMINATED, ENGRAVED NAMEPLATE WHICH BEARS THE UNIT MARK NUMBER AS INDICATED ON THE DRAWINGS (E.G. AC-1). PROVIDE 1/4" HIGH LETTERING, WHITE ON BLACK BACKGROUND. NAMEPLATES SHALL BE PERMANENTLY SECURED TO THE UNIT.

2.05 EQUIPMENT SUPPORT FRAMES:

A. UNLESS SPECIFICALLY NOTED OTHERWISE, IT SHALL BE THE RESPONSIBILITY OF MECHANICAL CONTRACTOR TO FURNISH AND INSTALL ALL SUPPORT FRAMES FOR ITS EQUIPMENT.

PART 3 - EXECUTION

3.01 SCHEDULING OF WORK:

A. ALL WORK SHALL BE SCHEDULED SUBJECT TO THE APPROVAL OF THE ENGINEER AND OWNER. NO WORK SHALL INTERFERE WITH THE OPERATION OF THE EXISTING FACILITIES ON OR ADJACENT TO THE SITE.

3.02 CONDUCT OF WORK:

A. THE CONTRACTOR SHALL HAVE AT ALL TIMES, AS CONDITIONS PERMIT, A SUFFICIENT FORCE OF WORKMEN AND QUANTITY OF MATERIALS TO INSTALL THE WORK CONTRACTED FOR AS RAPIDLY AS POSSIBLE CONSISTENT WITH GOOD WORK, AND SHALL CAUSE NO DELAY TO OTHER DIVISIONS ENGAGED UPON THIS PROJECT OR TO THE OWNER.

B. MECHANICAL CONTRACTOR SHALL ARRANGE FOR ALL CUTTING NECESSARY FOR THE PROPER INSTALLATION OF ITS WORK, PROVIDING ALL SLEEVES AND CHASES NECESSARY. CUTTING SHALL NOT BE DONE IN SUCH A MANNER TO IMPAIR THE STRENGTH OF THE STRUCTURE. ANY DAMAGE RESULTING FROM WORK SHALL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE TO THE SATISFACTION OF THE ENGINEER.

C. PROGRESSIVELY, DAILY AT THE COMPLETION OF EACH DAY'S WORK, AND AT COMPLETION OF THE JOB, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL OF HIS WORK, REMOVING ALL DEBRIS, STAIN AND MARKS RESULTING FROM HIS WORK.

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3.03 EXCAVATION AND BACKFILL:

A. EXCAVATION: TRENCHES ARE TO BE EXCAVATED TO GRADE AND DEPTH ESTABLISHED BY DRAWINGS. UNLESS OTHERWISE NOTED, MINIMUM EARTH COVER ABOVE TOP OF PIPE SHALL BE 24", NOT INCLUDING BASE AND PAVING IN PAVED AREAS. WIDTH OF TRENCHES AT TOP OF PIPE SHALL BE A MINIMUM OF 16" PLUS THE OUTSIDE DIAMETER OF THE PIPE. PROVIDE ALL SHORING REQUIRED BY SITE CONDITIONS. BARREL OF PIPE SHALL HAVE UNIFORM SUPPORT ON TRENCH BOTTOM, HAND EXCAVATE ADDITIONAL DEPTH AT BELLS, HUBS AND FITTINGS. WHERE OVER-EXCAVATION OCCURS, PROVIDE COMPACTED SELECTED BACKFILL TO PIPE BOTTOM. WHERE GROUND WATER IS ENCOUNTERED, REMOVE TO KEEP EXCAVATION DRY, USING WELL POINTS AND PUMPS AS REQUIRED.

B. BACKFILL:

1. AROUND PIPE AND TO ONE FOOT ABOVE PIPE: MATERIAL SHALL BE RIVER RUN SAND OR NATIVE GRANULAR FREE FLOWING MATERIAL, FREE OF CLAY LUMPS, SILT OR VEGETABLE MATTER AND SHALL HAVE 100% PASSING THROUGH THE NO. 4 SIEVE AND A MAXIMUM OF 3% PASSING THROUGH THE NO. 200 SIEVE. PLACE CAREFULLY AROUND AND ON TOP OF PIPE, TAKING CARE NOT TO DISTURB PIPING. CONSOLIDATE WITH VIBRATOR.
2. ONE FOOT ABOVE PIPE TO GRADE: MATERIAL TO BE SANDY OR SILTY LOAM, FREE OF LUMPS, LAID IN 6" LAYERS, UNIFORMLY MIXED, TO PROPER MOISTURE AND COMPACTED TO REQUIRED DENSITY. IF BACKFILL IS DETERMINED TO BE SUITABLE AND REQUIRED COMPACTION IS DEMONSTRATED BY LABORATORY TEST, WATER COMPACTION IN 6" LAYERS MAY BE USED, SUBJECT TO APPROVAL BY THE ENGINEER.
3. REMOVE ALL WATER SENSITIVE SETTLEMENT FROM TRENCH BACKFILL REGARDLESS OF LOCATION AND COMPACTION REQUIREMENTS.

C. COMPACTION: COMPACT TO A DENSITY OF 95% WITHIN BUILDING AND 90% OUTSIDE BUILDING. DEMONSTRATE PROPER COMPACTION BY TESTING AT ONE-HALF OF THE TRENCH DEPTH. PERFORM THREE TESTS PER 100' OF TRENCH.

3.04 OPENINGS, CUTTING AND PATCHING:

A. THE LOCATIONS AND DIMENSIONS FOR OPENINGS THROUGH WALLS, FLOORS, CEILINGS, FOUNDATIONS, FOOTINGS, ETC. REQUIRED TO ACCOMPLISH THE WORK UNDER THIS SPECIFICATION DIVISION SHALL BE PROVIDED UNDER THIS DIVISION. THE ACTUAL OPENINGS AND THE REQUIRED CUTTING AND PATCHING SHALL BE PROVIDED. CORING THROUGH EXISTING CONCRETE OR MASONRY WALLS, FLOORS, CEILINGS, FOUNDATIONS, FOOTINGS, ETC., AND SAW CUTTING OF CONCRETE FLOORS OR ASPHALTIC CONCRETE REQUIRED TO ACCOMPLISH THE WORK UNDER THIS SPECIFICATION DIVISION SHALL BE PROVIDED UNDER THIS DIVISION. PATCHING OF THESE SURFACES SHALL ALSO BE PROVIDED. CUTTING AND CORING SHALL NOT IMPAIR THE STRENGTH OF THE STRUCTURE. ANY DAMAGE RESULTING FROM THIS WORK SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE ENGINEER.

3.05 MANUFACTURER'S RECOMMENDATIONS:

A. ALL MATERIAL, EQUIPMENT, DEVICES, ETC., SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER OF A PARTICULAR ITEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INSTALLATIONS CONTRARY TO THE MANUFACTURER'S RECOMMENDATIONS. THE CONTRACTOR SHALL MAKE ALL NECESSARY CHANGES AND REVISIONS TO ACHIEVE SUCH COMPLIANCE. MANUFACTURER'S INSTALLATION INSTRUCTIONS SHALL BE DELIVERED TO AND MAINTAINED AT THE JOB SITE THROUGH THE CONSTRUCTION OF THE PROJECT.

3.06 QUIETNESS:

A. PIPING, DUCTWORK AND EQUIPMENT SHALL BE ARRANGED AND SUPPORTED SO THAT VIBRATION IS A MINIMUM AND IS NOT CARRIED TO THE BUILDING STRUCTURE OR SPACES.

3.07 DAMAGES BY LEAKS:

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGES TO OTHER WORK CAUSED BY LEAKS IN THE TEMPORARY OR PERMANENT PIPING SYSTEMS PRIOR TO COMPLETION OF WORK AND DURING THE PERIOD OF THE GUARANTEE, AND FOR DAMAGES TO OTHER WORK CAUSED BY DISCONNECTED PIPES OR FITTINGS, AND THE OVERFLOW OF EQUIPMENT PRIOR TO COMPLETION OF THE WORK.

3.08 CLEANING:

A. PROGRESSIVELY AND AT COMPLETION OF THE JOB, THE CONTRACTOR SHALL THOROUGHLY CLEAN ALL OF HIS WORK, REMOVING ALL DEBRIS, STAIN AND MARKS RESULTING FROM HIS WORK.

END OF SECTION ***

23 00 01 - 66

SECTION 23 00 01

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.01 GENERAL CONDITIONS:

A. THE FOREGOING SECTION 23 00 00, GENERAL MECHANICAL PROVISIONS SHALL FORM A PART OF THIS SPECIFICATION.

1.02 SCOPE:

A. INCLUDED: PERFORM ALL WORK NECESSARY AND REQUIRED TO COMPLETE CONSTRUCTION AS INDICATED. SUCH WORK INCLUDES THE FURNISHINGS OF ALL LABOR, MATERIALS AND SERVICES NECESSARY FOR A COMPLETE, LAWFUL AND OPERATING AIR CONDITIONING, HEATING, VENTILATING SYSTEM WITH ALL EQUIPMENT AS SHOWN OR NOTED ON THE DRAWINGS OR AS SPECIFIED HEREIN. THE WORK INCLUDES, BUT IS NOT NECESSARILY LIMITED TO, THE FOLLOWING:

1. HEATING, VENTILATING AND AIR CONDITIONING EQUIPMENT.
2. AIR DISTRIBUTION SYSTEM (DUCTWORK, AIR TERMINALS, ETC.).
3. SYSTEM INSULATION.
4. CONTROLS AND CONTROL WIRING AND CONDUIT FOR CONTROL WIRING.

B. WORK SPECIFIED ELSEWHERE:

1. LINE VOLTAGE POWER WIRING (60 VOLTS OR GREATER), MOTOR STARTERS IN MOTOR CONTROL CENTERS, AND DISCONNECT SWITCHES ARE INCLUDED IN THE ELECTRICAL SECTION.
2. CONNECTION OF GAS AND CONDENSATE DRAINS TO EQUIPMENT.
3. ACCESS DOORS.

PART 2 - MATERIALS

2.01 DUCTWORK MATERIALS:

A. GENERAL: ALL DUCTWORK MATERIALS SHALL HAVE FIRE AND SMOKE HAZARD RATINGS AS TESTED UNDER ASTM E-84 AND UL-181 NOT EXCEEDING A FLAME SPREAD OF 25 AND SMOKE DEVELOPED OF 50. ALL DUCTWORK SHALL BE PER CHAPTER 6 OF THE CMC.

B. LOW VELOCITY METAL DUCTWORK: METAL DUCTWORK SHALL BE GALVANIZED SHEET STEEL, ASTM A527.

C. LOW VELOCITY FLEXIBLE DUCTWORK: INSULATED FLEXIBLE DUCTWORK. CONTINUOUS INTERNAL LINER BONDED TO GALVANIZED STEEL WIRE HELIX. ONE POUND PER CUBIC FOOT GLASS FIBER INSULATION, R-8. THERMAL CONDUCTIVITY SHALL NOT EXCEED 0.13 BTU/HR SQ. FT.- DEGREES F AT A MEAN TEMPERATURE OF 75°F. SEAMLESS VAPOR BARRIER JACKET. EACH LENGTH SHALL HAVE A FACTORY INSTALLED METAL SLEEVE AT EACH END. DUCT SHALL BE CAPABLE OF CONTINUOUS OPERATION AT 1.5" OF WATER STATIC PRESSURE AND 4000 FT./ MIN. AIR VELOCITY. MAXIMUM LENGTH 5 FT., SINGLE PIECE AT RUNOUTS TO AIR TERMINALS. GENFLEX, UNDERGROUND DUCTS: SHALL BE POLYVINYL-COATED STEEL, 18 GA, WITH 4 MILS PVC PLASTIC COATING ON THE OUTSIDE OF THE DUCT AND 1 MIL EPOXY PRIMER ON THE INSIDE. SEE MECHANICAL DRAWINGS FOR LOCATION.

D. SPIRAL DUCT: DUCTWORK SHALL BE GALVANIZED STEEL WITH UNI-SEAL SPIRAL SEAMLOCK AND UNI-SEAL FITTINGS, ASTM A653. UNITED MCGILL CORP OR EQUAL. ALL EXPOSED SPIRAL DUCT SHALL BE PAINTED, COLOR SELECTED BY OWNER.

E. ROUND DUCT ON ROOF: DUCTWORK SHALL BE DOUBLE WALL INSULATED GALVANIZED STEEL WITH SOLID WELDED SEAM LONGITUDINAL SEAM-K27. UNITED MCGILL CORP OR EQUAL.

F. BONDING ADHESIVE: DURODYNE WBG, SCOTCHGRIP ADHESIVE 4230 OR EQUAL.

G. DUCT MASTIC: MINNESOTA MINING AND MANUFACTURING DUCT SEALER 800, TUFF-BOND NO. 12, GLENCOAT SEAL-FLEX OR EQUAL.

H. DUCT JOINTS:

1. AS AN OPTION TO JOINTS AND SEAMS DESIGNATED BY SMACNA OR SHOWN ON DRAWINGS, THE FOLLOWING SYSTEMS MAY BE USED:
   a. DUCTS WITH SIDES 24 INCHES TO 48 INCHES, TRANSVERSE DUCT JOINT SYSTEM BY DUCTMATE JR., NEXUS OR EQUAL (SMACNA "E" TYPE CONNECTION).
   b. DUCTS 48 INCHES AND LARGER, DUCTMATE REGULAR, NEXUS (SMACNA "J" TYPE CONNECTION) OR EQUAL.

I. FIBER TAPE: MINERAL IMPREGNATED FIBER TAPE AND PLASTIC ACTIVATOR-ADHESIVE. HARDCAST INC., UNITED MCGILL UNI-CAST OR EQUAL.

2.02 AIR TERMINALS AND DUCT FITTINGS:

A. GRILLES: (GRILLES, REGISTERS AND DIFFUSERS)

1. INFORMATION ON DRAWINGS: REFER TO THE AIR DISTRIBUTION SCHEDULE ON THE DRAWINGS FOR THE LIST OF GRILLES. MANUFACTURER'S MODEL NUMBERS ARE LISTED TO COMPLETE THE DESCRIPTION. EQUIVALENT MODELS OF J & J, KRUEGER, BARBER-COLMAN, ANEMOSTAT, PRICE, TITUS OR EQUAL. REFER TO THE FLOOR PLANS FOR NECK SIZE, CFM, AIR DIFFUSION PATTERN, AND FIRE DAMPER, IF REQUIRED.
2. PERFORMANCE: IF, ACCORDING TO THE CERTIFIED DATA OF THE MANUFACTURER OF THE PROPOSED UNITS, THE SIZES INDICATED ON THE DRAWINGS WILL NOT PERFORM SATISFACTORILY, THE UNITS SHALL BE RE-SELECTED BY THE CONTRACTOR FOR THE PROPER DIFFUSION, SPREAD, DROP AND THROW.
3. FRAME AND ACCESSORIES: ALL SURFACE MOUNTED GRILLES SHALL HAVE A PERIMETER GASKET AND FLANGED EDGE. ALL GRILLES SHALL HAVE FRAMES SUITABLE FOR MOUNTING IN THE SURFACES DESIGNATED BY THE ARCHITECTURAL DRAWING, COORDINATE PRIOR TO ORDERING.
4. FINISH: ALL CEILINGS AND WALL GRILLES SHALL HAVE A PAINTABLE WHITE FINISH UNLESS OTHERWISE NOTED. INTERIOR COMPONENTS SHALL BE FLAT BLACK.

B. TURNING VANES: DOUBLE WALL, HOLLOW METAL, AIR-FOIL SHAPE. SPACING IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. AERO DYNE, HEP OR EQUAL.

C. FLEXIBLE CONNECTION: UL LISTED NEOPRENE COATED 30-OUNCE FIBERGLASS CLOTH. 3" METAL, 6" FABRIC, 3" METAL. VENTGLAS OR EQUAL.

D. BRANCH DUCT VOLUME DAMPER: VOLUME CONTROL DAMPER (VCD) IN RECTANGULAR DUCTS SHALL BE AS FOLLOWS: OPPOSED BLADE, 6" MAXIMUM BLADE WIDTH, 16-GAGE BLADE, 48" MAXIMUM LENGTH, NYLON OR OIL IMPREGNATED BRONZE BEARINGS, ½" DIAMETER PIN SHAFT, 16-GAGE CHANNEL FRAME, ACTUATING ROD AND LINKAGE OUT OF AIR STREAM. VCD IN ROUND DUCT SHALL BE AS FOLLOWS: DAMPER BLADE FULL HEIGHT OF BRANCH AND 1" LESS THAN BRANCH WIDTH. ALL BRANCH DAMPERS SHALL HAVE REGULATOR WITH STAMPED STEEL HANDLE, SPRING LOADED SHAFT NUT, CAST BODY AND SERRATED SELF-LOCKING DIE CAST CORE. REGULATOR FOR HORIZONTAL DUCTS OVERHEAD SHALL BE MOUNTED ON SIDES OR BOTTOM OF DUCTS. SECURE A 12" LENGTH OF BRIGHTLY COLORED PLASTIC RIBBON TO HANDLE FOR EASE OF LOCATION (NOT APPLICABLE TO EXPOSED DUCT INSTALLATIONS). WHERE RECTANGULAR OR ROUND DUCTWORK IS INSULATED, SLIT INSULATION TO ALLOW HANDLE TO PROTRUDE. VENTLOK 641 (WITH 607 END BEARING FOR ROUND DUCTS).

E. FIRE/ SMOKE DAMPER: MULTI-BLADE CONSTRUCTION IN ACCORDANCE WITH CBC & CMC. UL 555 AND UL 555S LABELS. BLADES SHALL HAVE METAL-TO-METAL SEALS AND NOT RELY ON ACTUATOR TORQUE TO MAINTAIN LEAKAGE RATING. PREFCO, AIR BALANCE, RUSKIN, GREENHECK 5020-1 WITH 5800MB2 POWER OPEN/SPRING CLOSE OPERATOR, OR EQUAL.

F. LOUVERS: REFER TO THE AIR DISTRIBUTION SCHEDULE ON THE DRAWINGS. MANUFACTURER'S MODEL NUMBERS ARE LISTED TO COMPLETE THE DESCRIPTION. EQUIVALENT MODELS OF RUSKIN, GREENHECK, DAYTON OR APPROVED EQUAL. CONTRACTOR SHALL FABRICATE AND PROVIDE 16 GA. GALVANIZED PERFORATED PANEL (50% FREE AREA) OVER EXTERIOR OF ALL LOUVERS AND HAVE FIELD PAINTED TO MATCH EXTERIOR WALL. REFER TO THE FLOOR PLANS FOR ALL SIZES.

2.03 DUCTWORK INSULATION MATERIALS:

A. GENERAL: ALL DUCTWORK INSULATION MATERIALS SHALL HAVE FIRE AND SMOKE HAZARD RATINGS AS TESTED UNDER ASTM E-84 AND UL-181 NOT EXCEEDING A FLAME SPREAD OF 25 AND SMOKE DEVELOPED OF 50.

B. ACOUSTIC LINING: GLASS FIBER. ONE SIDE COATED TO PREVENT FIBER EROSION UP TO 6000 FT./ MIN. AVERAGE NOISE REDUCTION COEFFICIENT OF 0.90. 0.13 BTU/ HR - SQ. FT. - DEGREES F CONDUCTIVITY AT A MEAN TEMPERATURE OF 75 DEGREES F, R-8. CSG INSULATION CORP., SCHULLER, OWENS-CORNING, KNAUF OR EQUAL. DUCT DIMENSIONS SHOWN ON DRAWINGS FOR LINED DUCT ARE CLEAR (NET) OPENING INSIDE OF LINING.

C. FIBER GLASS BLANKET: FOIL FACED, 0.13 BTU/ HR - SQ. FT. - DEGREES F CONDUCTIVITY AT A MEAN TEMPERATURE OF 75 DEGREES F, R-8. CSG INSULATION CORP., SCHULLER, OWENS-CORNING, KNAUF OR EQUAL.

D. BONDING ADHESIVE: BENJAMIN FOSTER 85-15 OR EQUAL.

2.04 PIPING MATERIALS:

A. FLUE PIPING:

1. GAS FLUE PIPING: FLUE PIPE SHALL BE TYPE AS RECOMMENDED BY EQUIPMENT MANUFACTURER FOR WHICH THE PIPE IS CONNECTED TO. UL LISTED. METALBESTOS, AMERIVENT OR EQUAL.
2. FLUE CAP: DESIGNED TO PROPERLY VENTILATE FLUE REGARDLESS OF WIND DIRECTION. STORM PROOF, BIRD PROOF. METALBESTOS, AMERIVENT OR EQUAL.

B. FLUE/ COMBUSTION AIR PIPING:

1. GAS FLUE PIPING: SCHEDULE 40 PVC PIPE WITH SOLVENT WELD FITTINGS.
2. FLUE CAP: DESIGNED TO PROPERLY VENTILATE FLUE REGARDLESS OF WIND DIRECTION. STORM PROOF, BIRD PROOF. FACTORY CONCENTRIC VENT/ COMBUSTION AIR TERMINATION KIT.

D. MISCELLANEOUS PIPING ITEMS:

1. PIPE SUPPORT:
   a. PIPE HANGER: ADJUSTABLE SPLIT RING, SWIVEL HANGER AND ROD. BLACK MALLEABLE IRON. SIZE AND MAXIMUM LOADS PER MANUFACTURER'S RECOMMENDATION. FELT LINED, KIN-LINE 450 F.
   b. CONSTRUCTION CHANNEL: 12 GAGE 1-5/8" X 1-5/8" STEEL CHANNEL. SINGLE OR MULTIPLE SECTIONS. SELF-LOCKING NUTS AND FITTINGS. KIN-LINE, UNISTRUT.
2. PIPE SLEEVES: 24 GAGE GALVANIZED STEEL. ADJUS-TO-CRETE #10 WITH #99 THIMBLE FOR FLOORS. #100 FOR WALLS.

E. FLASHING: FLASHING FOR PIPING THROUGH ROOF SHALL BE PREFABRICATED 24 GAGE GALVANIZED STEEL ROOF JACKS WITH 8" SQUARE FLANGE AROUND PIPE. SEAL WITH WEATHERPROOFING MASTIC.

2.06 EQUIPMENT:

A. GENERAL REQUIREMENTS:

1. CAPACITY: CAPACITIES SHALL BE IN ACCORDANCE WITH SCHEDULES SHOWN ON DRAWINGS. CAPACITIES ARE TO BE CONSIDERED MINIMUM.
2. DIMENSIONS: EQUIPMENT MUST CONFORM TO SPACE REQUIREMENTS AND LIMITATIONS AS INDICATED ON DRAWINGS AND AS REQUIRED FOR OPERATION AND MAINTENANCE. WHERE ARCHITECTURAL SCREENING IS INDICATED, EQUIPMENT SHALL NOT EXTEND ABOVE OR BEYOND SCREENING. EQUIPMENT WILL NOT BE ACCEPTED THAT DOES NOT READILY CONFORM TO SPACE CONDITIONS. PREPARE AND SUBMIT LAYOUT DRAWINGS FOR ALL PROPOSED EQUIPMENT SHOWING ACTUAL JOB CONDITIONS, REQUIRED CLEARANCES FOR PROPER OPERATION, MAINTENANCE, ETC FOR ENGINEER'S REVIEW.
3. RATINGS:
   a. GAS: GAS BURNING EQUIPMENT SHALL BE FURNISHED WITH 100% SAFETY GAS SHUT-OFF, INTERMITTENT PILOT IGNITION, AND BE CSA (US) CERTIFIED, EXCEPT THAT BOILERS SHALL BE CSA (US) CERTIFIED OR UL LISTED.
   b. ELECTRICAL: ELECTRICAL EQUIPMENT SHALL BE IN ACCORDANCE WITH NEMA STANDARDS AND UL OR ETL LISTED WHERE APPLICABLE STANDARDS HAVE BEEN ESTABLISHED.
4. PIPING: EACH ITEM OR ASSEMBLY OF ITEMS SHALL BE FURNISHED COMPLETELY PIPED FOR CONNECTION TO SERVICES. CONTROL VALVES AND DEVICES SHALL BE PROVIDED. EQUIPMENT REQUIRING DOMESTIC WATER FOR NON-POTABLE USE SHALL BE PROVIDED WITH BACKFLOW PREVENTER ACCEPTABLE FOR INTENDED USE BY LOCAL GOVERNING AUTHORITIES.
5. ELECTRICAL:
   a. GENERAL: EACH ITEM OR ASSEMBLY OF ITEMS SHALL BE FURNISHED COMPLETELY WIRED TO INDIVIDUAL TERMINAL BLOCKS FOR CONNECTION TO SINGLE BRANCH ELECTRICAL CIRCUIT. ALL ELECTRICAL ACCESSORIES AND CONTROLS REQUIRED BY EQUIPMENT SHALL BE FURNISHED. PROVIDE TERMINAL BLOCKS FOR CONTROLS AND INTERLOCKS NOT INCLUDED IN EQUIPMENT PACKAGE. MANUAL AND MAGNETIC STARTERS SHALL HAVE AMBIENT COMPENSATING RUNNING OVERCURRENT PROTECTION IN ALL UNGROUNDED CONDUCTORS. MAGNETIC STARTERS SHALL BE MANUAL RESET, SHALL HAVE H-O-A SWITCHES AND AUXILIARY CONTACTS. CONTROLLERS AND OTHER DEVICES SHALL BE IN NEMA 1 OR 3R ENCLOSURES AS APPLICABLE.
   b. WIRING: CONDUCTORS, CONDUIT, AND WIRING SHALL BE IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS. INDIVIDUAL ITEMS WITHIN ASSEMBLY SHALL BE SEPARATELY PROTECTED WITH DEAD FRONT, FUSED DISCONNECT, FUSE BLOCK, OR CIRCUIT BREAKER FOR EACH UNGROUNDED CONDUCTOR, ALL ACCESSIBLE ON OPERATING SIDE OF EQUIPMENT. SWITCHES, CONTACTS AND OTHER DEVICES SHALL BE IN UNGROUNDED CONDUCTORS.
   c. MOTORS: SHALL BE RATED, CONSTRUCTED AND APPLIED IN ACCORDANCE WITH NEMA AND ANSI STANDARDS WITHOUT USING SERVICE FACTOR. SINGLE-PHASE MOTOR SHALL BE OF TYPE TO SUIT APPLICATION. THREE-PHASE MOTORS SHALL BE OPEN DRIP PROOF, NEMA B DESIGN ON PUMPS AND FANS, NEMA C ON RECIPROCATING EQUIPMENT, SEALED BALL BEARING, THREE-PHASE INDUCTION UNLESS OTHERWISE NOTED. DESIGN SHALL LIMIT STARTING INRUSH CURRENT AND RUNNING CURRENT TO VALUES SHOWN ON DRAWINGS. MOTORS 1 HORSEPOWER AND LARGER SHALL BE THE PREMIUM EFFICIENCY TYPE, TESTED ACCORDING TO IEEE STANDARD 112, METHOD B. MOTORS EXPOSED TO WEATHER SHALL BE TEFC. MOTORS IN A FAN AIR STREAM SHALL BE TEFC OR TEAO. VERTICAL MOTORS OUTDOORS SHALL BE ODP OR TEFC AND SHALL HAVE RAIN CAPS.
   d. STARTERS: MOTOR STARTERS SHALL BE FURNISHED FOR ALL EQUIPMENT EXCEPT WHERE STARTER IS IN A MOTOR CONTROL CENTER AS DESIGNATED ON THE ELECTRICAL DRAWINGS. DELIVER STARTER TO ELECTRICAL CONTRACTOR FOR INSTALLATION AND WIRING.
   e. CONTROL VOLTAGE: EQUIPMENT CONNECTED TO GREATER THAN 240 VOLTS SHALL BE PROVIDED WITH 120 VOLT CONTROL CIRCUIT FROM INTEGRAL PROTECTED TRANSFORMER IF SEPARATE SOURCE IS NOT INDICATED ON PLANS. 240 VOLT CONTROL IS ACCEPTABLE IF CONFINED WITHIN CONTROL PANEL.
   f. SUBMITTALS: INCLUDED IN SHOP DRAWINGS SHALL BE INTERNAL WIRING DIAGRAMS AND MANUFACTURER'S RECOMMEND EXTERNAL WIRING.
6. FAN SELECTION:
   a. FAN CURVES: PERFORMANCE CURVES SHALL BE SUBMITTED FOR ALL UNITS OF 3000 CFM OR GREATER. OPERATING POINT FOR FORWARD CURVED FANS SHALL BE FROM POINT OF MAXIMUM EFFICIENCY TOWARDS INCREASED CFM LIMITED BY HORSEPOWER SCHEDULED. OPERATING POINT FOR BACKWARD INCLINED FANS SHALL BE SELECTED NEAR POINT OF MAXIMUM EFFICIENCY. CURVES SHALL PLOT CFM VERSES STATIC PRESSURE WITH CONSTANT BRAKE HORSEPOWER, RPM AND EFFICIENCY LINES.
   b. STATIC PRESSURE: UNLESS OTHERWISE NOTED, PRESSURE SCHEDULED AS EXTERNAL STATIC PRESSURE (ESP) INCLUDES ALL DUCTWORK AND ACCESSORY LOSSES EXTERNAL TO THE UNIT HOUSING. UNLESS OTHERWISE NOTED, PRESSURE SCHEDULED AS TOTAL STATIC PRESSURE INCLUDES ALL DUCTWORK, FILTER, COIL, CABINET, DAMPER AND OTHER ACCESSORY LOSSES. UNLESS OTHERWISE NOTED, PRESSURE SCHEDULED AS DUCT STATIC PRESSURE INCLUDES ALL SUPPLY AND RETURN DUCTWORK AND ACCESSORY LOSSES EXTERNAL TO THE UNIT HOUSING AND PLENUM (AS APPLICABLE). THE ALLOWANCE FOR FILTER LOSSES IS 0.3" WC, UNLESS OTHERWISE NOTED. SUBMIT ITEMIZED STATIC PRESSURE LOSSES FOR ALL COMPONENTS.
7. FILTERS:
   a. GENERAL: TESTED AND RATED IN ACCORDANCE WITH ASHRAE STANDARD 52.2 AND TITLE 24, C.C.R. FURNISH AND INSTALL ONE COMPLETE CHANGE OF ALL FILTERS AFTER AIR BALANCE IN COMPLETED AND PRIOR TO ACCEPTANCE. PROVIDE PRESSURE DIFFERENTIAL GAGE ACROSS ALL FILTER BANKS.
   b. FILTER MEDIA: 2" MEDIA. MERV-13. CLEAN FILTER RESISTANCE 0.25" WATER AT 500 FPM. THROW-AWAY FRAME. CLASS 2. CAMFIL FARR AP-ELEVEN.
   c. PRESSURE DIFFERENTIAL GAGE: DIAPHRAGM ACTUATED. 4" DIAL. ZERO ADJUSTMENT. ACCURACY +/ - 2% OF FULL SCALE. RANGE AS REQUIRED. PROVIDE STATIC PRESSURE SENSORS, TUBING AND MOUNTING BRACKETS. DWYER SERIES 2000. MARK GAGE TO INDICATE FILTER REPLACEMENT PRESSURE, COORDINATE POINT WITH FILTER AND EQUIPMENT MANUFACTURERS.
8. MIXING DAMPERS: OPPOSED BLADE, 16-GAGE. SIX-INCH MAXIMUM BLADE WIDTH, 48" MAXIMUM LENGTH. NYLON OR OIL IMPREGNATED BRONZE BEARINGS. ONE-HALF INCH DIAMETER PIN SHAFT. 16-GAGE CHANNEL FRAME. ONE PERCENT MAXIMUM LEAKAGE AT 4" WC IN ACCORDANCE WITH AMCA 500 FOR OUTSIDE AIR DAMPERS. ACTUATING ROD OUT OF AIR STREAM. ARROW.
9. SOUND RATINGS: SHALL BE IN ACCORDANCE WITH ASHRAE 36-72. SOUND RATINGS SHALL NOT EXCEED SCHEDULED VALUES.
10. DRIVES: UNLESS NOTED AS DIRECT CONNECTED, DRIVES SHALL BE V-BELT, RATED AT 150% OF MOTOR HORSEPOWER. MULTIPLE DRIVE BELTS SHALL BE MATCHED SET. DRIVE SHEAVES SHALL BE DYNAMICALLY BALANCED, ADJUSTABLE, RANGE +/ - 10%, SELECTED AT MID RANGE. ADJUSTABLE RELATIVE MOVEMENT SHALL BE LOCKABLE TO SHAFT. BELTS SHALL BE ALIGNED WITHIN 1-1/2 DEGREES AT ALL TIMES. OPEN DRIVES SHALL BE PROVIDED WITH OSHA APPROVED OPEN MESH BELT GUARDS. BELT GUARDS EXPOSED TO WEATHER SHALL BE WEATHERPROOF ENCLOSURE WITH LOUVERED FACE FOR ADEQUATE VENTILATION. DRIVING MOTOR SHALL BE MOUNTED ON ADJUSTABLE RAILS. T.B. WOODS, BROWNING. SUBMIT RPM RANGE OF DRIVEN MACHINE WITH DRIVE SELECTION.

B. GAS FIRED FURNACE:

1. GENERAL: THE UNITS SHALL BE AGA CERTIFIED. REZNOR, MODINE, ROBERTS GORDON OR EQUAL.
2. HEAT EXCHANGER: STAINLESS STEEL CONSTRUCTION, SEPARATED COMBUSTION WITH VERTICAL OR HORIZONTAL VENTING AND CONCENTRIC VENT KIT.
3. CASING: 18-GAUGE STEEL WITH THREADED PIPE CONNECTIONS FOR HANGER RODS.
4. FINISH: FACTORY APPLIED BAKED FINISH.
5. FAN: DIRECT DRIVE, CENTRIFUGAL TYPE, STATICALLY AND DYNAMICALLY BALANCED.
6. AIR OUTLET: VERTICAL DISCHARGE.
7. MOTOR: HORIZONTAL MODELS WITH PERMANENTLY LUBRICATED SLEEVE BEARINGS; VERTICAL MODELS WITH GREASE LUBRICATED BALL BEARINGS.
8. CONTROL: 24-VOLT TRANSFORMER, HIGH TEMPERATURE LIMIT CONTROL, FLUE PRESSURE SAFETY SWITCH
9. CAPACITY: SEE DRAWING FOR CAPACITY.

C. EXHAUST FANS:

1. GENERAL: ALL EXHAUST FANS SHALL BE TESTED AND RATED IN ACCORDANCE WITH AMCA STANDARD 210. FANS EXPOSED TO THE WEATHER SHALL HAVE VENTILATED WEATHERPROOF HOUSING OVER MOTOR AND DRIVE ASSEMBLY.
2. ROOF FAN: MULTIVANE CENTRIFUGAL FAN. BALL BEARINGS. VIBRATION ISOLATION MOUNT. ALL ALUMINUM CURB BASE. WEATHERPROOF DISCONNECT SWITCH. DOWN BLAST TYPE UL LISTED. COOK, GREENHECK, PENN BARRY, ACME OR EQUAL.

PART 3 - EXECUTION

3.01 DUCTWORK INSTALLATION:

A. GENERAL:

1. STANDARDS: UNLESS OTHERWISE NOTED, ALL DUCTWORK SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH CURRENT SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". DUCTWORK AND ACCESSORIES SHALL BE INSTALLED IN A MANNER TO PREVENT VIBRATION AND RATTLING.
2. SEISMIC BRACING: ALL DUCTS SHALL BE BRACED AND SUPPORTED PER SMACNA GUIDELINES FOR "SEISMIC RESTRAINTS MANUAL FOR MECHANICAL SYSTEMS" DATED 1998, INCLUDING APPENDIX E.
3. DUCT ACCESS DOORS: PROVIDE ACCESS DOORS AS REQUIRED TO ADJUST EQUIPMENT AND DAMPERS.
4. FLEXIBLE CONNECTIONS: CONNECTIONS OF DUCTWORK TO ALL EQUIPMENT SHALL BE WITH 6" (MIN.) FLEXIBLE CONNECTION. INSTALL WITH AMPLE SLACK AND UNIFORM GAP AFTER DEFLECTION OF VIBRATION ISOLATORS. THERE SHALL BE NO METAL TO METAL CONTACT ACROSS FLEXIBLE CONNECTION. PROTECT OUTDOOR CONNECTIONS WITH WEATHERPROOF METAL SHROUD ON TOP AND SIDES, NO METAL-TO-METAL CONTACT. PROVIDE AT ALL SEISMIC JOINTS.
5. DUCTED RETURNS: ALL AIR HANDLING THAT IS NOT DIRECTLY LOCATED IN THE SPACE THAT IT SERVES SHALL HAVE DUCTED RETURNS.
6. OPEN ENDS OF DUCTWORK SHALL BE COVERED DURING CONSTRUCTION TO KEEP INSIDE CLEAN.

B. LOW VELOCITY-LOW PRESSURE (UP TO 2000 FT/ MIN; UP TO 2.0 IN. WATER):

1. SHEET METAL DUCTWORK:
   a. ELLS: ELLS WITH LESS THAN STANDARD RADIUS AND SQUARE ELLS SHALL BE FITTED WITH TURNING VANES.
   b. TEES: TEES SHALL BE STRAIGHT TAP-IN WITH EXTRACTOR OR 45 DEGREE TAKEOFF, AS SHOWN ON DRAWINGS.
   c. DUCT JOINTS: SEAL DUCT JOINTS AIRTIGHT WITH FIBER TAPE AND ADHESIVE PER MANUFACTURER'S PRINTED INSTRUCTION. DUCTS IN WEATHER SHALL BE SEALED AIR AND WATER TIGHT WITH DUCT MASTIC BEFORE CLOSING AND TAPING.
   i. WHERE DUCTMATE TYPE JOINTS ARE USED, THE MANUFACTURER'S DESIGNATED PROCEDURE SHALL BE FOLLOWED. DUCTMATE JOINTS ON ROOF SHALL HAVE CONTINUOUS CLEAT ON TOP DUCT FLANGE TO PREVENT WATER FROM COLLECTING ON GASKET.
   d. DAMPERS: INSTALL VOLUME CONTROL DAMPER AND DAMPER REGULATOR IN ALL BRANCH DUCTS.
   e. DUCT DIMENSIONS:
   i. SIZES INDICATED DRAWINGS FOR LINED DUCTS, ARE CLEAR NET OPENINGS INSIDE OF LINING.
   ii. WHERE DIMENSIONS ARE NOT INDICATED, CONTRACTOR TO VERIFY WITH ENGINEER PRIOR TO INSTALLATION.
   f. TOP OF DUCTS EXPOSED TO WEATHER SHALL BE CROSS BROKEN AND SLOPED SLIGHTLY TO EACH SIDE TO ALLOW RAIN WATER TO RUN OFF. DUCTS THAT DO NOT DRAIN OFF TOP WILL BE REJECTED AND NEED TO BE REPLACED AT CONTRACTORS' EXPENSE.

3.02 AIR TERMINALS AND DUCT FITTINGS INSTALLATION:

A. GENERAL: UNLESS OTHERWISE NOTED, ALL AIR TERMINALS AND DUCT FITTINGS SHALL BE INSTALLED IN ACCORDANCE WITH CURRENT SMACNA "HVAC DUCT CONSTRUCTION STANDARDS", DETAILS ON DRAWINGS AND MANUFACTURERS INSTRUCTIONS. TERMINALS AND FITTINGS SHALL BE INSTALLED IN A MANNER TO PREVENT VIBRATION AND RATTLING.

B. FIRE SMOKE DAMPER OR COMBINATION SMOKE FIRE DAMPER: SHALL BE INSTALLED IN ACCORDANCE WITH THEIR STATE FIRE MARSHAL APPROVAL AND THE MANUFACTURER'S RECOMMENDATIONS.

3.03 DUCTWORK INSULATION INSTALLATION:

A. GENERAL: ALL SUPPLY AND RETURN SHEET METAL DUCTWORK SHALL BE INSULATED.

B. CONCEALED DUCTWORK: WRAP DUCTWORK WITH FIBERGLASS BLANKET LAPPED 2" MINIMUM. SECURE WITH FOIL TAPE AT ALL JOINTS FOR A COMPLETE VAPOR BARRIER.

C. ACOUSTIC LINING: ALL DUCTWORK IN EQUIPMENT ROOMS, WHERE EXPOSED TO WEATHER, AND ELSEWHERE AS INDICATED ON DRAWINGS, SHALL HAVE ACOUSTIC LINING. INCREASE EACH SHEET METAL DIMENSION TO ACCOMMODATE LINING AND MAINTAIN CLEAR INSIDE DUCT DIMENSIONS SHOWN ON DRAWINGS. APPLY LINING WITH BONDING ADHESIVE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND ALSO SECURE WITH MECHANICAL FASTENERS IN ACCORDANCE WITH SMACNA STANDARDS. SEAL EXPOSED EDGES OF LINING WITH BONDING ADHESIVE.

3.04 PIPING INSTALLATION:

A. GENERAL:

1. PIPING LAYOUT: PIPING SHALL BE CONCEALED IN WALLS, ABOVE THE CEILINGS, OR BELOW GRADE UNLESS OTHERWISE NOTED. EXPOSED PIPING SHALL RUN PARALLEL TO ROOM SURFACES; LOCATION TO BE APPROVED BY ARCHITECT. NO STRUCTURAL MEMBER SHALL BE WEAKENED BY CUTTING, NOTCHING, BORING OR OTHERWISE UNLESS SPECIFICALLY ALLOWED BY STRUCTURAL DRAWINGS AND/ OR SPECIFICATIONS. WHERE SUCH CUTTING IS REQUIRED, REINFORCEMENT SHALL BE PROVIDED AS SPECIFIED OR DETAILED. ALL PIPING SHALL BE INSTALLED IN A MANNER TO ENSURE UNRESTRICTED FLOW, ELIMINATE AIR POCKETS, PREVENT ANY UNUSUAL NOISE, AND PERMIT COMPLETE DRAINAGE OF THE SYSTEM. ALL PIPING SHALL BE INSTALLED TO PERMIT EXPANSION AND CONTRACTION WITHOUT STRAIN ON PIPING OR EQUIPMENT. EXPANSION JOINTS AND/OR FLEXIBLE CONNECTORS SHALL BE INSTALLED AS REQUIRED. VERTICAL LINES SHALL BE INSTALLED TO ALLOW FOR BUILDING SETTLEMENT WITHOUT DAMAGE TO PIPING. LINES SHALL BE ADEQUATELY BRACED AGAINST VERTICAL AND LATERAL MOVEMENT.
2. PIPE SUPPORT:
   a. GENERAL: HANGERS SHALL BE PLACED TO SUPPORT PIPING WITHOUT STRAIN ON JOINTS OR FITTINGS. MAXIMUM SPACING BETWEEN SUPPORTS SHALL BE AS SPECIFIED BELOW. ACTUAL SPACING REQUIREMENTS WILL DEPEND ON STRUCTURAL SYSTEM. REFER TO DRAWINGS FOR ADDITIONAL REQUIREMENTS AND ATTACHMENT TO STRUCTURE. VERTICAL PIPING SHALL BE SUPPORTED AT FLOOR AND CEILING. SUPPORT PIPE WITHIN 12" OF ALL CHANGES IN DIRECTION. NO PERFORATED STRAPHANGER SHALL BE USED IN ANY WORK.
   b. FLUE PIPING: FLUE PIPING SHALL BE INSTALLED IN ACCORDANCE WITH ITS UL LISTING AND MANUFACTURER'S INSTRUCTIONS. ALL WELDERS SHALL BE CERTIFIED IN ACCORDANCE WITH AWS STANDARD D9.1, SPECIFICATIONS FOR WELDING SHEET METAL.
   c. PVC PIPING: SHALL BE CUT SQUARE AND ASSEMBLED PRIOR TO SOLVENT WELD. APPLY PRIMER PER MANUFACTURER'S RECOMMENDATIONS. COAT MALE JOINT FULLY WITH SOLVENT, MAKE JOINT BEFORE SOLVENT DRIES AND WIPE EXTERIOR CLEAN.

3.05 EQUIPMENT INSTALLATION:

A. GENERAL: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSURE THAT NO WORK DONE UNDER OTHER SPECIFICATION SECTIONS SHALL IN ANY WAY BLOCK, OR OTHERWISE HINDER ACCESS PANELS OR DIMINISH THE EFFECTIVENESS OF EQUIPMENT VIBRATION ISOLATION.

B. CONNECTIONS TO EQUIPMENT: WHERE SIZE REDUCTIONS ARE REQUIRED FOR CONNECTIONS TO EQUIPMENT, THEY SHALL BE MADE IMMEDIATELY ADJACENT TO THE EQUIPMENT AND, IF POSSIBLE, INSIDE THE EQUIPMENT CABINET. CONNECTIONS MADE TO EQUIPMENT MOUNTED ON VIBRATION ISOLATORS SHALL BE WITH FLEXIBLE CONNECTORS, INSTALLED ADJACENT TO EQUIPMENT.

C. START UP: ENGAGE MANUFACTURER OR FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM START UP SUPERVISION. MANUFACTURER SHALL PROVIDE ON-SITE START UP AND COMMISSIONING ASSISTANCE THROUGH JOB COMPLETION. COMPLETE INSTALLATION AND START UP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.

3.06 BUILDING MANAGEMENT SYSTEM:

A. THERMOSTATS SHALL HAVE THE CAPABILITY OF TERMINATING ALL HEATING AT A TEMPERATURE OF NO MORE THAN 70 DEGREES F, OR TERMINATING ALL COOLING AT A TEMPERATURE OF NO LESS THAN 78 DEGREES F, AND TO PROVIDE A TEMPERATURE RANGE OF UP TO 10 DEGREES F BETWEEN FULL HEATING AND FULL COOLING.

B. THERMOSTAT AND CONTROL SHALL BE COMPATIBLE AND INTEGRATED WITH EXISTING-SITE BUILDING MANAGEMENT SYSTEM.

1. THERMOSTATS SHALL HAVE CAPABILITY TO MEASURE TEMPERATURE, HUMIDITY, AND CARBON DIOXIDE LEVELS.
   a. SYSTEM SHALL HAVE THE ABILITY TO LOCALLY DISPLAY THE CARBON DIOXIDE LEVELS AND PROVIDE LOCAL ALARM. ALARM TO BE AUDIBLE AND/OR VISUAL; REQUIREMENT TO BE DETERMINED BY OWNER.

C. CONTROLS CONTRACTOR TO SUBMIT SHOP DRAWINGS AND APPLICABLE CUTSHEETS FOR ENGINEER'S REVIEW PRIOR TO INSTALLATION

D. ALL CONTROL WIRING, REGARDLESS OF VOLTAGE, SHALL BE INSTALLED IN CONDUIT.

E. PLEASE REFERENCE PLANS FOR SEQUENCES OF OPERATIONS.

3.07 SYSTEM AIR BALANCE:

A. SCOPE: PROVIDE THE SERVICES OF A QUALIFIED INDEPENDENT TEST AND BALANCE AGENCY CERTIFIED BY THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) TO TEST, ADJUST AND BALANCE, RETEST, AND RECORD PERFORMANCE OF THE SYSTEM TO OBTAIN DESIGN QUANTITIES AS SPECIFIED. BALANCING CONTRACTOR MUST ALSO BE TABB CERTIFIED AND HAVE A C-20 LICENSE.

B. QUALIFICATIONS: PRIOR TO COMMENCING WORK, THE AGENCY SHALL BE APPROVED BY THE OWNER'S REPRESENTATIVE.

C. INSTRUMENTS: ALL INSTRUMENTS SHALL BE ACCURATELY CALIBRATED; CALIBRATION HISTORIES SHALL BE AVAILABLE FOR EXAMINATION. APPLICATION OF INSTRUMENTATION SHALL BE IN ACCORDANCE WITH AABC STANDARDS.

D. PROCEDURE: GENERAL: BALANCED QUANTITIES SHALL BE PLUS 10%, MINUS 10% OF DESIGN QUANTITIES. ALL NAME-PLATE DATA, MANUFACTURER, MODEL, AND SERIAL NUMBERS SHALL BE RECORDED FOR EACH ITEM TESTED.

E. EXTENDED WARRANTY: THE TEST AND BALANCE AGENCY SHALL INCLUDE AN EXTENDED WARRANTY OF 90 DAYS AFTER COMPLETION OF TEST AND BALANCE WORK, DURING WHICH TIME THE OWNER'S REPRESENTATIVE AT HIS DISCRETION MAY REQUEST A RECHECK OR RESETTING OF ANY ITEM OR ITEMS IN TEST REPORT. THE AGENCY SHALL PROVIDE TECHNICIANS TO ASSIST THE OWNER'S REPRESENTATIVE IN MAKING ANY TESTS HE MAY REQUIRE DURING THIS PERIOD OF TIME.

F. AIR BALANCE PROCEDURE (FOR EACH AIR HANDLING SYSTEM):

1. ALL AIR FILTERS SHALL BE CLEAN WHEN AIR BALANCE IS PERFORMED.
2. PROVIDE A SKETCH OF THE EQUIPMENT SHOWING EXACTLY WHERE ALL PRESSURE READINGS WERE TAKEN.
3. ADJUST BLOWER RPM TO DESIGN REQUIREMENTS.
4. RECORD MOTOR FULL LOAD AMPERES.
5. MAKE PITOT TUBE TRAVERSE OF MAIN SUPPLY AND RETURN DUCTS AND OBTAIN DESIGN CFM AT FANS.
6. RECORD SYSTEM STATIC PRESSURES, INLET AND DISCHARGE.
7. RECORD FILTER QUANTITY, SIZE(S) AND PRESSURE DROP ACROSS FILTER(S) AT EACH FILTER BANK.
8. ADJUST SYSTEM FOR DESIGN CFM RECIRCULATED AIR.
9. ADJUST SYSTEM FOR DESIGN CFM OUTSIDE AIR.
10. RECORD ENTERING AIR TEMPERATURES. (DB HEATING, DB AND WB COOLING.)
11. RECORD LEAVING AIR TEMPERATURES. (DB HEATING, DB AND WB COOLING.)
12. ADJUST ALL MAIN SUPPLY AND RETURN AIR DUCTS TO DESIGN CFM.
13. ADJUST ALL ZONES TO DESIGN CFM, SUPPLY AND RETURN.
14. ADJUST ALL DIFFUSERS, GRILLES AND REGISTERS TO PLUS 10%, MINUS 10% OF DESIGN REQUIREMENTS.
15. ADJUST CFM AT ALL EXHAUST FANS, MAKE-UP UNITS, ETC. (HIGH AND LOW SPEED, WHERE APPLICABLE). RECORD APPLICABLE DATA FROM ITEMS 1 THROUGH 11 ABOVE.
16. EACH GRILLE, DIFFUSER AND REGISTER SHALL BE IDENTIFIED AS TO LOCATION.
17. VERIFY PROPER DIFFUSION PATTERN FOR ALL CEILING GRILLES AND THAT ALL SIDEWALL GRILLES ARE SET FOR 5 DEGREES DOWNWARD DEFLECTION UNLESS OTHERWISE NOTED. MAKE A NOTATION OF ANY THAT ARE NOT SET PROPERLY.
18. SIZE, TYPE AND MANUFACTURER OF DIFFUSERS, GRILLES, REGISTERS AND ALL TESTED ITEMS SHALL BE IDENTIFIED AND LISTED. MANUFACTURER'S RATINGS SHALL BE USED TO MAKE REQUIRED CALCULATIONS ON ALL ITEMS.
19. READINGS AND TESTS OF DIFFUSERS, GRILLES, AND REGISTERS SHALL INCLUDE REQUIRED FPM VELOCITY AND TEST RESULTANT VELOCITY, REQUIRED CFM AND TEST RESULTANT CFM AFTER ADJUSTMENTS.
20. IN COOPERATION WITH THE CONTROL MANUFACTURER'S REPRESENTATIVE, SET ADJUSTMENTS OF AUTOMATICALLY OPERATED DAMPERS TO OPERATE AS SPECIFIED. TESTING AGENCY SHALL CHECK ALL CONTROLS FOR PROPER CALIBRATIONS AND LIST ALL CONTROLS REQUIRING ADJUSTMENT BY CONTROL INSTALLERS.
21. ALL DIFFUSERS, GRILLES AND REGISTERS SHALL BE ADJUSTED FOR REQUIRED AIR PATTERNS AND TO MINIMIZE DRAFTS.
22. AS A PART OF THE WORK OF THIS CONTRACT, THE AIR CONDITIONING CONTRACTOR SHALL MAKE ANY CHANGES IN PULLEYS, BELTS, DAMPERS OR THE ADDITION OF DAMPERS CLEANING OF INSECT SCREENS AND REPLACEMENT OF FILTERS REQUIRED FOR CORRECT BALANCE AS RECOMMENDED BY AIR BALANCE AGENCY, AT NO ADDITIONAL COST TO OWNER.
23. SET, TEST AND ADJUST PACKAGED HEATING/ COOLING UNIT ECONOMIZER OPERATION IN COOPERATION WITH CONTROLS CONTRACTOR. RECORD MINIMUM AND MAXIMUM OUTSIDE AND EXHAUST AIRFLOWS.

G. ACOUSTIC PERFORMANCE TESTING: PROVIDE ACOUSTIC PERFORMANCE TESTING IN ACCORDANCE WITH THE REQUIREMENTS OF EQ3.0 OF THE "CALIFORNIA CRITERIA FOR HIGH PERFORMANCE SCHOOLS, BEST PRACTICES MANUAL, 2009 EDITION".

1. MAXIMUM BACKGROUND NOISE LEVEL: UNOCCUPIED CLASSROOMS MUST HAVE A MAXIMUM BACKGROUND NOISE LEVEL OF NO MORE THAN 45 DBA LAEQ. THE STANDARD ANTICIPATES TWO PRIMARY NOISE SOURCES, STEADY HVAC EQUIPMENT NOISE AND THE USUALLY UNSTEADY EXTERIOR ENVIRONMENTAL NOISE. WHERE THE MEASURED AMBIENT NOISES DUE TO SOURCES OTHER THAN HVAC ARE WITHIN 5 DB OF THE MEASURED OVERALL NOISE (HVAC AND EXTERIOR INTRUSIVE NOISE) A MEASUREMENT OF AT LEAST ½ HOUR DURATION SHALL BE MADE IN AT LEAST TWO CLASSROOMS IN EACH BUILDING IN THE WORSE CASE (NOISIEST) LOCATIONS ON THE SCHOOL SITE DURING NORMAL SCHOOL DAYS AND HOURS.
   a. TO EVALUATE THE SIGNIFICANCE OF INTRUSIVE EXTERIOR NOISE, A 30-MINUTE EQUIVALENT SOUND LEVEL (LAEQ30, IN GENERAL CONFORMANCE WITH ANSI S12.60-2002, ANNEX E3) MEASUREMENT SHALL BE MADE IN THE CLASSROOM THAT IS SUBJECTIVELY ASSESSED TO REPRESENT THE WORSE CASE EXPOSURE TO EXTERIOR NOISE, WITH THE HVAC SYSTEM NOT IN OPERATION. THIS LEQ30 MEASUREMENT SHALL BE REPEATED WITH THE HVAC IN OPERATION. IF THE SECOND "HVAC-ON" SOUND LEVEL IS MORE THAN 5 DB GREATER THAN THE INITIAL "HVAC-OFF" MEASUREMENT, EXTERIOR NOISE INTRUSION SHALL BE DEEMED "NOT SIGNIFICANT".
   b. WHERE INTRUSIVE EXTERIOR NOISE HAS BEEN DEEMED "NOT SIGNIFICANT" SHORT-TERM (15 SECOND) A-WEIGHTED SOUND LEVEL MEASUREMENTS SHALL BE MADE IN EACH CLASSROOM WITH THE HVAC SYSTEMS IN OPERATION. WHERE EXTERIOR INTRUSIVE NOISE HAS BEEN DEEMED "SIGNIFICANT" (PER THE EVALUATION METHOD NOTED ABOVE), LAEQ30 SOUND LEVEL MEASUREMENTS SHALL BE MADE IN EACH CLASSROOM WITH THE HVAC SYSTEM IN OPERATION. IN EITHER CASE, WHERE CLASSROOMS ARE SERVED BY VARIABLE-AIR-VOLUME SYSTEMS, THE SYSTEMS SHALL BE OPERATED AT MAXIMUM NOMINAL FLOW (TYPICALLY BY MEANS OF VARYING THE THERMOSTAT SET POINT).
   c. WHERE EXPOSURE TO EXTERIOR NOISE VARIES SIGNIFICANTLY BETWEEN GROUPS OF CLASSROOMS (E.G. ONE SIDE OF A CLASSROOM WING ADJACENT TO A STREET, THE OTHER SIDE FACING AWAY), SEPARATE EVALUATIONS OF EXTERIOR NOISE SIGNIFICANCE CAN BE CONDUCTED TO LIMIT THE NEED FOR LAEQ30 MEASUREMENTS.
2. MAXIMUM REVERBERATION: CLASSROOMS LESS THAN 10,000 CUBIC FEET MUST HAVE A 0.6-SECOND MAXIMUM (UNOCCUPIED) REVERBERATION TIME AND CLASSROOMS WITH VOLUMES BETWEEN 10,000 CUBIC FEET AND 20,000 CUBIC FEET MUST HAVE A 0.7-SECOND MAXIMUM (UNOCCUPIED, FURNISHED, AND FITTED-OUT) REVERBERATION TIME. (ANSI STANDARD S12.60-2002). THE REVERBERATION TIMES SHALL BE MEASURED IN EACH CLASSROOM IN THREE OCTAVE BANDS WITH CENTER FREQUENCIES OF 500, 1000, AND 2000 HZ. THE ARITHMETIC AVERAGE OF THE THREE MEASURED VALUES SHALL BE COMPARED TO THE STANDARD.

*** END OF SECTION ***

CFC CHAPTER 33

SECTION 3302 CONSTRUCTION SAFEGUARDS

3302.1 ALTERATION, REPAIR AND ADDITIONS

REQUIRED EXITS, EXISTING STRUCTURAL ELEMENTS, FIRE PROTECTION DEVICES AND SANITARY SAFEGUARDS SHALL BE MAINTAINED ALL THE TIMES DURING ALTERATION, REPAIRS OR ADDITIONS TO ANY BUILDING OR STRUCTURE.

EXCEPTIONS:

1. WHERE SUCH REQUIRED ELEMENTS OR DEVICES ARE BEING ALTERED OR REPAIRED, ADEQUATE SUBSTITUTE PROVISIONS SHALL BE MADE.
2. MAINTENANCE OF SUCH ELEMENTS AND DEVICES IS NOT REQUIRED WHEN THE EXISTING BUILDING IS NOT OCCUPIED.

3302.2 MANNER OF REMOVAL

WASTE MATERIALS SHALL BE REMOVED IN A MANNER THAT PREVENTS INJURY OR DAMAGE TO PERSONS, ADJOINING PROPERTIES AND PUBLIC RIGHTS-OF-WAY.

3302.3 FIRE SAFETY DURING CONSTRUCTION

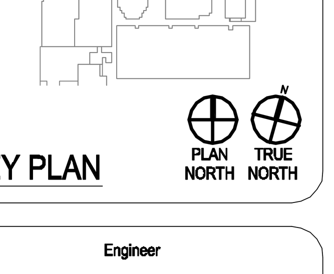
FIRE SAFETY DURING CONSTUCTION SHALL COMPLY WITH THE APPLICABLE REQUIREMENTS OF THIS CODE AND THE APPLICABLE PROVISIONS OF CHAPTER 33 OF THE CALIFORNIA FIRE CODE.

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REGISTERED PROFESSIONAL ENGINEER
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MECHANICAL
STATE OF CALIFORNIA

Architect

CLIENT	
NMUSD	
PROJECT NUMBER	P2101400ME
DATE	02/08/2021
REVISIONS	

#	DESCRIPTION	DATE

100% CONSTRUCTION DOCUMENT

MECHANICAL SPECIFICATIONS

MP0.04

PLUMBING SPECIFICATIONS

CONDITIONS OF THE CONTRACT AND DIVISION 1, AS APPLICABLE, APPLY TO THIS SECTION.

PART 1 - GENERAL

1.1 SUMMARY

A. PROVIDE ALL WORK FOR MECHANICAL, PLUMBING AND FIRE PROTECTION SYSTEMS REQUIRED IN THE PROJECT TO BE PROPERLY INSTALLED, TESTED AND PERFORMING THEIR INTENDED FUNCTION.

B. CODE COMPLIANCE, RESEARCH, DESIGN COORDINATION, AND INSTALLATION OR A COMPLETE AND FUNCTIONAL HYDRAULICALLY CALCULATED WET PIPE SPRINKLER SYSTEM THAT MEETS THE APPROVAL, AND IS IN ACCORDANCE WITH THE REQUIREMENTS OF NFPA FIRE PROTECTION STANDARDS LISTED IN 1.4 (A), UNDERWRITERS LABORATORY (UL), ALL LOCAL AND STATE REGULATIONS, AND THESE SPECIFICATIONS.

C. ALL MATERIALS AND EQUIPMENT FOR THE POTABLE WATER SYSTEM SHALL MEET THE LATEST MANDATES AND REQUIREMENTS FOR LEAD FREE REQUIRED BY LAW THAT GOES INTO EFFECT JANUARY 2014.

D. THE SCOPE OF WORK DESCRIBED IN THESE SPECIFICATIONS AND/OR INDICATED ON THE DRAWINGS SHALL INCLUDE (EXCEPT WHERE OTHERWISE NOTED) THE FURNISHING OF ALL MATERIALS, EQUIPMENT, APPURTENANCES, ACCESSORIES, CONNECTIONS, LABOR, ETC. REQUIRED AND/OR NECESSARY TO COMPLETELY INSTALL, CLEAN, INSPECT, ADJUST, TEST, BALANCE AND LEAVE IN SAFE AND PROPER OPERATING CONDITION ALL SYSTEMS. ALL WORK SHALL BE ACCOMPLISHED BY WORKMEN SKILLED IN THE VARIOUS TRADES INVOLVED.

E. THE DRAWINGS AND SPECIFICATIONS ARE COMPLEMENTARY TO EACH OTHER AND WHAT IS CALLED FOR BY ONE SHALL BE AS BINDING AS IF CALLED FOR BY BOTH. IF A DISCREPANCY EXISTS BETWEEN THE DRAWING AND SPECIFICATIONS, THE HIGHER COST SHALL BE INCLUDED, AND THE ENGINEER SHALL BE NOTIFIED OF THE DISCREPANCY.

1.2 QUALITY ASSURANCE

A. PERFORM ALL WORK IN ACCORDANCE WITH THE LATEST EDITION OF THE APPLICABLE CODES, SPECIFICATIONS, LOCAL ORDINANCES, INDUSTRY STANDARDS, UTILITY COMPANY REGULATIONS, NATIONALLY ACCEPTED CODES.

B. ALL MATERIALS AND DISTRIBUTION, AND UTILIZATION EQUIPMENT SHALL BE UL LISTED.

C. ALL EQUIPMENT AND MATERIALS SHALL BE NEW, UNUSED AND OF UNITED STATES DOMESTIC MANUFACTURE UNLESS APPROVED OTHERWISE BY ENGINEER OR OWNER.

D. AN APPROVED CONTRACTOR FOR THE WORK UNDER THIS DIVISION SHALL BE:
1. A LICENSED SPECIALIST IN THIS FIELD AND HAVE THE PERSONNEL, EXPERIENCE, TRAINING, SKILL, AND ORGANIZATION TO PROVIDE A PRACTICAL WORKING SYSTEM.
2. ABLE TO FURNISH EVIDENCE OF HAVING CONTRACTED FOR AND INSTALLED NOT LESS THAN 3 SYSTEMS OF COMPARABLE SIZE AND TYPE THAT HAVE SERVED THEIR OWNERS SATISFACTORILY FOR NOT LESS THAN 3 YEARS.

1.3 COORDINATION WITH OTHER TRADES

A. COORDINATE THE WORK OF THIS DIVISION WITH ALL OTHER DIVISIONS TO ENSURE THAT ALL COMPONENTS OF THE MECHANICAL, PLUMBING AND FIRE PROTECTION SYSTEM WILL BE INSTALLED AT THE PROPER TIME AND FIT THE AVAILABLE SPACE.

B. LOCATE AND SIZE ALL OPENINGS IN WORK OF OTHER TRADES REQUIRED FOR THE PROPER INSTALLATION OF THE MECHANICAL, PLUMBING AND FIRE PROTECTION SYSTEM COMPONENTS.

C. MAKE ALL MECHANICAL, PLUMBING AND FIRE PROTECTION CONNECTIONS TO ALL EQUIPMENT FURNISHED BY THIS DIVISION AND AS REQUIRED BY ANY OTHER DIVISION.

1.4 SUBMITTALS

A. PROVIDE SHOP DRAWINGS AND COMPLETE PRODUCT DATA AS INDICATED IN EACH SPECIFICATION SECTION.

B. COORDINATION DRAWINGS: USING THE MECHANICAL DUCTWORK SHOP DRAWINGS AS A BASIS, PROVIDE A COMPOSITE SET OF AUTOCAD DRAWINGS IN WHICH THE MAJOR MECHANICAL, PLUMBING AND FIRE PROTECTION EQUIPMENT, DUCTWORK AND PIPING ARE SUPERIMPOSED ON THE ARCHITECTURAL REFLECTED CEILING PLAN AND STRUCTURAL FRAMING PLAN. INCLUDE SPOT ELEVATIONS OF BOTTOM OF STEEL ALONG WITH FINISHED CEILING HEIGHT. PREPARE AT 1/8 INCH SCALE OR LARGER, ONE DRAWING PER BUILDING AREA. PROVIDE 1/4 INCH SCALE ENLARGEMENTS OF LOCATIONS WHERE SPECIAL ATTENTION TO ROUGH-IN DIMENSIONS AS REQUIRED TO ENSURE ALL SYSTEMS WILL FIT WITHIN THE AVAILABLE SPACE.

C. SHOP DRAWINGS WILL BE REVIEWED AND RETURNED TO THE CONTRACTOR WITH ONE OF THE FOLLOWING CATEGORIES:
1. REVIEWED: NO FURTHER SUBMITTAL ACTION IS REQUIRED. SUBMITTAL TO BE INCLUDED IN O & M MANUAL.
2. REVISE AND RESUBMIT: CONTRACTOR TO RESUBMIT SUBMITTAL AS INDICATED IN COMMENTS SECTION OF ENGINEER'S SUBMITTAL COVER LETTER.
3. REJECTED: CONTRACTOR TO RESUBMIT NEW SUBMITTAL WHEN ALTERNATE OR SUBSTITUTION IS NOT APPROVED AND BE REQUIRED TO FURNISHED PRODUCT NAMED IN SPECIFICATION AND OR DRAWINGS.
4. FURNISH AS CORRECTED: CONTRACTOR TO SUBMIT LETTER VERIFYING THAT REQUIRED CORRECTIONS NOTED ON ENGINEER'S SUBMITTAL COVER LETTER HAVE BEEN RECEIVED AND COMPLIED WITH BY MANUFACTURER. IF EQUIPMENT ON SITE IS NOT IN COMPLIANCE WITH CORRECTIONS NOTED, CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF REMOVING AND REPLACING EQUIPMENT.

1.5 EXISTING CONDITIONS

A. THE CONTRACTOR SHALL BE FAMILIAR WITH THE REQUIRED SCOPE OF WORK TO ACCOMPLISH THE WORK REQUIRED BY THESE DOCUMENTS. ALL DEMOLITION WORK IMPLIED OR REQUIRED SHALL BE INCLUDED IN THE SCOPE OF THIS CONTRACT.

B. OUTAGES OF SERVICES ARE REQUIRED BY THE NEW INSTALLATION WILL ONLY BE PERMITTED AT A TIME APPROVED BY THE OWNER. THE CONTRACTOR SHALL ALLOW THE OWNER A 2 WEEK WINDOW IN ORDER TO SCHEDULE REQUIRED OUTAGES. THE TIME ALLOWED FOR OUTAGES WILL NOT BE DURING NORMAL OPERATING HOURS UNLESS OTHERWISE APPROVED BY THE OWNER. ALL COSTS FOR OUTAGES, INCLUDING OVERTIME CHARGES, SHALL BE INCLUDED IN THE CONTRACT AMOUNT.

C. WORK SEQUENCE, TIMING, COORDINATION WITH OWNER:

1. DURING THE CONSTRUCTION OF THIS PROJECT, NORMAL FACILITY ACTIVITIES WILL CONTINUE IN EXISTING BUILDINGS UNTIL NEW BUILDINGS OR RENOVATED AREAS ARE COMPLETED. PLUMBING, FIRE PROTECTION, LIGHTING, ELECTRICAL, COMMUNICATIONS, HEATING, AIR CONDITIONING, AND VENTILATION SYSTEMS WILL HAVE TO BE MAINTAINED IN SERVICE WITHIN THE OCCUPIED SPACES OF THE EXISTING BUILDING.

D. DEMOLITION AND WORK WITHIN EXISTING BUILDINGS:
1. ALL EQUIPMENT AND/OR SYSTEMS NOTED ON THE DRAWINGS "TO REMAIN' SHALL BE INSPECTED AND TESTED ON SITE TO CERTIFY WORKING CONDITION. A WRITTEN REPORT ON THE CONDITION OF ALL EQUIPMENT TO REMAIN, INCLUDING A COPY OF THE TEST RESULTS AND RECOMMENDED REMEDIAL ACTIONS AND COSTS SHALL BE MADE BY THIS CONTRACTOR TO THE ARCHITECT/ENGINEER FOR REVIEW.
2. ALL EQUIPMENT AND/OR SYSTEMS NOTED ON THE DRAWINGS "TO BE REMOVED" SHALL BE REMOVED INCLUDING ASSOCIATED SYSTEM CONNECTIONS. WHERE DUCT OR PIPE IS TO BE CAPPED FOR FUTURE EXTENSION OR END OF LINE USE, IT SHALL BE PROPERLY TAGGED WITH ITS FUNCTION OR SERVICE APPROPRIATELY IDENTIFIED. WHERE EXISTING EQUIPMENT IS TO BE REMOVED OR RELOCATED AND HAS AN ELECTRIC CONNECTION, THE ELECTRICAL CONTRACTOR SHALL DISCONNECT EQUIPMENT AND REMOVE WIRING BACK TO PANEL OR DISCONNECT SWITCH. CONTRACTOR SHALL REMOVE OR RELOCATE EQUIPMENT AND ASSOCIATED DISCONNECT.
3. CERTAIN WORK DURING THE DEMOLITION AND CONSTRUCTION PHASES OF CONSTRUCTION MAY REQUIRE TEMPORARY EVACUATION OF THE OCCUPANTS. COORDINATE AND SCHEDULE ALL PROPOSED EVACUATION WITH THE PROJECT ADMINISTRATOR AT LEAST SEVENTY-TWO (72) HOURS IN ADVANCE IN WRITING.
4. ANY SALVAGEABLE EQUIPMENT AS DETERMINED BY THE OWNER, SHALL BE DELIVERED TO THE OWNER, AND PLACED IN STORAGE AT THE LOCATION OF HIS CHOICE. ALL OTHER DEBRIS SHALL BE REMOVED FROM THE SITE IMMEDIATELY.
5. INCLUDE IN THE CONTRACT PRICE ALL REROUTING OF EXISTING PIPE, DUCT, ETC., AND THE RECONNECTING OF THE EXISTING EQUIPMENT AND PLUMBING FIXTURES AS NECESSITATED BY FIELD CONDITIONS TO ALLOW THE INSTALLATION OF THE NEW SYSTEMS REGARDLESS OF WHETHER OR NOT SUCH REROUTING, RECONNECTING OR RELOCATING IS SHOWN ON THE DRAWINGS. FURNISH ALL TEMPORARY PIPE, DUCT, CONTROLS, ETC., AS REQUIRED TO MAINTAIN HEATING, COOLING, VENTILATION AND PLUMBING SERVICES FOR THE EXISTING AREAS.
6. NO PORTION OF THE FIRE PROTECTION SYSTEMS SHALL BE TURNED OFF, MODIFIED OR CHANGED IN ANY WAY WITHOUT THE EXPRESS KNOWLEDGE AND WRITTEN PERMISSION OF THE OWNER'S REPRESENTATIVE IN ORDER TO PROTECT SYSTEMS THAT SHALL REMAIN IN SERVICE.

1.6 DELIVERY, STORAGE, AND HANDLING

A. PROVIDE TEMPORARY END CAPS AND CLOSURES ON PIPING AND FITTINGS. MAINTAIN IN PLACE UNTIL INSTALLATION.

B. PROTECT PIPING SYSTEMS FROM ENTRY OF FOREIGN MATERIALS BY TEMPORARY COVERS, COMPLETING SECTIONS OF THE WORK, AND ISOLATING PARTS OF COMPLETED SYSTEM

PART 2 – PRODUCTS

1.7 GENERAL ELECTRICAL REQUIREMENTS

A. PROVIDE ELECTRIC MOTORS, CONTROL PANELS, CERTAIN CONTROL AND SAFETY DEVICES AND CONTROL WIRING WHEN SPECIFIED OR REQUIRED FOR PROPER OPERATION OF ELECTRICAL SYSTEMS ASSOCIATED WITH MECHANICAL EQUIPMENT SPECIFIED IN DIVISION 23.

B. ELECTRICAL MATERIALS AND WORK PROVIDED SHALL BE IN ACCORDANCE WITH DIVISION 26.

2.1 GENERAL REQUIREMENTS

A. ALL EQUIPMENT, MATERIALS, ACCESSORIES, ETC. USED SHALL BE NEW AND OF CURRENT PRODUCTION UNLESS SPECIFIED OTHERWISE. EQUIPMENT NOT SPECIFIED IN THE CONTRACT DOCUMENTS SHALL BE SUITABLE FOR THE INTENDED USE AND SHALL BE SUBJECT TO APPROVAL BY THE ENGINEER.

B. ALL EQUIPMENT, PRODUCTS AND MATERIALS SHALL BE FREE OF DEFECTS AND SHALL BE CONSTRUCTED TO OPERATE IN A SAFE MANNER WITHOUT EXCESSIVE NOISE, VIBRATION, LEAKAGE, OR WEAR.

C. ALL EQUIPMENT SHALL BEAR THE INSPECTION LABEL OF UNDERWRITERS LABORATORIES INC.

D. CAST IRON SOIL PIPE AND FITTINGS SHALL BEAR THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE.

E. ACCESS PANELS:
GROUP VALVES TOGETHER ABOVE SUSPENDED CEILINGS, WALLS, FURRED SPACES TO
1. MINIMIZE THE NUMBER OF ACCESS PANELS, BUT WITH ALL VALVES FREELY ACCESSIBLE FOR MAINTENANCE. LOCATE ALL VALVES WITHIN 1'-0" OF ACCESS POINT.
2. FURNISH ACCESS PANELS OF PROPER SIZE TO SERVICE CONCEALED VALVES AND CLEANOUTS. PANELS SHALL BE OF THE PROPER TYPE FOR MATERIAL IN WHICH THEY OCCUR AND ARE TO BE FURNISHED BY THE CONTRACTOR, BUT INSTALLED BY THE PARTICULAR TRADE FOR THE MATERIAL WITHIN WHICH THE ACCESS PANEL IS INSTALLED.
3. PANELS SHALL HAVE FLUSH DOORS WITH NO.14 USCG STEEL DOOR AND TRIM NO. 16 USCG STEEL FRAME, METAL WINGS FOR KEYING INTO CONSTRUCTION, CONCEALED HINGES, AND SCREWDRIVER OPERATED STAINLESS STEEL CAM LOCK. PANELS SHALL BE SHOP COATED WITH ONE COAT OF ZINC CHROMATE PRIMER. VALVES ABOVE REMOVABLE CEILINGS SHALL HAVE TILE CLIPS BY THE CONTRACTOR FOR IDENTIFICATION.
4. ACCESS PANELS ARE NOT ALLOWED IN GYPSUM CEILINGS IN PUBLIC SPACES.

G. GALVANIC PROTECTION
1. INSULATE JOINTS BETWEEN DISSIMILAR METALS WITH SUITABLE ISOLATION GASKET AND BOLTS WITH FIBER FERRULES AND WASHERS AND/OR SUITABLE ARMORED INSULATION FITTINGS BY CLEARFLOW, CRANE, CAPITAL, OR EPCO, SO THERE WILL BE NO CONTACT BETWEEN THE METALS OR WITH INSULATING BUSHINGS.

H. FLOOR, WALL, & CEILING PLATES
1. FURNISH AND INSTALL HEAVY GAUGE CHROMIUM PLATED STEEL WALL AND CEILING PLATES ON ALL EXPOSED PIPES IN FINISHED AREAS WHERE THEY PASS THROUGH WALLS, CEILINGS, ETC. PLATES SHALL BE OF TYPE THAT WILL REMAIN PERMANENTLY IN POSITION AND WHERE PIPES ARE INSULATED THEY SHALL BE OF SIZE NECESSARY TO COVER INSULATED PIPE.

I. SYSTEMS IDENTIFICATION
1. A MARKER SHOWING THE SERVICE AND AN ARROW INDICATING THE DIRECTION OF FLOW SHALL BE APPLIED ON ALL OF THE FOLLOWING PIPING SYSTEMS APPLICABLE TO THE PROJECT INSTALLED UNDER THIS SECTION OF THE SPECIFICATIONS:
a. GAS PIPING
2. PIPING IDENTIFICATION SHALL BE APPLIED ON ALL PIPING SYSTEMS IN AREAS OF EXPOSED CONSTRUCTION AND IN AREAS WITH ACCESSIBLE OR LAY-IN CEILINGS. THE PIPING SHALL BE LABELED AT EACH WALL AND FLOOR PENETRATION (BOTH SIDES), AND AT CONNECTIONS TO EQUIPMENT. IN ADDITION, STRAIGHT RUNS OF PIPING SHALL BE LABELED AT INTERVALS NOT GREATER THAN 25 FEET.
3. THE LETTER SIZE AND BACKGROUND COLOR SHALL CONFORM TO THE IDENTIFICATION OF PIPE SYSTEM ANSI A-13-1. THE VINYL PLASTIC MARKERS SHALL BE AS MANUFACTURED BY SETON NAME-PLATE COMPANY, W. H. BRADY COMPANY, OR WESTLINE PRODUCTS.
4. EACH VALVE IN THE PLUMBING AND FIRE PROTECTION SYSTEMS IS TO BE PROVIDED WITH AN INDIVIDUALLY NUMBERED VALVE TAG (STAMPED NUMBERED TAGS). PROVIDE IDENTIFICATION TAGS ON ALL EMERGENCY FIXTURE AND UNIT OR SHUT OFF VALVES.
5. VALVE TAGS ARE TO BE BRASS OR PLASTIC LAMINATE, 1-1/2" MINIMUM DIAMETER WITH BRASS CHAIN AND HOOK FOR SECURING TO THE VALVE.
6. ALL EQUIPMENT SHALL BE LABELED. THIS SHALL INCLUDE ALL PUMPS, WATER HEATERS, STORAGE TANKS, AND OTHER SIMILAR EQUIPMENT.
7. EQUIPMENT LABELING SHALL BE ONE OF THE FOLLOWING, UNLESS NOTED OR SPECIFIED OTHERWISE.
a. PERMANENTLY ATTACHED PLASTIC LAMINATE SIGNS WITH 1" HIGH LETTERING.
b. STENCIL PAINTED IDENTIFICATION, 2" HIGH LETTERS, WITH STANDARD FIBERBOARD STENCILS AND STANDARD BLACK (OR OTHER APPROPRIATE COLOR) EXTERIOR STENCIL ENAMEL.

2.2 PIPE HANGERS AND SUPPORTS

A. MANUFACTURERS:
1. UNISTRUT CORP.

B. PIPE SUPPORTS:
1. CONFORM TO MSS SP58.
2. HANGERS FOR PIPE SIZES 1/2 TO 1-1/2 INCH: CARBON STEEL, ADJUSTABLE SWIVEL, SPLIT RING.
3. HANGERS FOR PIPE SIZES TWO (2) INCHES AND LARGER: CARBON STEEL, ADJUSTABLE, CLEVIS.
4. MULTIPLE OR TRAPEZE HANGERS: STEEL CHANNELS WITH WELDED SPACERS AND HANGER RODS.
5. WALL SUPPORT FOR PIPE SIZES THREE (3) INCHES AND SMALLER: CAST IRON HOOK.
6. WALL SUPPORT FOR PIPE SIZES FOUR (4) INCHES AND LARGER: WELDED STEEL BRACKET AND WROUGHT STEEL CLAMP.
7. VERTICAL SUPPORT: STEEL RISER CLAMP.
8. FLOOR SUPPORT: CAST IRON ADJUSTABLE PIPE SADDLE, LOCK NUT, NIPPLE, FLOOR FLANGE, AND CONCRETE PIER OR STEEL SUPPORT.
9. COPPER PIPE SUPPORT: COPPER-PLATED, CARBON-STEEL ADJUSTABLE, RING.
10. PEX TUBE SUPPORT: CTS SIZED HANGERS OR SUPPORTS FREE OF SHARP EDGES.

C. ACCESSORIES
1. HANGER RODS: MILD STEEL THREADED BOTH ENDS, THREADED ON ONE END, OR CONTINUOUS THREADED.

D. INSERT

1. INSERTS: MALLEABLE IRON CASE OF STEEL SHELL AND EXPANDER PLUG FOR THREADED CONNECTION WITH LATERAL ADJUSTMENT, TOP SLOT FOR REINFORCING RODS, LUGS FOR ATTACHING TO FORMS; SIZE INSERTS TO SUIT THREADED HANGER RODS.

E. SLEEVES
1. SLEEVES FOR PIPES THROUGH NON-FIRE RATED FLOORS AND WALLS: 18 GAGE THICK GALVANIZED STEEL.
2. PROVIDE CHROME PLATED ESCUTCHEON PLATES ON PIPES PASSING THROUGH WALLS, FLOORS, AND CEILINGS EXPOSED TO VIEW. PROVIDE STAINLESS STEEL SHEET METAL FOR EXTERIOR WALLS.
3. SEALANT: ACRYLIC
4. FIRE STOPPING: DIFFERENT TYPES OF PRODUCTS BY MULTIPLE MANUFACTURERS ARE ACCEPTABLE AS REQUIRED TO MEET SPECIFIED SYSTEM DESCRIPTION AND PERFORMANCE REQUIREMENTS; PROVIDE ONLY ONE TYPE FOR EACH SIMILAR APPLICATION.
a. SILICONE FIRESTOPPING ELASTOMERIC FIRESTOPPING: MULTIPLE COMPONENT SILICONE ELASTOMERIC COMPOUND AND COMPATIBLE SILICONE SEALANT.
b. FORMULATED FIRESTOPPING COMPOUND OF INCOMBUSTIBLE FIBERS: FORMULATED COMPOUND MIXED WITH INCOMBUSTIBLE NON-ASBESTOS FIBERS.
c. FIBER STUFFING AND SEALANT FIRESTOPPING: COMPOSITE OF MINERAL FIBER STUFFING INSULATION WITH SILICONE ELASTOMER FOR SMOKE STOPPING.
d. MECHANICAL FIRESTOPPING DEVICE WITH FILLERS: MECHANICAL DEVICE WITH INCOMBUSTIBLE FILLERS AND SILICONE ELASTOMER, COVERED WITH SHEET STAINLESS STEEL JACKET, JOINED WITH COLLARS, PENETRATION SEALED WITH FLANGED STOPS.
e. INTUMESCENT FIRESTOPPING: INTUMESCENT PUTTY COMPOUND WHICH EXPANDS ON EXPOSURE TO SURFACE HEAT GAIN.

F. VALVES:
1. GENERAL
a. VALVES SHALL BE LOCATED TO PERMIT EASY OPERATION, REPLACEMENT AND REPAIR. THEY SHALL BE INSTALLED WHERE SHOWN ON THE DRAWINGS, OR AS HEREIN SPECIFIED.

3. SHUT-OFF VALVES:
a. MANUFACTURERS: NIBCO INC., OR APPROVED EQUAL.
b. LINE SHUT-OFF VALVES 2-1/2" AND LARGER WHERE SYSTEM OPERATING PRESSURE WILL NOT EXCEED 160 P.S.I.G. SHALL BE 200 WOG THREADED LUG TYPE DUCTILE IRON BODY BUTTERFLY VALVE WITH EXTENDED NECK, LOCKABLE LEVER HANDLE, 416 STAINLESS STEEL STEM, ALUMINUM BRONZE DISC, EPDM LINER AND SEAL, SUITABLE FOR BI-DIRECTIONAL FLOW AND DEAD END SERVICE WITH DOWNSTREAM FLANGE REMOVED. ACCEPTABLE VALVES ARE NIBCO MODEL LD-2000, OR APPROVED EQUIVALENT MODEL BY KEYSTONE, JAMESBURY, MILWAUKEE, CRANE OR APOLLO.
c. PROVIDE STEM EXTENSIONS OF A NON-THERMAL CONDUCTING MATERIAL FOR VALVES IN INSULATED LINES TO ALLOW UNOBSTRUCTED OPERATION.

2.5 PLUMBING FIXTURES AND EQUIPMENT

A. PROVIDE AS SPECIFIED.

B. COMPLY WITH MANUFACTURERS AND CODES REQUIREMENTS.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. ALL EQUIPMENT AND MATERIALS SHALL BE COMPLETELY INSTALLED, ADJUSTED, AND FULLY OPERATIONAL WITH ALL ACCESSORIES AND CONNECTIONS.

B. THE ENGINEER RESERVES THE RIGHT TO DIRECT THE REMOVAL OF ANY ITEM WHICH, IN HIS OPINION, DOES NOT PRESENT AN ORDERLY AND REASONABLY NEAT OR WORKMANLIKE APPEARANCE. SUCH REMOVAL AND REPLACEMENT SHALL BE DONE WHEN DIRECTED BY THE ENGINEER AND WITHOUT ADDITIONAL COST TO THE OWNER.

C. MOUNTING HEIGHTS, UNLESS OTHERWISE NOTED, ARE TO THE FINISHED BOTTOM OF THE DEVICE.

3.2 DEMOLITION AND EXTENSION OF EXISTING MECHANICAL WORK

A. DISCONNECT MECHANICAL, PLUMBING AND FIRE PROTECTION SYSTEMS IN WALLS, FLOORS, AND CEILINGS SCHEDULED FOR REMOVAL.

B. PROVIDE ALL REQUIRED CONNECTIONS TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING CONSTRUCTION.

C. REMOVED EQUIPMENT:
1. STORE REMOVED ITEMS AT SITE; OWNER RETAINS RIGHTS TO ALL REMOVED ITEMS.
2. ALLOW OWNER AMPLE TIME TO REVIEW REMOVED ITEMS AND TO DESIGNATE WHICH ITEMS TO BE KEPT BY OWNER.
3. DISPOSE PROPERLY, OFF-SITE, ALL ITEMS OWNER CHOOSES NOT TO KEEP.

D. ALL ITEMS WHICH ARE TO BE RELOCATED SHALL BE CAREFULLY REMOVED IN REVERSE TO ORIGINAL ASSEMBLY OR PLACEMENT AND PROTECTED UNTIL RELOCATED. THE CONTRACTOR SHALL CLEAN AND REPAIR AND PROVIDE ALL NEW MATERIALS, FITTINGS, AND APPURTENANCES REQUIRED TO COMPLETE THE RELOCATIONS AND TO RESTORE TO GOOD OPERATIVE ORDER. ALL RELOCATIONS SHALL BE PERFORMED BY WORKMEN SKILLED IN THE WORK AND IN ACCORDANCE WITH STANDARD PRACTICE OF THE TRADES INVOLVES.

E. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOSS OR DAMAGE TO THE EXISTING FACILITIES AND SHALL BE RESPONSIBLE FOR REPAIRING SUCH LOSS OR DAMAGE. THE CONTRACTOR SHALL SEND PROPER NOTICES, MAKE NECESSARY ARRANGEMENTS, AND PERFORM OTHER SERVICES REQUIRED FOR THE CARE, PROTECTION AND OPERATIONAL MAINTENANCE OF ALL ELECTRICAL SERVICES FOR THE NEW AND EXISTING FACILITIES, THE CONTRACTOR SHALL ERECT TEMPORARY BARRICADES, WITH NECESSARY SAFETY DEVICES, AS REQUIRED TO PROTECT PERSONNEL FROM INJURY, REMOVING ALL SUCH TEMPORARY PROTECTION UPON COMPLETION OF THE WORK.

F. WHERE PARTITIONS, WALLS, FLOORS, OR CEILINGS OF EXISTING CONSTRUCTION ARE BEING REMOVED, ALL CONTRACTORS SHALL REMOVE AND REINSTALL IN LOCATIONS APPROVED BY THE ARCHITECT ALL DEVICES REQUIRED FOR THE OPERATION OF THE VARIOUS SYSTEMS INSTALLED IN THE EXISTING CONSTRUCTION.

3.3 CLEANING

A. AT ALL TIMES, THE PREMISES SHALL BE KEPT REASONABLY CLEAN AND FREE OF UNDUE AMOUNTS OF WASTE, TRASH AND DEBRIS BY PERIODIC CLEANING AND REMOVAL. AFTER COMPLETION, ALL FOREIGN MATERIAL, TRASH AND OTHER DEBRIS SHALL BE REMOVED FROM THE JOB SITE.

B. AFTER ALL EQUIPMENT HAS BEEN INSTALLED, BUT PRIOR TO TESTING AND BALANCING, ALL EQUIPMENT, PIPING, ETC. SHALL BE THOROUGHLY CLEANED BOTH INSIDE AND OUT.

C. AFTER TESTING AND BALANCING OF SYSTEMS AS SPECIFIED AND JUST PRIOR TO OWNER REVIEW AND ACCEPTANCE, ALL SYSTEMS SHALL BE FINALLY CLEANED AND SHALL BE LEFT READY FOR USE.

3.4 TESTING OF PIPING SYSTEMS

A. GENERAL
1. ALL PIPING SYSTEMS SHALL BE SUBJECTED, BEFORE BEING INSULATED OR CONCEALED, TO TESTING WITH WATER OR AIR AS NOTED AND SHALL HOLD TIGHT AT THE PRESSURE HEAD STATED FOR THE TIME INTERVAL REQUIRED WITHOUT ADDING AIR OR WATER. WHILE ANY SYSTEM IS BEING TESTED REQUIRED HEAD OR PRESSURE SHALL BE MAINTAINED UNTIL ALL JOINTS ARE INSPECTED.
2. ALL TESTS SHALL BE WITNESSED BY THE INSPECTOR HAVING JURISDICTION AND THE OWNER'S REPRESENTATIVE, WITH A MINIMUM 48-HOUR NOTICE GIVEN THESE AUTHORITIES.
3. ALL EQUIPMENT, MATERIAL, LABOR AND TESTING MEDIUMS REQUIRED FOR TESTING ANY OF THE VARIOUS SYSTEMS OR ANY PART THEREOF SHALL BE FURNISHED BY THE CONTRACTOR.
4. ALL CONNECTED EQUIPMENT, ACCESSORIES, ETC. SHALL BE ISOLATED FROM PIPING SYSTEMS PRIOR TO TESTING.

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Architect

CLIENT
NMUSD
PROJECT NUMBER
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DATE 02/08/2021

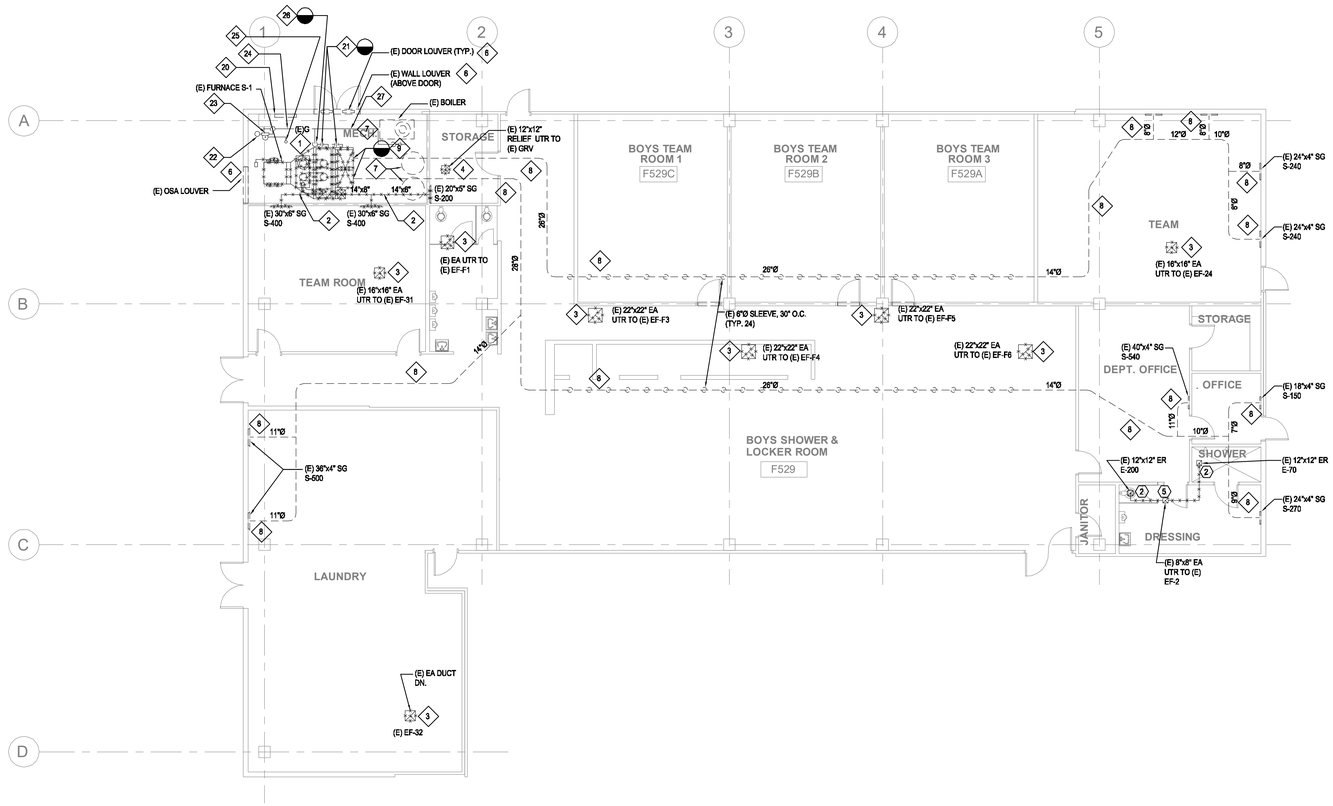
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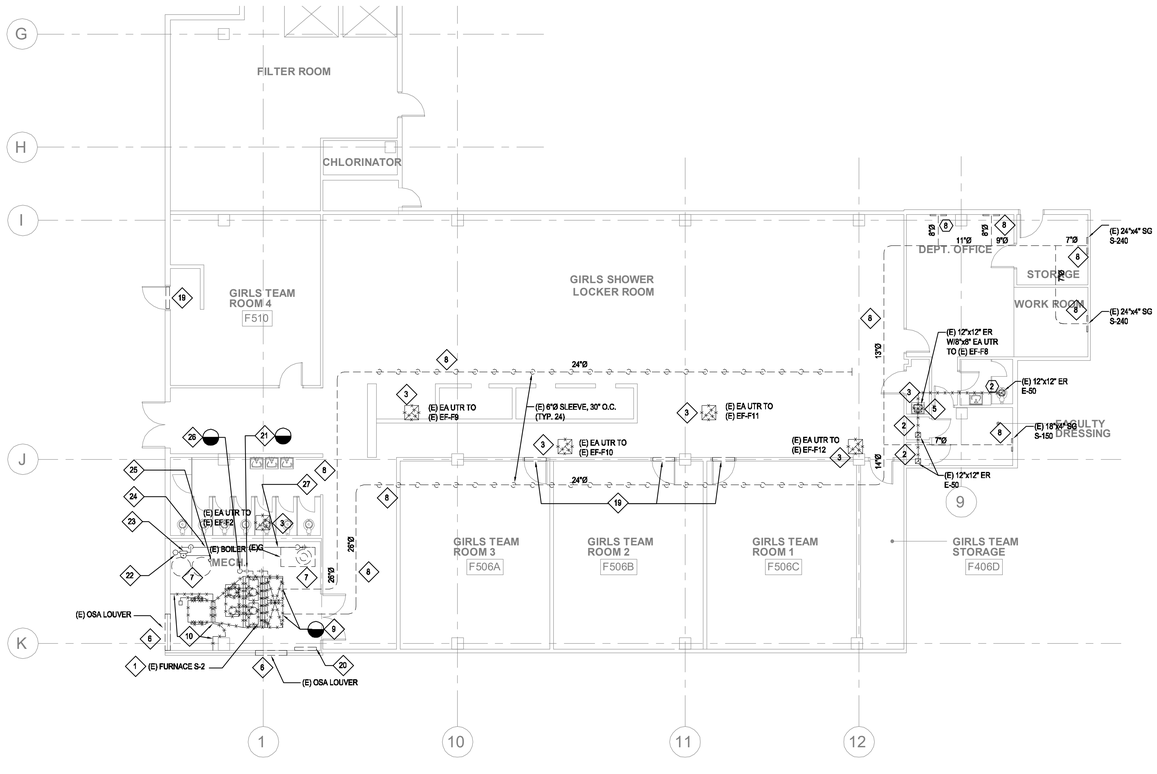
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PLUMBING SPECIFICATIONS

MP0.05



2 BOYS LOCKER ROOM - DEMOLITION
1/8" = 1'-0"



1 GIRLS LOCKER ROOM - DEMOLITION
1/8" = 1'-0"

GENERAL NOTES

1. CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND SIZES OF ALL EXISTING EQUIPMENT, DUCTWORK, ACCESSORIES, ETC. BEFORE COMMENCING WORK.

DEMOLITION KEY NOTES

1. (E) FURNACE TO BE DEMOLISHED WITH ALL ASSOCIATED MOTOR, DUCTWORK, DAMPER, CONDUIT/WIRING, ETC.
2. (E) SUSPENDED DUCTWORK TO BE DEMOLISHED WITH ALL ASSOCIATED DAMPERS, GRILLES/REGISTERS, ETC.
3. (E) EXHAUST AIR DUCT UTR TO (E) EXHAUST FAN, AND REGISTER, TO BE DEMOLISHED.
4. (E) RELIEF AIR DUCT UTR TO (E) GRAVITY VENT, AND REGISTER, TO BE DEMOLISHED.
5. (E) EXHAUST AIR DUCT UTR TO (E) EXHAUST FAN TO BE DEMOLISHED.
6. (E) LOUVER TO REMAIN. REPAIR AND PAINT ALL SURFACES FOR PROPER OPERATION.
7. (E) BOILER AND HOT WATER TANK TO REMAIN WITH ALL ASSOCIATED FLUE, PIPES, ACCESSORIES, ETC.
8. (E) UNDERGROUND DUCTWORK TO REMAIN WITH ALL ASSOCIATED GRILLES, REGISTERS, ETC.
9. DISCONNECT (E) DUCTWORK AT POINT OF DISCONNECT, A.F.F., AS SHOWN AND PREPARE SURFACES FOR NEW DUCTWORK INSTALLATION. SEE NEW MECHANICAL KEY NOTES ON SHEET MP2.01.
10. (E) WALL PARTITION/ENCLOSURE TO BE REMOVED WITH ALL DOORS, ACCESSORIES, ETC.
19. (E) WALL WALL TO REMAIN.
20. (E) CONTROL PANEL TO REMAIN.

PLUMBING DEMOLITION KEY NOTES

21. REMOVE (2) 1" GAS SUPPLY LINES TO FURNACES CAP 2" GAS LINE AT BRANCH OFF
22. (E) MEDIUM PRESSURE GAS DOWN FROM ROOF
23. (E) GAS REGULATOR TO REMAIN
24. (E) 3" GAS HEADER TO REMAIN
25. (E) GAS REGULATOR VENT UP THROUGH ROOF TO REMAIN
26. (E) 2" GAS DOWN TO FURNACES
27. (E) 2" GAS TO BOILER TO REMAIN

PLUMBING GENERAL NOTES

1. FOR CONTINUATION OF ALL UTILITIES SEE BUILDING AS-BUILT/RECORD SET DRAWINGS.
2. BEFORE COMMENCEMENT OF WORK, THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS, ELEVATIONS AND CHARACTERISTICS OF ALL UTILITIES AND PIPING BY PHYSICAL EXCAVATION, AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT OF ANY DISCREPANCIES.
3. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES AND POINTS OF CONNECTION PRIOR TO BIDDING PROJECT.
4. WHERE PLANS INDICATE NEW FIXTURES OR EQUIPMENT CONNECTING TO EXISTING SERVICES, PLUMBING CONTRACTOR SHALL MODIFY AND/OR EXTEND EXISTING PIPING OR ROUGH-INS AS REQUIRED TO SUIT THE NEW FIXTURE.
5. THE PLUMBING CONTRACTOR SHALL RUN ALL SERVICE LINES, ROUGH-IN AND MAKE FINAL CONNECTIONS TO ALL FIXTURES AND EQUIPMENT. PLUMBING CONTRACTOR SHALL FURNISH AND INSTALL ALL TRIMS AS REQUIRED.

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KEY PLAN
PLAN NORTH
TRUE NORTH

Engineer

Architect

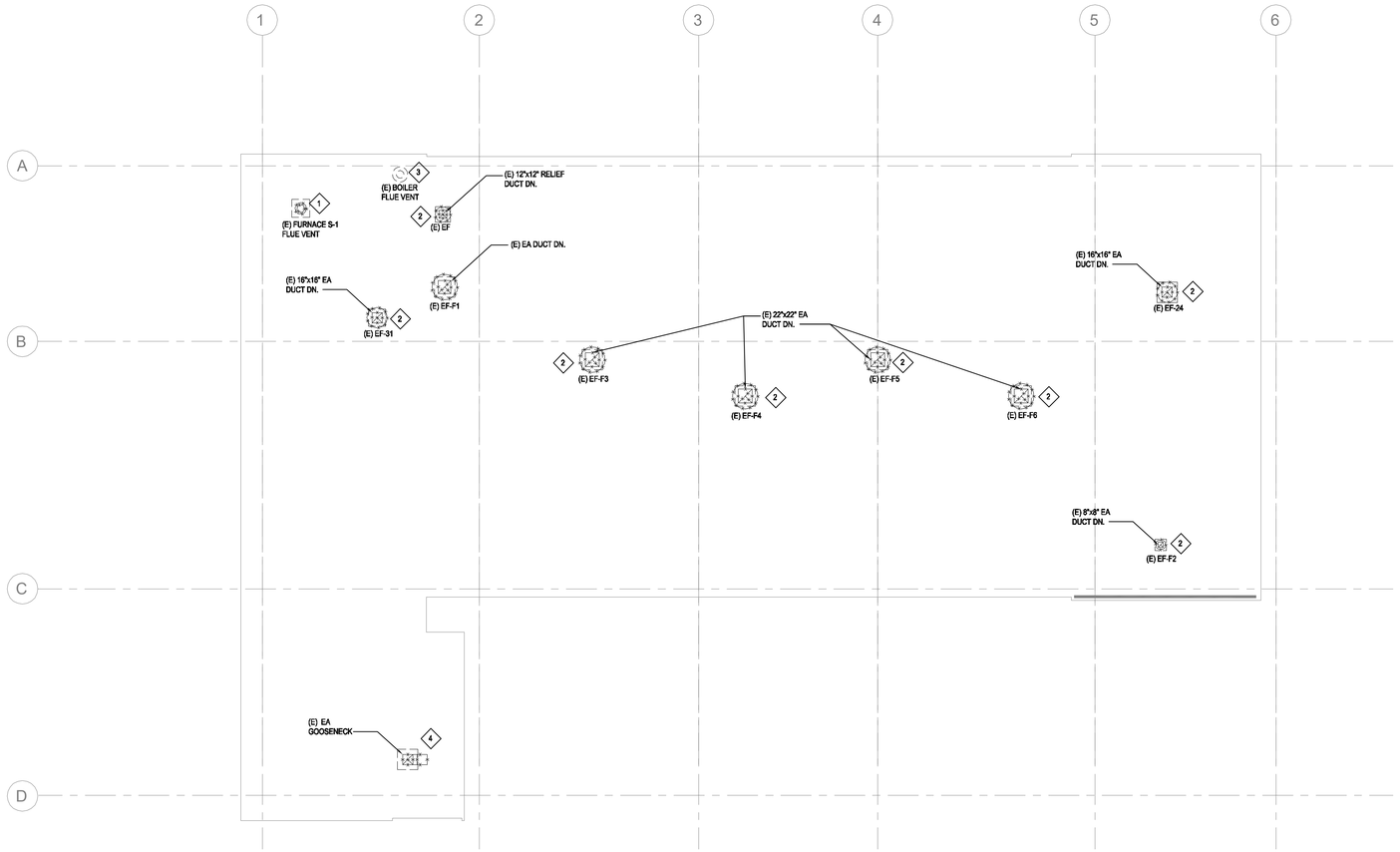
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PROJECT NUMBER
P2101400ME
DATE 02/08/2021
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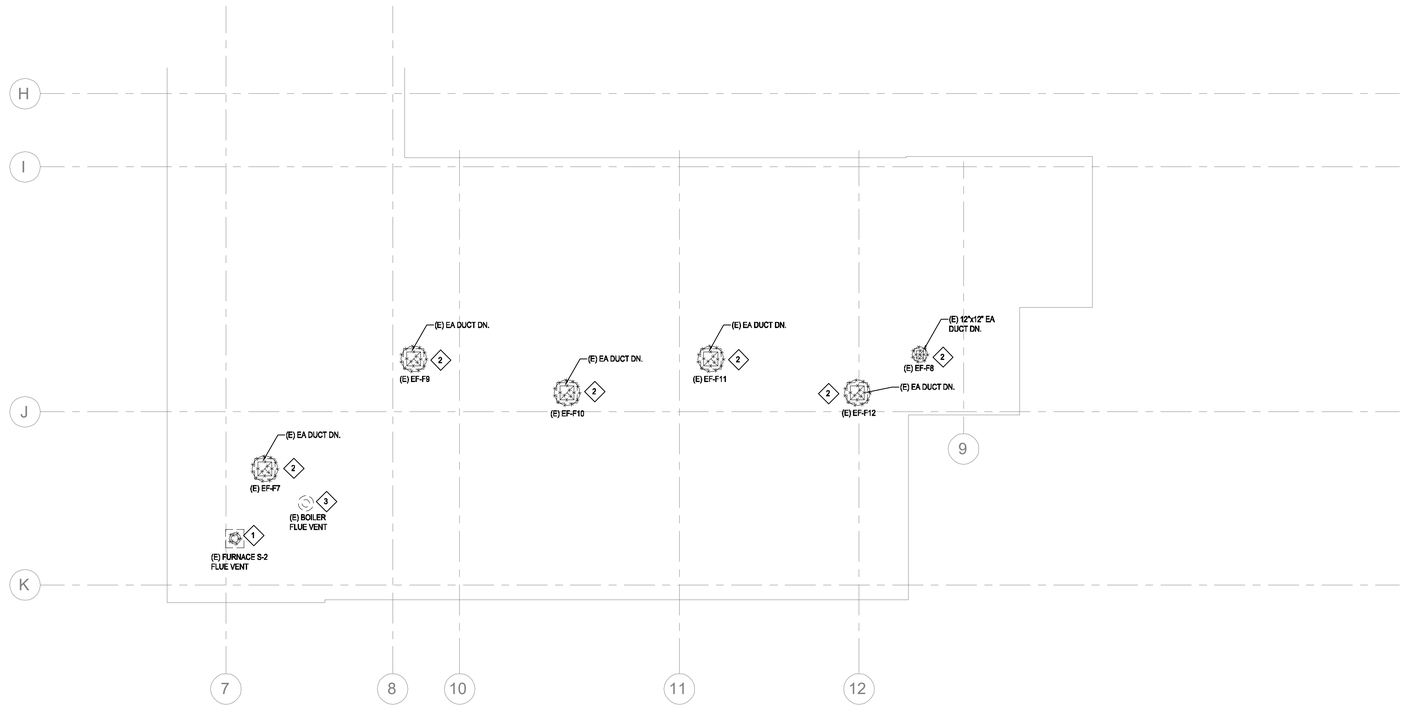
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MECHANICAL PLUMBING FLOOR PLANS DEMOLITION

MP2.01D



2 ROOF -BOYS LOCKER - DEMOLITION
1/8" = 1'-0"



1 ROOF -GIRLS LOCKER - DEMOLITION
1/8" = 1'-0"

GENERAL NOTES

1. CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND SIZES OF ALL EXISTING EQUIPMENT, DUCTWORK, ACCESSORIES, ETC. BEFORE COMMENCING WORK.

DEMOLITION KEY NOTES

1. (E) FURNACE FLUE VENT TO BE DEMOLISHED WITH ALL ASSOCIATED ACCESSORIES. (E) ROOF CURB TO REMAIN, PREPARE SURFACE FOR (N) FLUE VENT INSTALLATION.
2. (E) ROOF MOUNTED EXHAUST FAN TO BE DEMOLISHED WITH ALL ASSOCIATED DUCTS, DAMPERS, CONDUIT/WIRING, ETC. (E) ROOF CURB TO REMAIN, PREPARE SURFACE FOR (N) EXHAUST FAN INSTALLATION.
3. (E) BOILER'S FLUE VENT TO REMAIN.
4. (E) RELIEF DUCT GOOSENECK TO BE DEMOLISHED. ROOF CURB TO REMAIN, PREPARE SURFACE FOR (N) EXHAUST FAN INSTALLATION.

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KEY PLAN

PLAN NORTH

TRUE NORTH

Engineer

REGISTERED PROFESSIONAL ENGINEER
STATE OF CALIFORNIA

Architect

CLIENT
NMUSD

PROJECT NUMBER
P2101400ME

DATE 02/08/2021

REVISIONS

#	DESCRIPTION	DATE

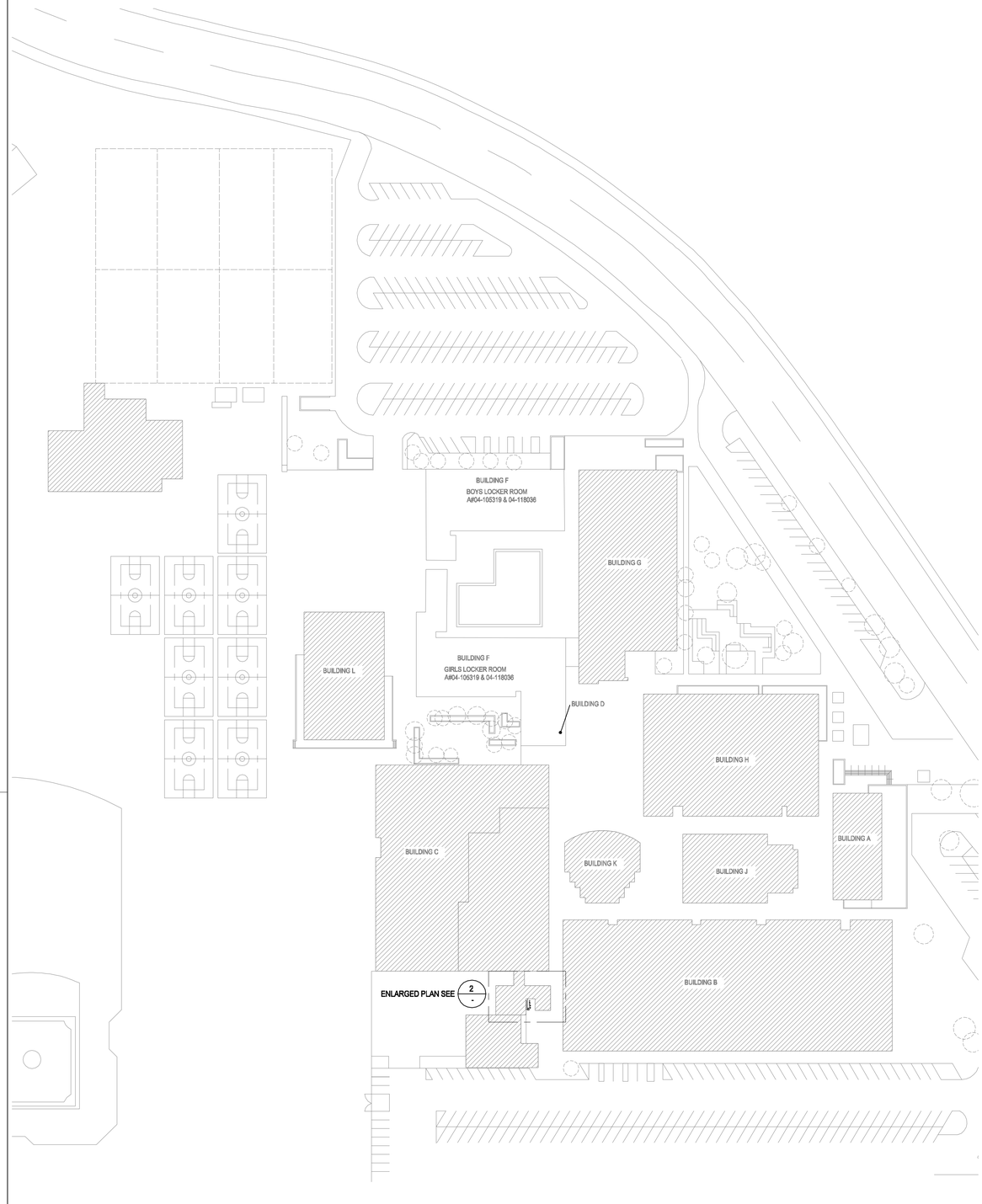
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MECHANICAL PLUMBING ROOF PLANS DEMOLITION

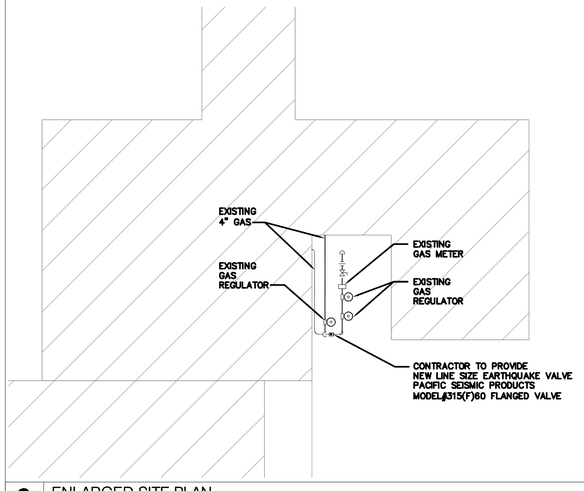
MP3.01D

PLUMBING GENERAL NOTES

1. FOR CONTINUATION OF ALL UTILITIES SEE BUILDING AS-BUILT/RECORD SET DRAWINGS.
2. BEFORE COMMENCEMENT OF WORK, THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS, ELEVATIONS AND CHARACTERISTICS OF ALL UTILITIES AND PIPING BY PHYSICAL EXCAVATION, AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT OF ANY DISCREPANCIES.
3. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES AND POINTS OF CONNECTION PRIOR TO BIDDING PROJECT.
4. WHERE PLANS INDICATE NEW FIXTURES OR EQUIPMENT CONNECTING TO EXISTING SERVICES, PLUMBING CONTRACTOR SHALL MODIFY AND/OR EXTEND EXISTING PIPING OR ROUGH-INS AS REQUIRED TO SUIT THE NEW FIXTURE.



1 SITE PLAN
1" = 60'-0"



2 ENLARGED SITE PLAN
1/8" = 1'-0"

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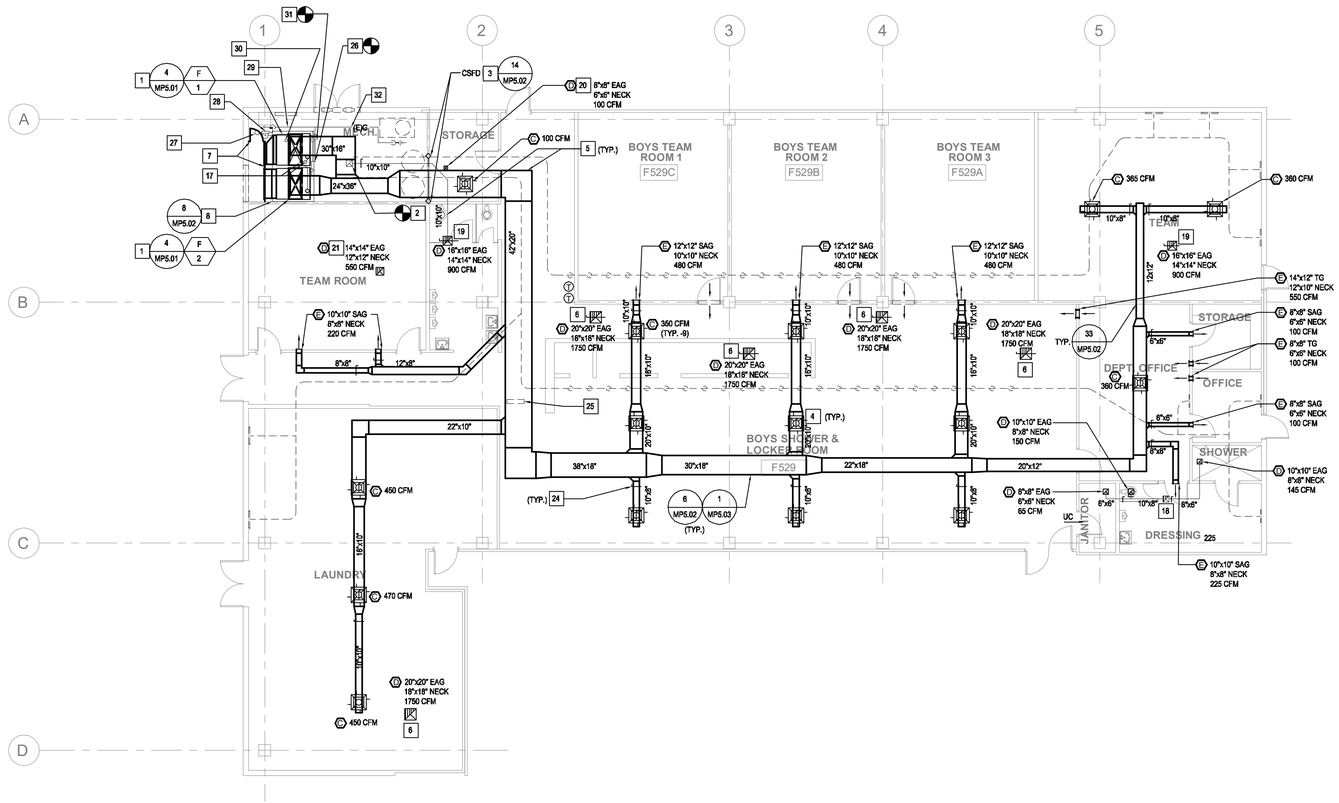
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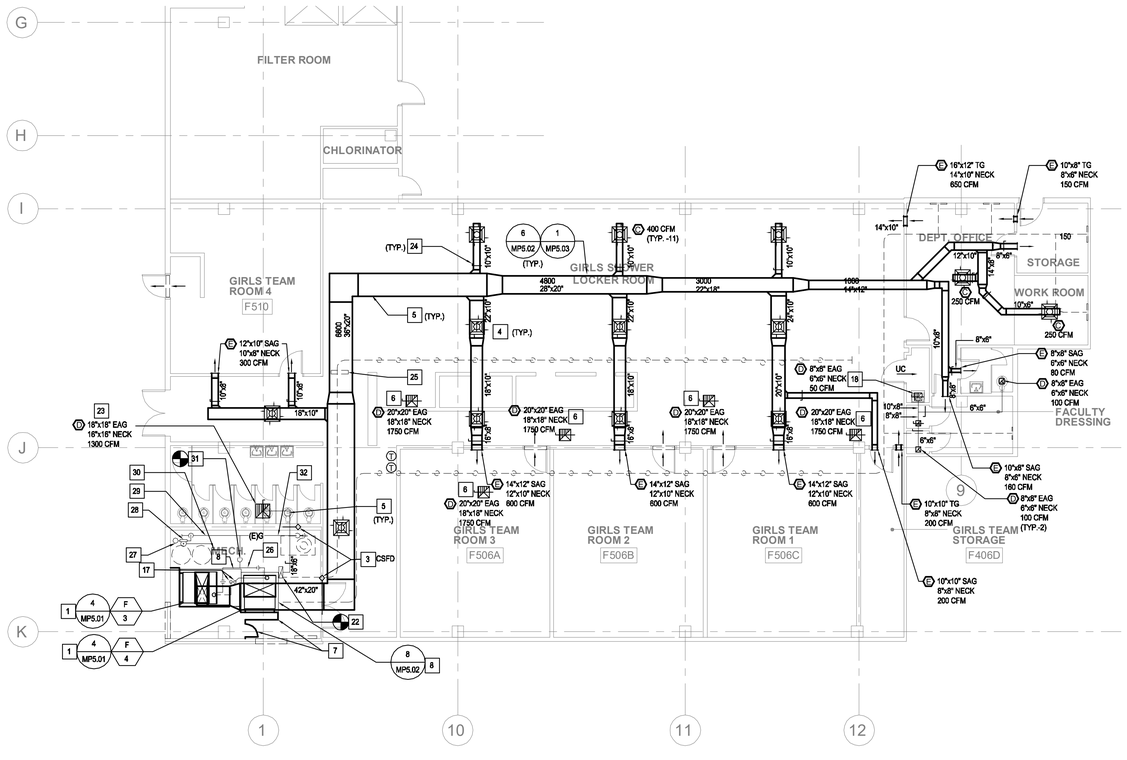
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MECHANICAL PLUMBING SITE PLAN

MP1.00



2 BOYS LOCKER ROOM
1/8" = 1'-0"



1 GIRLS LOCKER ROOM
1/8" = 1'-0"

KEY NOTES

1. (N) NEW FURNACE. (4 / MP5.01)
2. CONNECT (N) 10"x10" EXHAUST AIR DUCT TO EXISTING UNDERGROUND DUCT, AT POINT OF CONNECTION , A.F.F., AS SHOWN. BALANCE FOR 450 CFM. REPAIR, PATCH, CAP AND SEAL THE REMAINING PORTION OF EXISTING FLOOR OPENING TO MATCH EXISTING FLOOR CONDITIONS.
3. (N) COMBINATION SMOKE/FIRE DAMPER.
4. (N) SUPPLY AIR DIFFUSER.
5. (N) SUSPENDED DUCTWORK.
6. (N) 18"x18" EXHAUST AIR DUCT UTR.
7. (N) SHEET METAL OSA PLENUM. PROVIDE WITH 20"x56" ACCESS DOOR OPENING. PLENUM SHALL BE FULL HEIGHT AND AS SHOWN ON PLANS.
8. (N) 4" CONCRETE HOUSEKEEPING PAD. (8 / MP5.02)
17. PROVIDE (N) 5"Ø 26 GAUGE SHEET METAL FLUE DUCT UTR.
18. (N) 10"x10" EXHAUST AIR DUCT UTR.
19. (N) 14"x14" EXHAUST AIR DUCT UTR.
20. (N) 8"x16" EXHAUST AIR DUCT UTR.
21. (N) 12"x12" EXHAUST AIR DUCT UTR.
22. CONNECT (N) 18"x8" EXHAUST AIR DUCT TO EXISTING UNDERGROUND DUCT, AT POINT OF CONNECTION , A.F.F., AS SHOWN. BALANCE FOR 450 CFM. PATCH, CAP AND SEAL THE REMAINING PORTION OF EXISTING FLOOR OPENING TO MATCH EXISTING FLOOR CONDITIONS.
23. (N) 16"x16" EXHAUST AIR DUCT UTR.
24. (N) VOLUME/BALANCING DAMPER.
25. COORDINATE WITH ELECTRICAL CONTRACTOR TO RELOCATE EXISTING EXIT SIGN TO ALLOW FOR INSTALLATION OF NEW DUCTWORK, SEE ELECTRICAL PLANS SHEET E2.01.

PLUMBING KEY NOTES

26. PROVIDE (2) 1" GAS SUPPLY LINES (250 CFH) TO NEW FURNACES PROVIDE SHUTOFF VALVE , UNION AND DRIP LEG (2 / MP5.02)
27. (E) MEDIUM PRESSURE GAS DOWN FROM ROOF
28. (E) GAS REGULATOR
29. (E) 3" GAS HEADER
30. (E) GAS REGULATOR VENT UP THROUGH ROOF
31. (E) 2" GAS DOWN TO FURNACES CONNECT NEW 2" GAS TO EXISTING LINE EXTEND HEADER DOWN TO NEW FURNACES
32. (E) 2" GAS TO BOILER

PLUMBING GENERAL NOTES

1. FOR CONTINUATION OF ALL UTILITIES SEE BUILDING AS-BUILT/RECORD SET DRAWINGS.
2. BEFORE COMMENCEMENT OF WORK, THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS, ELEVATIONS AND CHARACTERISTICS OF ALL UTILITIES AND PIPING BY PHYSICAL EXCAVATION, AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT OF ANY DISCREPANCIES.
3. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES AND POINTS OF CONNECTION PRIOR TO BIDDING PROJECT.
4. WHERE PLANS INDICATE NEW FIXTURES OR EQUIPMENT CONNECTING TO EXISTING SERVICES, PLUMBING CONTRACTOR SHALL MODIFY AND/OR EXTEND EXISTING PIPING OR ROUGH-INS AS REQUIRED TO SUIT THE NEW FIXTURE.
5. THE PLUMBING CONTRACTOR SHALL RUN ALL SERVICE LINES, ROUGH-IN AND MAKE FINAL CONNECTIONS TO ALL FIXTURES AND EQUIPMENT. PLUMBING CONTRACTOR SHALL FURNISH AND INSTALL ALL TRIMS AS REQUIRED.

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Architect

CLIENT	NMUSD
PROJECT NUMBER	P2101400ME
DATE	02/08/2021

REVISIONS

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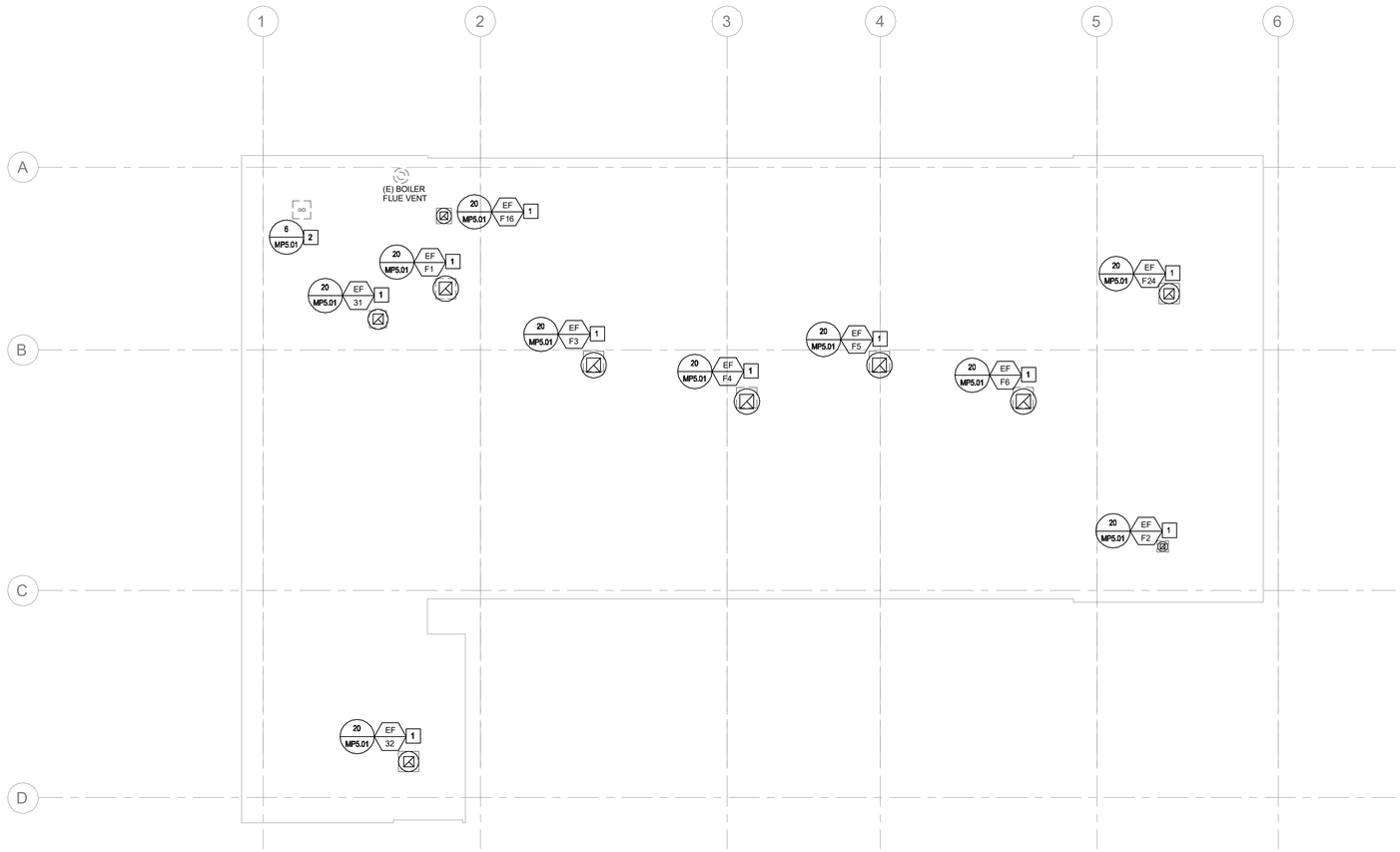
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MECHANICAL PLUMBING FLOOR PLANS

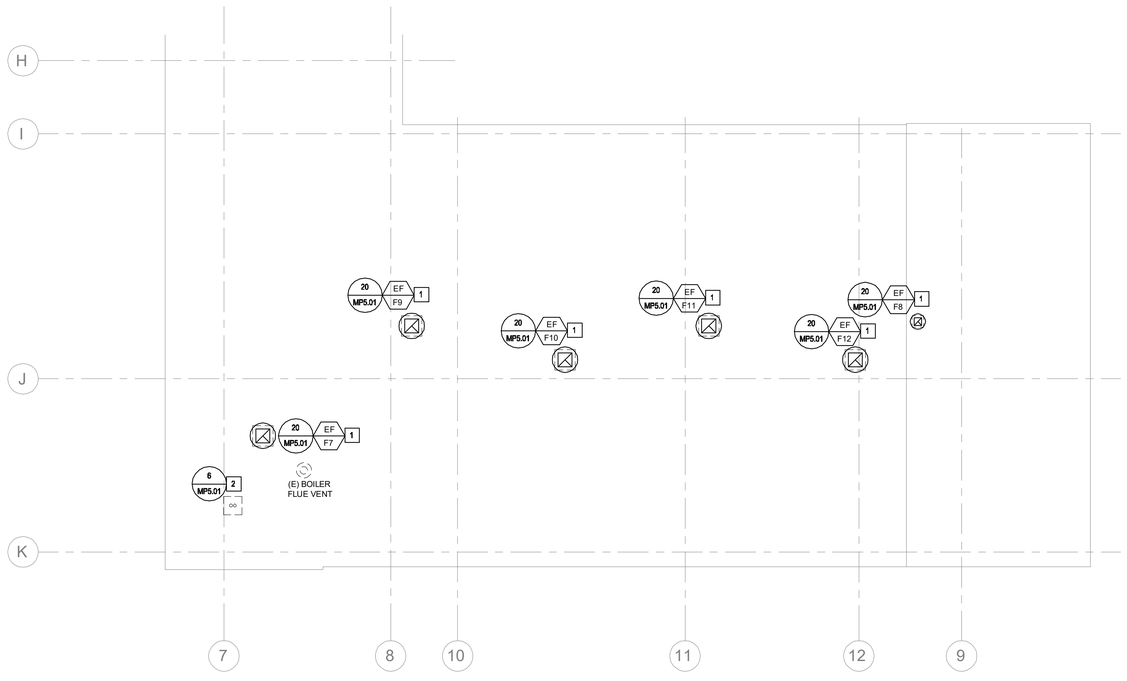
MP2.01

KEY NOTES

1. (N) EXHAUST FAN.
2. (N) 5"Ø FLUE DUCT (TYP.) WITH CAP. TERMINATE MINIMUM 3'-0" ABOVE ROOF LEVEL



2 ROOF -BOYS LOCKER
1/8" = 1'-0"



1 ROOF -GIRLS LOCKER
1/8" = 1'-0"

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KEY PLAN

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REN: 03-31-21
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MECHANICAL

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MECHANICAL PLUMBING ROOF PLANS

MP3.01

NATURAL GAS FIRED FURNACES SCHEDULE

UNIT	MANUFACTURER & MODEL NO.	LOCATION	SERVICE	FAN						HEATING COIL			ELECTRICAL				FLUE VENT CONNECTION DIAMETER (IN.)	GAS CONNECTION DIAMETER (IN.)	OPER. WT. (LBS)	REMARKS
				CFM	OSA	ESP. (IN)	HP	RPM	DRIVE	INPUT (MBH)	OUTPUT (MBH)	EFF. (%)	VOLTAGE	FLA	MCA	MOCP				
F 1	REZNOR CAUA-250	BUILDING "F" BOYS LOCKER ROOM MECHANICAL ROOM	BOYS LOCKER ROOM	4,000	4,000	1.25	3.0	3600	BELT	250.0	200.0	80	460/3Ø/60	4.4	5.5	15	5	3/4	380	-
F 2	REZNOR CAUA-250	BUILDING "F" BOYS LOCKER ROOM MECHANICAL ROOM	BOYS LOCKER ROOM	4,000	4,000	1.25	3.0	3600	BELT	250.0	200.0	80	460/3Ø/60	4.4	5.5	15	5	3/4	380	-
F 3	REZNOR CAUA-250	BUILDING "F" GIRLS LOCKER ROOM MECHANICAL ROOM	GIRLS LOCKER ROOM	4,000	4,000	1.25	3.0	3600	BELT	250.0	200.0	80	460/3Ø/60	4.4	5.5	15	5	3/4	380	-
F 4	REZNOR CAUA-250	BUILDING "F" GIRLS LOCKER ROOM MECHANICAL ROOM	GIRLS LOCKER ROOM	4,000	4,000	1.25	3.0	3600	BELT	250.0	200.0	80	460/3Ø/60	4.4	5.5	15	5	3/4	380	-

NOTES:
1. PROVIDE WITH THERMOSTAT WITH COVER BOX FOR TEMPERATURE CONTROL, CO2 SENSOR AND HUMIDITY SENSOR. REFER TO SEQUENCE OF OPERATION 24/MP5.01.
2. OVERALL SMOKE DETECTION SYSTEM PROVIDED BY ELECTRICAL FOR ALL FURNACES TO SHUT-OFF UPON DETECTION OF SMOKE AND SIGNAL THE FIRE ALARM SYSTEM. INSTALL IN STRICT ACCORDANCE WITH THE 2019 CALIFORNIA MECHANICAL CODE, SECTION 608. REFER TO ELECTRICAL PLANS AND MECHANICAL TO CONNECT TO ELECTRICAL RELAY. PRIOR TO MECHANICAL FINAL PERMIT, A SMOKE DETECTOR SYSTEM SHUT-OFF TEST WILL BE REQUIRED.
3. PROVIDE WITH ONE 4" CONCRETE HOUSEKEEPING PAD FOR F-1 & F-2 AND ANOTHER 4" CONCRETE HOUSEKEEPING PAD FOR F-3 & F-4, SEE DETAIL 8/MP5.02.
4. PROVIDE WITH VARIABLE FREQUENCY DRIVE (VFD).
5. SCHEDULED LOADS INCLUDE FAN AND MOTOR HEAT.
6. PROVIDE WITH FUSED DISCONNECT SWITCH.
7. PROVIDE WITH 26 GAUGE SHEET METAL FLUE DUCT UP TO ROOF WITH ROOF CAP.

EXHAUST FANS SCHEDULE

UNIT	MANUFACTURER & MODEL NO.	LOCATION	SERVICE	CFM	ESP (IN.)	RPM	ROOF OPENING SIZE (SQUARE IN.)	TYPE	HP/ BHP	DRIVE	VOLTAGE	FLA	SONES	OPER. WEIGHT (LBS.)	REMARKS
EF F1	COOK ACE-B 135C3B	BUILDING "F" BOYS LOCKER ROOM	BOYS TOILET	900	0.5	984	15.5	ROOF MOUNTED DOWNBLAST	1/4 0.138	BELT	115/1/60	5.8	6.1	76	FAN SHALL BE INSTALLED ON EXISTING 32"x32" ROOF CURB.
EF F2	COOK ACE-B 100C2B	BUILDING "F" BOYS LOCKER ROOM	DRESSING ROOM	360	0.375	1180	13.5	ROOF MOUNTED DOWNBLAST	1/6 0.055	BELT	115/1/60	4.4	5.7	60	FAN SHALL BE INSTALLED ON EXISTING 18"x18" ROOF CURB.
EF F3	COOK ACE-B 150C4B	BUILDING "F" BOYS LOCKER ROOM	BOYS LOCKER ROOM	1,750	0.375	1020	19.5	ROOF MOUNTED DOWNBLAST	1/3 0.269	BELT	115/1/60	7.2	8.9	94	FAN SHALL BE INSTALLED ON EXISTING 32"x32" ROOF CURB.
EF F4	COOK ACE-B 150C4B	BUILDING "F" BOYS LOCKER ROOM	BOYS LOCKER ROOM	1,750	0.375	1020	19.5	ROOF MOUNTED DOWNBLAST	1/3 0.269	BELT	115/1/60	7.2	8.9	94	FAN SHALL BE INSTALLED ON EXISTING 32"x32" ROOF CURB.
EF F5	COOK ACE-B 150C4B	BUILDING "F" BOYS LOCKER ROOM	BOYS LOCKER ROOM	1,750	0.375	1020	19.5	ROOF MOUNTED DOWNBLAST	1/3 0.269	BELT	115/1/60	7.2	8.9	94	FAN SHALL BE INSTALLED ON EXISTING 32"x32" ROOF CURB.
EF F6	COOK ACE-B 150C4B	BUILDING "F" BOYS LOCKER ROOM	BOYS LOCKER ROOM	1,750	0.375	1020	19.5	ROOF MOUNTED DOWNBLAST	1/3 0.269	BELT	115/1/60	7.2	8.9	94	FAN SHALL BE INSTALLED ON EXISTING 32"x32" ROOF CURB.
EF F7	COOK ACE-B 150C4B	BUILDING "F" BOYS LOCKER ROOM	GIRLS TOILET	1,750	0.5	1071	19.5	ROOF MOUNTED DOWNBLAST	1/3 0.311	BELT	115/1/60	7.2	9.7	94	FAN SHALL BE INSTALLED ON EXISTING 32"x32" ROOF CURB.
EF F8	COOK ACE-B 80C2B	BUILDING "F" BOYS LOCKER ROOM	DRESSING ROOM	350	0.375	1230	13.5	ROOF MOUNTED DOWNBLAST	1/6 0.090	BELT	115/1/60	4.4	6.2	60	FAN SHALL BE INSTALLED ON EXISTING 18"x18" ROOF CURB.
EF F9	COOK ACE-B 150C4B	BUILDING "F" BOYS LOCKER ROOM	GIRLS LOCKER ROOM	1,750	0.375	1020	19.5	ROOF MOUNTED DOWNBLAST	1/3 0.269	BELT	115/1/60	7.2	8.9	94	FAN SHALL BE INSTALLED ON EXISTING 32"x32" ROOF CURB.
EF F10	COOK ACE-B 150C4B	BUILDING "F" BOYS LOCKER ROOM	GIRLS LOCKER ROOM	1,750	0.375	1020	19.5	ROOF MOUNTED DOWNBLAST	1/3 0.269	BELT	115/1/60	7.2	8.9	94	FAN SHALL BE INSTALLED ON EXISTING 32"x32" ROOF CURB.
EF F11	COOK ACE-B 150C4B	BUILDING "F" BOYS LOCKER ROOM	GIRLS LOCKER ROOM	1,750	0.375	1020	19.5	ROOF MOUNTED DOWNBLAST	1/3 0.269	BELT	115/1/60	7.2	8.9	94	FAN SHALL BE INSTALLED ON EXISTING 32"x32" ROOF CURB.
EF F12	COOK ACE-B 150C4B	BUILDING "F" BOYS LOCKER ROOM	GIRLS LOCKER ROOM	1,750	0.375	1020	19.5	ROOF MOUNTED DOWNBLAST	1/3 0.269	BELT	115/1/60	7.2	8.9	94	FAN SHALL BE INSTALLED ON EXISTING 32"x32" ROOF CURB.
EF F13	COOK ACE-B 135C2B	BUILDING "F" BOYS LOCKER ROOM	TEAM ROOM	900	0.375	884	15.5	ROOF MOUNTED DOWNBLAST	1/6 0.105	BELT	115/1/60	4.4	4.8	75	FAN SHALL BE INSTALLED ON EXISTING 24"x24" ROOF CURB.
EF F14	COOK ACE-B 120C2B	BUILDING "F" BOYS LOCKER ROOM	TEAM ROOM	550	0.375	942	15.5	ROOF MOUNTED DOWNBLAST	1/6 0.064	BELT	115/1/60	4.4	4.2	74	FAN SHALL BE INSTALLED ON EXISTING 27"x27" ROOF CURB.
EF F15	COOK ACE-B 150C4B	BUILDING "F" BOYS LOCKER ROOM	LAUNDRY ROOM	1,700	0.375	1000	19.5	ROOF MOUNTED DOWNBLAST	1/3 0.255	BELT	115/1/60	7.2	8.5	94	FAN SHALL BE INSTALLED ON EXISTING 32"x32" ROOF CURB.
EF F16	COOK ACE-B 80C2B	BUILDING "F" BOYS LOCKER ROOM	STORAGE	100	0.375	1331	13.5	ROOF MOUNTED DOWNBLAST	1/6 0.070	BELT	115/1/60	4.4	7.1	60	FAN SHALL BE INSTALLED ON EXISTING 25"x25" ROOF CURB.

NOTES:
1. FAN SHALL BE INSTALLED ON EXISTING ROOF CURB WITH NEW ROOF CURB ADAPTER.
2. INTERLOCK FANS WITH THE OPERATION OF NEW FURNACES THROUGH THE EXISING EMS SYSTEM, REFER TO SEQUENCE OF OPERATION 24/MM5.01.
3. PROVIDE WITH BACKDRAFT DAMPER.
4. PROVIDE FACTORY MOUTED AND WIRED DISCONNECT SWITCH.
5. OVERALL SMOKE DETECTION SYSTEM PROVIDED BY ELECTRICAL FOR ALL EXHAUST FANS TO SHUT-OFF UPON DETECTION OF SMOKE AND SIGNAL THE FIRE ALARM SYSTEM. INSTALL IN STRICT ACCORDANCE WITH THE 2019 CALIFORNIA MECHANICAL CODE, SECTION 608. REFER TO ELECTRICAL PLANS AND MECHANICAL TO CONNECT TO ELECTRICAL RELAY. PRIOR TO MECHANICAL FINAL PERMIT, A SMOKE DETECTOR SYSTEM SHUT-OFF TEST WILL BE REQUIRED.

AIR DISTRIBUTION SCHEDULE

SYMBOL	TYPE	MAKE & MODEL	DESCRIPTION
A	CEILING SUPPLY	TITUS MODEL MCD-3	NOTE USED.
B	CEILING RETURN	TITUS MODEL PAR-3	NOTE USED.
C	CEILING SUPPLY	TITUS MODEL MCD-1	MODULAR CORE DIFFUSER WITH FRAME FOR SURFACE MOUNTING.
D	CEILING EXHAUST	TITUS MODEL 50F	EGG CRATE GRILLE DIFFUSER WITH FRAME FOR SURFACE MOUNTING.
E	SIDEWALL SUPPLY/TRANSFER	TITUS MODEL 1700	DOUBLE DEFLECTION HORIZONTAL 5° DOWN FRONT GRILLE WITH 1/2" BLADE SPACING, FRAME FOR WALL MOUNTING.
F	CEILING SUPPLY	TITUS MODEL ML-3B-2B	NOT USED.

NOTES:
1. EQUIVALENT MODELS OF KRUEGER, ANEMOSTAT, PRICE OR J&J ARE ACCEPTABLE.
2. REFER TO THE FLOOR PLANS FOR NECK SIZE, CFM, AIR DIFFUSION PATTERN AND FIRE/DAMPER, IF REQUIRED.
3. PROVIDE AIR CONTROL GRID FOR ALL CEILING SUPPLY DIFFUSERS SET AT 90°.
4. INTERIOR OF ALL GRILLES SHALL BE PAINTED FLAT BLACK.

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TRUE NORTH

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STATE OF CALIFORNIA
RENEWAL 03-31-23

Architect

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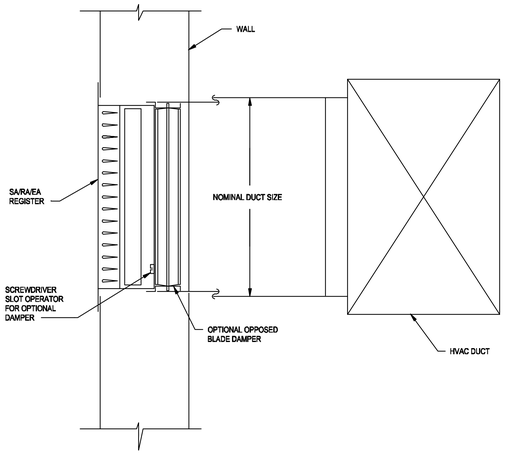
MECHANICAL PLUMBING SCHEDULES

MP4.01

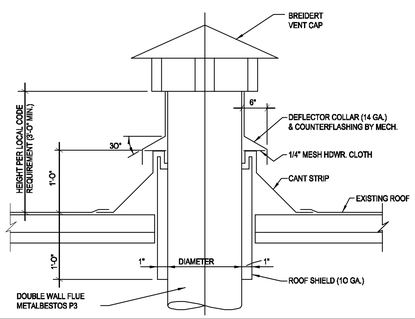
ALL CONTROLS MUST BE COMPATIBLE WITH EXISTING ALERTON CONTROLS BMS.
THE BOYS LOCKER ROOM IS SUPPLIED BY 2 FURNACES AND 10 EXHAUST FANS.
- THE FURNACES SHOULD OPERATE WITH 2-STAGES OF VENTILATION AND HEATING.
  - STAGE-1, ONE FURNACE WILL OPERATE AT FULL SPEED TO MAINTAIN VENTILATION AND FURNACE SECTION WILL MODULATE TO MAINTAIN HEATING SETPOINT. EXHAUST FANS EF-F1, EF-F2, EF-F3, EF-F5, EF-F13, EF-14, EF-F15, & EF-F16 WILL OPERATE AT FULL SPEED.
  - STAGE-2, BOTH FURNACES WILL OPERATE AT FULL SPEED TO MAINTAIN VENTILATION AND FURNACE SECTION WILL MODULATE TO MAINTAIN HEATING SET POINT. EXHAUST FANS EF-F1, EF-F2, EF-F3, EF-F4, EF-F5, EF-F6, EF-F13, EF-14, EF-F15, & EF-F16 WILL OPERATE AT FULL SPEED.
- THE THERMOSTAT SHALL BE CAPABLE OF READING TEMPERATURE, HUMIDITY, AND CARBON DIOXIDE LEVELS.
- TEMPERATURE CONTROL
  - THE FURNACE(S) SHALL MODULATE TO MAINTAIN THE HEATING SETPOINT. INITIAL SETPOINT TO BE 68°F (FIELD ADJUSTABLE) IF OPERATING IN STAGE-1 AND HEATING SETPOINT IS UNABLE TO BE MET, INITIATE STAGE-2 OPERATION. IF OPERATING IN STAGE-2 AND BOTH FURNACES ARE AT MINIMUM FOR 10 MINUTES (FIELD ADJUSTABLE), INITIATE STAGE-1 OPERATING.
- HUMIDITY CONTROL
  - IF SYSTEM IS OPERATING IN STAGE-1 AND THE RELATIVE HUMIDITY INCREASES BEYOND THE HUMIDITY SETPOINT, STAGE-2 SHALL BE INITIATED UNTIL THE HUMIDITY FALLS BELOW THE SETPOINT. INITIAL SETPOINT TO BE 65%RH (FIELD ADJUSTABLE)
- CARBON DIOXIDE CONTROL
  - IF SYSTEM IS OPERATING IN STAGE-1 AND THE CARBON DIOXIDE LEVEL INCREASES BEYOND THE SETPOINT, STAGE-2 SHALL BE INITIATED UNTIL THE CARBON DIOXIDE LEVEL FALLS BELOW THE SETPOINT. INITIAL SETPOINT TO BE 1000PPM (FIELD ADJUSTABLE)
- FURNACES SHALL ROTATE POSITION, LEAD AND LAG, ON A WEEKLY BASIS (FIELD ADJUSTABLE).
- EXHAUST FANS EF-F1, EF-F2, EF-F13, EF-F14, EF-F15, EF-F15 & EF-F16 SHALL ALWAYS MAINTAIN LEAD POSITION. OTHER EXHAUST FANS SHALL ROTATE POSITIONS LAG1, LAG2, ETC. ON A WEEKLY BASIS (FIELD ADJUSTABLE).
- FURNACES SHALL OPERATION ON A BUILDING SCHEDULE (SCHEDULE DETERMINED BY DISTRICT)
  - EXHAUST FAN OPERATION SHALL BE INTERLOCKED WITH FURNACE OPERATION.

THE GIRLS LOCKER ROOM IS SUPPLIED BY 2 FURNACES AND 6 EXHAUST FANS.
- THE FURNACES SHOULD OPERATE WITH 2-STAGES OF VENTILATION AND HEATING.
  - STAGE-1, ONE FURNACE WILL OPERATE AT FULL SPEED TO MAINTAIN VENTILATION AND FURNACE SECTION WILL MODULATE TO MAINTAIN HEATING SETPOINT. EXHAUST FANS EF-F7, EF-F8, EF-F9, & EF-F11 WILL OPERATE AT FULL SPEED.
  - STAGE-2, BOTH FURNACES WILL OPERATE AT FULL SPEED TO MAINTAIN VENTILATION AND FURNACE SECTION WILL MODULATE TO MAINTAIN HEATING SET POINT. EXHAUST FANS EF-F7, EF-F8, EF-F9, EF-F10, EF-F11, EF-F12 WILL OPERATE AT FULL SPEED.
- THE T-STAT SHALL BE CAPABLE OF READING TEMPERATURE, HUMIDITY, AND CARBON DIOXIDE LEVELS
- TEMPERATURE CONTROL
  - THE FURNACE(S) SHALL MODULATE TO MAINTAIN THE HEATING SETPOINT. INITIAL SETPOINT TO BE 68°F (FIELD ADJUSTABLE) IF OPERATING IN STAGE-1 AND HEATING SETPOINT IS UNABLE TO BE MET, INITIATE STAGE-2 OPERATION. IF OPERATING IN STAGE-2 AND BOTH FURNACES ARE AT MINIMUM FOR 10 MINUTES (FIELD ADJUSTABLE), INITIATE STAGE-1 OPERATING.
- HUMIDITY CONTROL
  - IF SYSTEM IS OPERATING IN STAGE-1 AND THE RELATIVE HUMIDITY INCREASES BEYOND THE HUMIDITY SETPOINT, STAGE-2 SHALL BE INITIATED UNTIL THE HUMIDITY FALLS BELOW THE SETPOINT. INITIAL SETPOINT TO BE 65%RH (FIELD ADJUSTABLE)
- CARBON DIOXIDE CONTROL
  - IF SYSTEM IS OPERATING IN STAGE-1 AND THE CARBON DIOXIDE LEVEL INCREASES BEYOND THE SETPOINT, STAGE-2 SHALL BE INITIATED UNTIL THE CARBON DIOXIDE LEVEL FALLS BELOW THE SETPOINT. INITIAL SETPOINT TO BE 1000PPM (FIELD ADJUSTABLE)
- FURNACES SHALL ROTATE POSITION, LEAD AND LAG, ON A WEEKLY BASIS (FIELD ADJUSTABLE).
- EXHAUST FANS EF-F7, & EF-F8 SHALL ALWAYS MAINTAIN LEAD POSITION. OTHER EXHAUST FANS SHALL ROTATE POSITIONS LAG1, LAG2, ETC. ON A WEEKLY BASIS (FIELD ADJUSTABLE).
- FURNACES SHALL OPERATION ON A BUILDING SCHEDULE (SCHEDULE DETERMINED BY DISTRICT)
  - EXHAUST FAN OPERATION SHALL BE INTERLOCKED WITH FURNACE OPERATION.

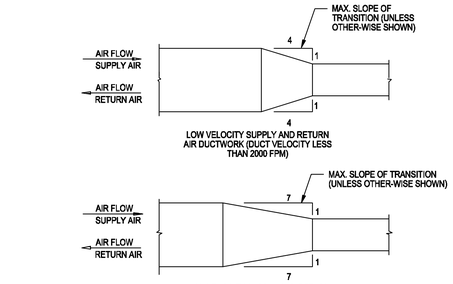
24 SEQUENCE OF OPERATION
NTS



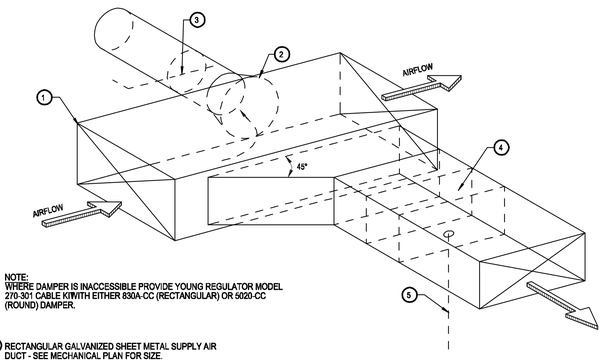
12 SIDE WALL REGISTER DETAIL
NOT TO SCALE



6 FLUE THRU ROOF DETAIL
NTS



28 RECTANGULAR DUCT TRANSITION DETAIL
NOT TO SCALE

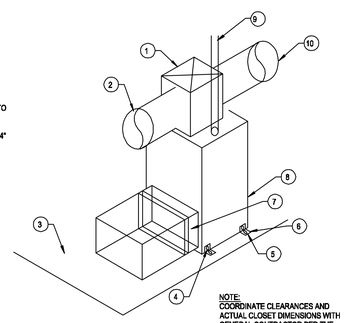


NOTE:
WHERE DAMPER IS INACCESSIBLE PROVIDE YOUNG REGULATOR MODEL 270-301 CABLE KITWITH EITHER 830A-CC (RECTANGULAR) OR 5020-CC (ROUND) DAMPER.

1. RECTANGULAR GALVANIZED SHEET METAL SUPPLY AIR DUCT - SEE MECHANICAL PLAN FOR SIZE.
2. CUT OPENING ACCURATELY FOR SPIN IN (FLARED) FITTING - WHERE POSSIBLE.
3. BUTTERFLY DAMPER W/ LOCKING QUAD. (TYP)
4. VOLUME CONTROL DAMPER WITH LOCKING QUADRANT.
5. DAMPER REGULATOR

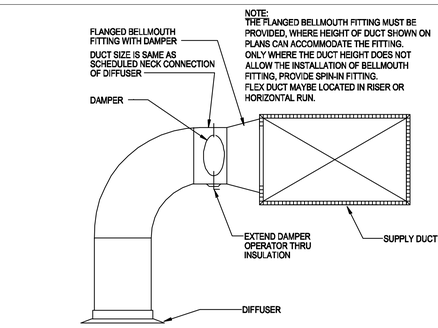
16 BRANCH DUCT TAKE-OFF & DMP. DETAIL
NOT TO SCALE

DETAIL NOTES:
1. GALV. SHT. METAL SUPPLY AIR PLENUM.
2. ADDITIONAL SUPPLY AIR DUCT, SEE MECH. PLAN FOR SIZE.
3. HOUSEKEEPING PAD, SEE DETAIL 8/MP5.02.
4. 3/8" X 2" BOLT W/NUT LOCK WASHER & 1/4" NEOPRENE PAD AT EACH CLIP.
5. 2-1/2" X 2-1/2" X 1/4" ANGLE CLIP (4) REQUIRED. LOCATE TO AVOID ACCESS PANEL.
6. 1/2" Ø SIMPSON STRONG-BOLT 2 EXP. ANCHOR WITH 2-3/4" EFFECTIVE EMBED (ICC ESR-3037) WITH 1/4" NEOPRENE PAD BETWEEN CLIP AND CONCRETE PAD..
7. RETURN OSA PLENUM. ASSEMBLY, SEE FURNACE SCHEDULE FOR SIZE & TYPE.
8. UPFLOW FURNACE, SEE MECHANICAL PLAN AND SCHEDULE.
9. VENT PER MANUFACTURER'S RECOMMENDATIONS. SEE PLAN FOR CONTINUATION.
10. SUPPLY AIR DUCT, SEE MECHANICAL PLAN FOR SIZE.

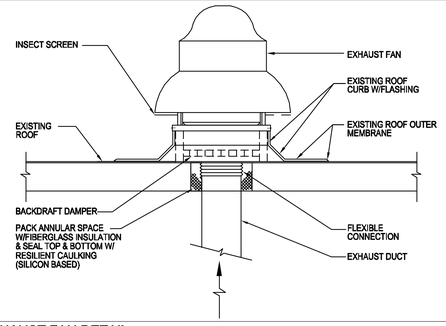


NOTE:
COORDINATE CLEARANCES AND ACTUAL CLOSET DIMENSIONS WITH GENERAL CONTRACTOR PER THE C.M.C. AND MANUFACTURER'S REQUIREMENTS.

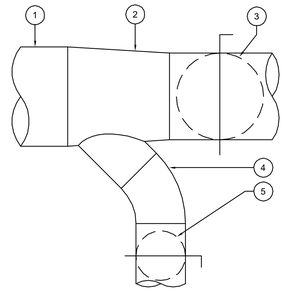
4 TYPICAL FURNACE ASSEMBLY DETAIL
NTS



26 DIFFUSER CONNECTION DETAIL
NTS



20 DOWNBLAST EXHAUST FAN DETAIL
NTS



1. SHEET METAL DUCT
2. SHEET METAL TAPER WITH BRANCH STUB.
3. DAMPER AT END OF RUN ONLY.
4. BRANCH TAKE-OFF.
5. BUTTERFLY DAMPER WITH LOCKING QUAD. (TYP.)

NOTE:
A. WHERE DAMPER IS INACCESSIBLE PROVIDE YOUNG REGULATOR MODEL 270-301 CABLE KIT WITH EITHER 830A-CC RECTANGULAR) OR 5020-CC (ROUND) DAMPER.

B. PROVIDE DAMPER WITH LOCKING QUADRANT AT ALL SINGLE RUNOUTS.

14 BRANCH DUCT DAMPER DETAIL
NTS

DIMENSION OF LONGEST SIDE, INCHES	SHEET METAL GAGE (ALL FOUR SIDES)	TRANSVERSE REINFORCING (1)						
		MINIMUM REINFORCING ANGLE SIZE AND MAXIMUM LONGITUDINAL SPACING BETWEEN TRANSVERSE JOINTS &/OR INTERMEDIATE REINFORCING	AT JOINTS					
			MIN. HT. IN.	DRIVE SLIP / PLAIN S SLIP	HEMMED S SLIP	ALTERNT BAR SLIP	REIN-FORCED BAR SLIP	
				RECOM-MENDED GAGE	RECOM-MENDED GAGE	RECOM-MENDED GAGE	RECOM-MENDED GAGE	
UP THRU 12	26	NONE REQUIRED	1	26	26	24	24	
13 - 18	24	NONE REQUIRED	1	24	24	24	24	
19 - 30	24	1" x 1" x 1/8" @ 60 IN.	1		24	24	24	
31 - 42	22	1" x 1" x 1/8" @ 60 IN.	1			22	22	
43 - 60	20	1" x 1" x 1/8" @ 60 IN.	1				20	
61 & ABOVE	18	1" x 1" x 1/8" @ 60 IN.	1				18	
(1) TRANSVERSE REINFORCING SIZE IS DETERMINED BY DIMENSION OF SIDE TO WHICH ANGLE IS APPLIED.								

2 DUCT CONSTRUCTION STANDARDS
NTS

LEAF ENGINEERS
A PBK COMPANY
LEAFENGINEERS.com
ONTARIO
3110 E. Guasti Road, Suite 300
Ontario, CA 91761
916-882-9494 P
916-882-0990 F

NMUSD Estancia HS Locker Rooms
2323 Placentia Ave.
Costa Mesa, CA 92627
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KEY PLAN — PLAN NORTH / TRUE NORTH

Engineer

Architect

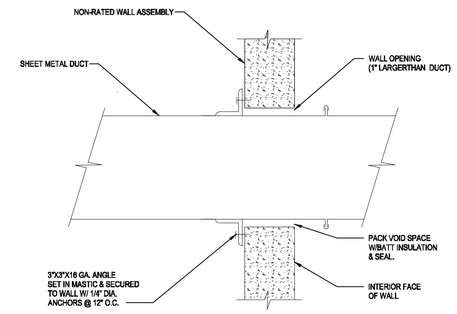
CLIENT
NMUSD
PROJECT NUMBER
P2101400ME
DATE 02/08/2021
REVISIONS

#	DESCRIPTION	DATE

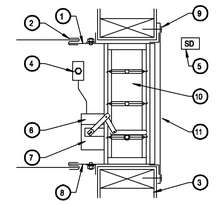
100% CONSTRUCTION DOCUMENT

MECHANICAL PLUMBING DETAILS

MP5.01



33 DUCT THRU-WALL PENETRATION DETAIL
NOT TO SCALE



DAMPER CSFM LISTING NO: 3235-0245:0124

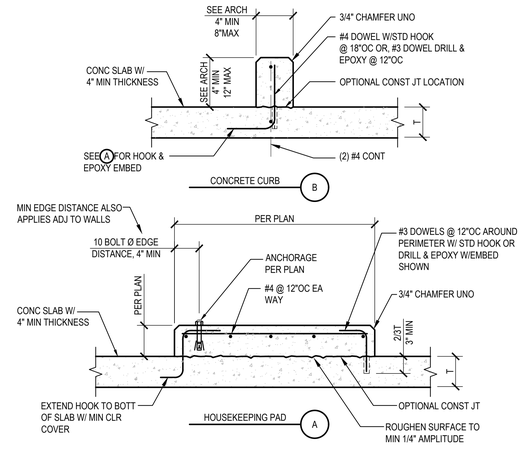
DETAIL NOTES:

1. SLEEVE TO EXTEND 3" BEYOND WALL.
2. DUCT TO SLEEVE CONNECTION (S-LOCK).
3. FRAMED FIRE RATED WALL, SEE ARCHITECTURAL DWGS.
4. EFL, ELECTRIC RESET LINK, REST ON OUTSIDE OF DMP.
5. AREA SMOKE DETECTOR SHALL BE FURNISHED AND CONNECTED BY ELECTRICAL CONTRACTOR. OVERALL DETECTION SYSTEM SHALL CONTROL DAMPERS, SEE ELECTRICAL DRAWINGS.
6. JUNCTION BOX.
7. 120 VOLT ELECTRIC ACTUATOR.
8. 16 GA. ANGLE FRAME, WELDED BOLTED OR SCREWED TO ALL FOUR SIDES OF SLEEVE. ANGLE FRAME NOT LESS THAN 1-1/2" ANGLE. NET OPENING IN FRAMED WALLS SHALL EXCEED NET O.D. OF THE DAMPER ASSEMBLY BY 1/8" FOR EACH FOOT OF WIDTH AND HEIGHT OF DAMPER ASSEMBLY. USE S/M SCREWS OR FASTENERS AS REQUIRED TO SECURE ASSEMBLY.
9. STANDARD REGISTER SCREW INTO FRAMING MEMBE FOR WOOD FRAMED WALLS.
10. 1-1/2 HOUR FIRE/SMOKE DAMPER SHALL BE U.L. 555 LISTED FOR FIRE AND U.L. 555S LEAKAGE RATED FOR NO LESS THAN CLASS II. RUSKIN MODEL FSD36 WITH FACTORY G-STYLE ENCLOSURE FOR SQUARE OR RECTANGULAR DUCTS. PROVIDE W/ RELAYS AS REQUIRED BY SMOKE DETECTORS PROVIDE SP100 DUAL POSITION INDICATOR SWITCH, TS150 FIRESTAT AND MP10 REMOTE PANEL.
11. REGISTER OR GRILLE, SEE MECHANICAL PLAN.

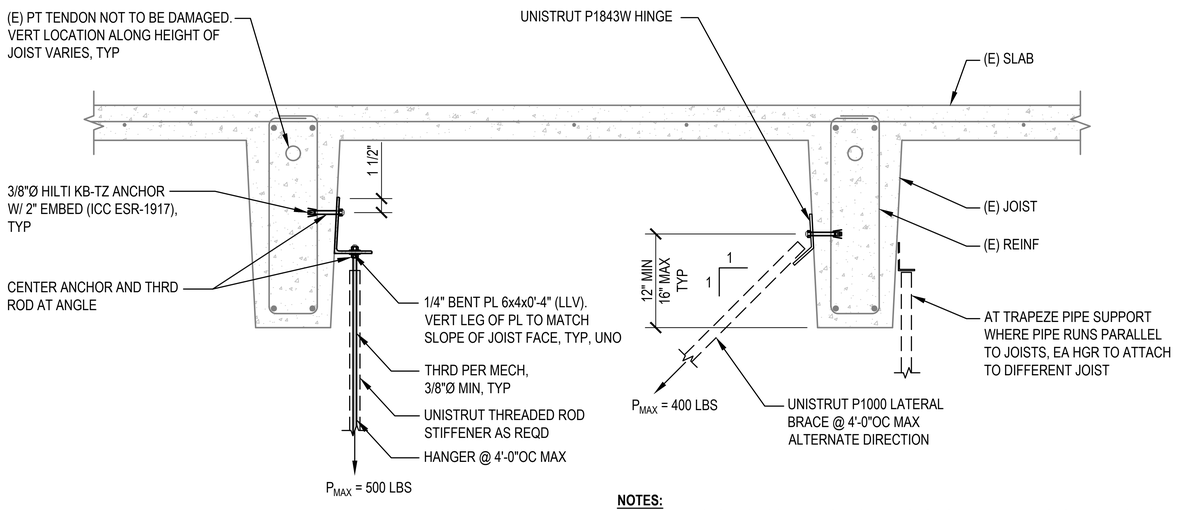
NOTES:

1. FIRE DAMPER & INSTALLATION TO BE IN ACCORDANCE WITH CALIFORNIA STATE FIRE MARSHAL # LISTED ABOVE.
2. FIRE DAMPER SHALL BE STATE FIRE MARSHAL APPROVED & INSTALLED STRICTLY PER MFG'S PRINTED INSTRUCTIONS.
3. MANUFACTURER'S INSTALLATION INSTRUCTIONS SHALL BE MADE AVAILABLE TO THE INSPECTION AUTHORITIES.
4. AREA SMOKE DETECTOR SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR. SEE ELECTRICAL DRAWINGS.
5. FIRE DAMPER DETAIL FOR REFERENCE ONLY.

14 COMBINATION FIRE/SMOKE DAMPER DETAIL (WOOD)
NOT TO SCALE



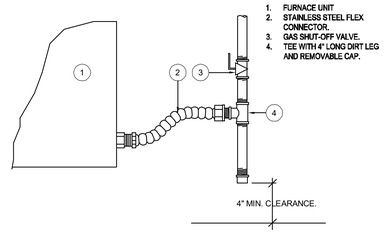
8 CONCRETE PAD TO (E) SLAB ON GRADE DETAIL
NOT TO SCALE



NOTES:

1. CONTRACTOR TO LOCATE EXISTING REINFORCING AND P.T. TENDONS PRIOR TO INSTALLATION OF POST INSTALLED ANCHORS. NOTIFY ENGINEER IF LOCATION OF ANCHOR CONFLICTS WITH LOCATION OF EXISTING TENDON OR REINFORCING.
2. PROVIDE SPECIAL INSPECTION OF POST INSTALLED ANCHORS AS NOTED PER STRUCTURAL GENERAL NOTES AND THE APPLICABLE PRODUCT EVALUATION REPORT.

6 SUSPENDED EQUIPMENT SUPPORT DETAIL
NOT TO SCALE



1. FURNACE UNIT
2. STAINLESS STEEL FLEX CONNECTOR.
3. GAS SHUT-OFF VALVE.
4. TEE WITH 4" LONG DIRT LEG AND REMOVABLE CAP.

2 FURNACE GAS CONNECTION DETAIL
NOT TO SCALE

LEAF ENGINEERS
A PBK COMPANY
LEAFENGINEERS.com
ONTARIO
3110 E. Guasti Road, Suite 300
Ontario, CA 91761
916-682-9494 P
916-682-0990 F

NMUSD Estancia HS Locker Rooms

2323 Placentia Ave.
Costa Mesa, CA 92627
100% CONSTRUCTION DOCUMENT



KEY PLAN
PLAN NORTH
TRUE NORTH

Engineer

REGISTERED PROFESSIONAL ENGINEER
No. M37275
EXP. 03-31-21
MECHANICAL
STATE OF CALIFORNIA

Architect

CLIENT
NMUSD
PROJECT NUMBER
P2101400ME
DATE 02/08/2021
REVISIONS

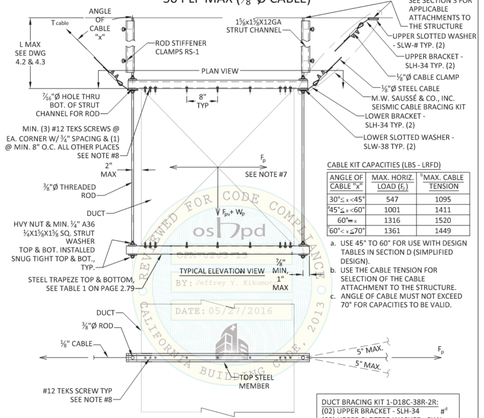
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MECHANICAL PLUMBING DETAILS

MP5.02

CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT - TRANSVERSE 30 PLF MAX (⅜"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (f_L)	MAX. CABLE TENSION
30°≤ x <45°	547	1095
45°≤ x <60°	1001	1411
60°= x	1316	1520
60°< x ≤70°	1361	1449

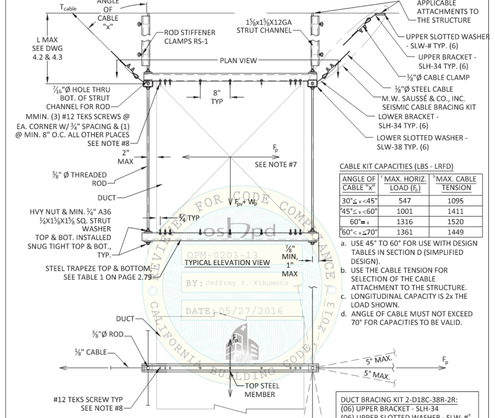
a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 1-D18C-38R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(02) ½" CABLE - 10 FT.
(04) ½" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

CABLE BRACING SYSTEM - TRAPEZE HUNG DUCT TRANSVERSE & LONGITUDINAL - 30 PLF MAX (⅜"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (f_L)	MAX. CABLE TENSION
30°≤ x <45°	547	1095
45°≤ x <60°	1001	1411
60°= x	1316	1520
60°< x ≤70°	1361	1449

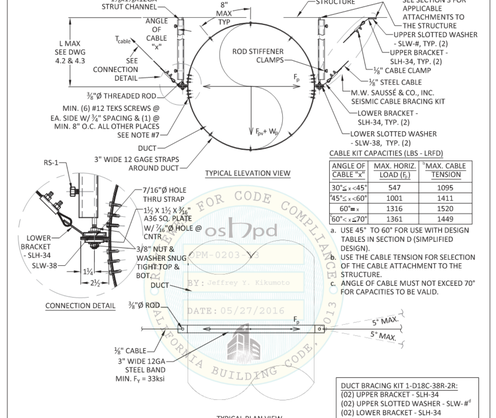
a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 2-D18C-38R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(06) ½" CABLE - 10 FT.
(12) ½" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PG 4.5
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. RDP SHALL CONSIDER THE ECCENTRIC LOAD DISTRIBUTION WHEN DETERMINING THE F_p VALUE USED IN THE DESIGN
8. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE - 30 PLF MAX (⅛"Ø CABLE)



CABLE KIT CAPACITIES (LBS - LRFD)

ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (f_L)	MAX. CABLE TENSION
30°≤ x <45°	547	1095
45°≤ x <60°	1001	1411
60°= x	1316	1520
60°< x ≤70°	1361	1449

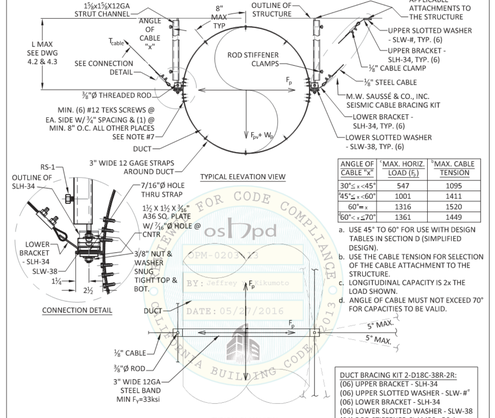
a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 1-D18C-38R-2R:
(02) UPPER BRACKET - SLH-34
(02) UPPER SLOTTED WASHER - SLW-#
(02) LOWER BRACKET - SLH-34
(02) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(02) ½" CABLE - 10 FT.
(04) ½" CABLE CLAMPS

d. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

CABLE BRACING SYSTEM - HUNG ROUND DUCT - TRANSVERSE & LONGITUDINAL - 30 PLF MAX (⅛"Ø CABLE)



ANGLE OF CABLE "x"	MAX. HORIZ. LOAD (f_L)	MAX. CABLE TENSION
30°≤ x <45°	547	1095
45°≤ x <60°	1001	1411
60°= x	1316	1520
60°< x ≤70°	1361	1449

a. USE 45° TO 60° FOR USE WITH DESIGN TABLES IN SECTION D (SIMPLIFIED DESIGN).
b. USE THE CABLE TENSION FOR SELECTION OF THE CABLE ATTACHMENT TO THE STRUCTURE.
c. LONGITUDINAL CAPACITY IS 2x THE LOAD SHOWN.
d. ANGLE OF CABLE MUST NOT EXCEED 70° FOR CAPACITIES TO BE VALID.

DUCT BRACING KIT 2-D18C-38R-2R:
(06) UPPER BRACKET - SLH-34
(06) UPPER SLOTTED WASHER - SLW-#
(06) LOWER BRACKET - SLH-34
(06) LOWER SLOTTED WASHER - SLW-38
(04) ROD STIFFENER CLAMPS - RS-1
(06) ½" CABLE - 10 FT.
(12) ½" CABLE CLAMPS

e. UPPER SLOTTED WASHER TO MATCH SELECTED ATTACHMENT.

NOTES:
1. CABLE IS 7 X 19 GALVANIZED STEEL CABLE. SEE PAGE 4.5.
2. CABLES TO BE INSTALLED TAUT W/O SLACK. CAUTION - CABLE MUST NOT SUSTAIN ANY DEAD LOAD.
3. SEE PAGE 4.2 & 3 FOR ROD STIFFENER DETAIL & REQUIREMENTS.
4. SEE PAGE 4.4 FOR BRACKET - SLH-34 AND SLOTTED WASHER - SLW-XX DETAIL.
5. SEE PAGE 4.5 FOR CABLE CLAMP DETAIL.
6. TEKS SCREWS MUST BE PER ICC ESR-1976.
7. USE SHORTEST SMS POSSIBLE WHEN PENETRATING DUCTWORK TO MINIMIZE AIRFLOW NOISE INSIDE THE DUCT (FEMA 414).

RS-1 - ROD STIFFENER DETAILS & REQUIREMENTS

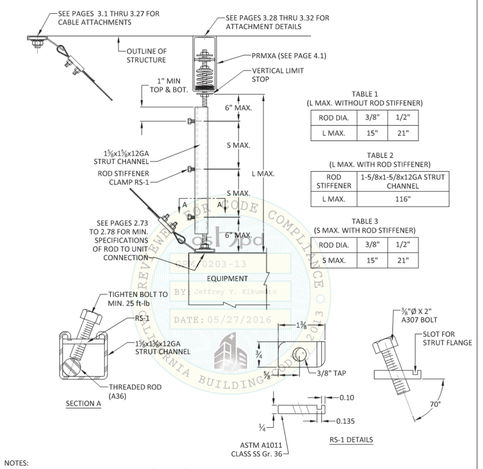


TABLE 1 (L MAX. WITHOUT ROD STIFFENER)

ROD DIA.	3/8"	1/2"
L MAX.	15"	21"

TABLE 2 (L MAX. WITH ROD STIFFENER)

ROD STIFFENER	1-5/8x1-5/8x12GA STRUT CHANNEL
L MAX.	116"

TABLE 3 (S MAX. WITH ROD STIFFENER)

ROD DIA.	3/8"	1/2"
S MAX.	15"	21"

NOTES:
1. SEE TABLE 1 FOR MAXIMUM LENGTH OF ⅜" THRU ½"Ø RODS WITHOUT ROD STIFFENER.
2. SEE TABLE 2 FOR MAXIMUM LENGTH OF ⅜" THRU ½"Ø RODS WITH ROD STIFFENER.
3. SEE TABLE 3 TO DETERMINE NUMBER OF ROD STIFFENER CLIPS REQUIRED.
4. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD.
5. SEE SECTION 3 FOR STRUCTURAL ATTACHMENTS FOR HANGER BOX AND CABLE BRACING

RS-1 - ROD STIFFENER DETAILS & REQUIREMENTS

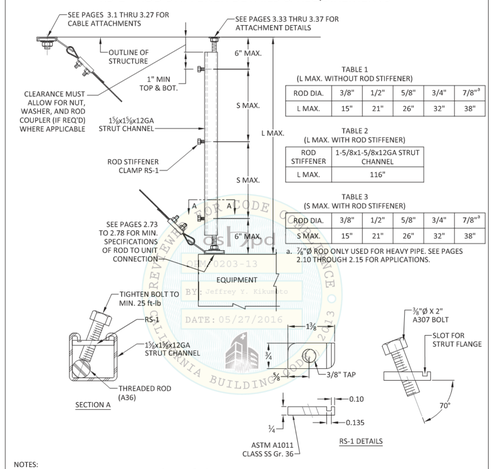


TABLE 1 (L MAX. WITHOUT ROD STIFFENER)

ROD DIA.	3/8"	1/2"	5/8"	3/4"	7/8"[a]
L MAX.	15"	21"	26"	32"	38"

TABLE 2 (L MAX. WITH ROD STIFFENER)

ROD STIFFENER	1-5/8x1-5/8x12GA STRUT CHANNEL
L MAX.	116"

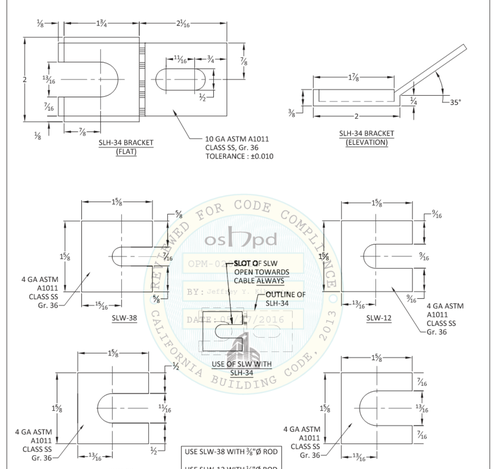
TABLE 3 (S MAX. WITH ROD STIFFENER)

ROD DIA.	3/8"	1/2"	5/8"	3/4"	7/8"[a]
S MAX.	15"	21"	26"	32"	38"

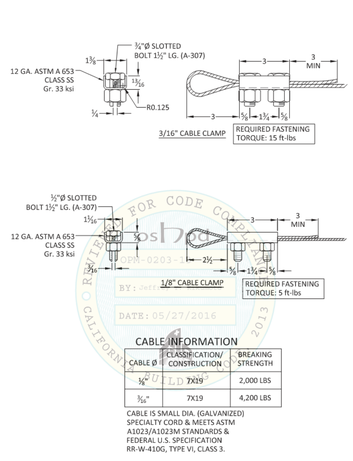
a. ⅞"Ø ROD ONLY USED FOR HEAVY PIPE. SEE PAGES 2.10 THROUGH 2.15 FOR APPLICATIONS.

NOTES:
1. SEE TABLE 1 FOR MAXIMUM LENGTH OF ⅜" THRU ½"Ø RODS WITHOUT ROD STIFFENER.
2. SEE TABLE 2 FOR MAXIMUM LENGTH OF ⅜" THRU ½"Ø RODS WITH ROD STIFFENER.
3. SEE TABLE 3 TO DETERMINE NUMBER OF ROD STIFFENER CLIPS REQUIRED.
4. PROVIDE ROD STIFFENING ONLY WHERE SEISMIC BRACKETS ARE ATTACHED TO THE ROD.
5. SEE SECTION 3 FOR STRUCTURAL ATTACHMENTS FOR HANGER BOX AND CABLE BRACING

SLH-34 & SLW-38, 12, 58, & 34 DETAILS



CABLE CLAMP DETAILS



CABLE INFORMATION

CABLE Ø	CLASSIFICATION/ CONSTRUCTION	BREAKING STRENGTH
⅛"	7X19	2,000 LBS
3/16"	7X19	4,200 LBS

CABLE IS SMALL DIA. (GALVANIZED) SPECIALTY CORD & MEETS ASTM A1023/A1023M STANDARDS & FEDERAL U.S. SPECIFICATION RR-W-410G, TYPE VI, CLASS 3.

GENERAL NOTE:
FOR ALL ATTACHMENTS TO STRUCTURE, SEE DETAIL 6/MP5.02

1 OPM ATTACHMENT DETAILS
NOT TO SCALE

LEAF ENGINEERS A PBK COMPANY
LEAFENGINEERS.com
ONTARIO
3110 E. Guasti Road, Suite 300
Ontario, CA 91761
916-682-9494 P
916-682-0990 F

NMUSD Estancia HS Locker Rooms

2323 Placentia Ave.
Costa Mesa, CA 92627

100% CONSTRUCTION DOCUMENT





KEY PLAN

Engineer



Architect

CLIENT
NMUSD
PROJECT NUMBER
P2101400ME
DATE 02/08/2021

REVISIONS

#	DESCRIPTION	DATE

100% CONSTRUCTION DOCUMENT

MECHANICAL PLUMBING DETAILS

MP5.03

DEVICE SCHEDULE

SYMBOL	DESCRIPTION	MODEL	MANUFACTURER	BACKBOX	MOUNTING HEIGHT	C.S.F.M. NUMBER
FACP	EXISTING FIRE ALARM CONTROL PANEL	4100U	SIMPLEX	EXISTING	—	—
VECP	EXISTING VOICE EVACUATION CONTROL PANEL	IFP-2100 ECS	FARENHYT	EXISTING	—	7165-0559:0505
AMP	EXISTING VOICE EVACUATION AUDIO AMPLIFIER	ECS-DUAL 50W	FARENHYT	EXISTING	—	—
FAPS	EXISTING FIRE ALARM POWER SUPPLY	RPS-2000	FARENHYT	EXISTING	—	—
FATC	EXISTING FIRE ALARM TERMINAL CABINET	N/A	N/A	—	—	N/A
S P	EXISTING ADDRESSABLE SMOKE DETECTOR	IDP-PHOTO B200S(BASE)	FARENHYT	EXISTING	—	7272-0559:0512 7300-1653:0213
CR	NEW ADDRESSABLE CONTROL RELAY	IDP-RELAY	FARENHYT BY HONEYWELL	4S DEEP BOX	—	7300-0559:0155

REFERENCE EXISTING INFORMATION PER A#04-118036 AND A#04-105319.

LEGENDS

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
A OR AMP	AMPERES	NIC	NOT IN CONTRACT
AFF	ABOVE FINISHED FLOOR	NO.	NUMBER
AIC	AMPERES INTERRUPTING CAPACITY	PH. OR Ø	PHASE
ARCH.	ARCHITECT; ARCHITECTURAL	PNL	PANEL
AWG	AMERICAN WIRE GAUGE	PWR	POWER
C	CONDUIT	REC/RECEPT	RECEPTACLE
CKT	CIRCUIT	REQ'D	REQUIRED
CL.	CEILING MOUNTED DEVICE	RM	ROOM
C.O.	CONDUIT ONLY WITH PULL WIRE	SF	SQUARE FEET
CU	COPPER	SHT	SHEET
DWG	DRAWING	SP	SINGLE POLE
EA	EACH	SPECS	SPECIFICATIONS
EMT	ELECTRICAL METALLIC TUBING	SW	SWITCH
EQUIP	EQUIPMENT	TYP	TYPICAL
EX / (E)	EXISTING	UG	UNDERGROUND
FIN.	FINISH	U.O.N.	UNLESS OTHERWISE NOTED
FLR	FLOOR	V	VOLTS
FT	FEET	V-A	VOLT-AMPERES
GFI	GROUND FAULT INTERRUPTER	W	WATTS
GND	GROUND	W/	WITH
LTG.	LIGHTING	W/O	WITHOUT
MTG	MOUNTING	WP	WEATHERPROOF
N	NEW	NEC	NATIONAL ELECTRICAL CODE

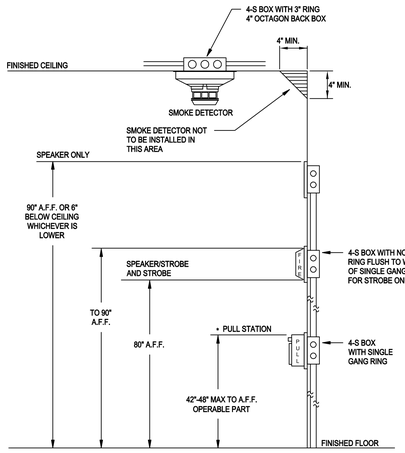
DRAWING INDEX

SHEET NO.	DESCRIPTION
SHEET FA0.01	FIRE ALARM SYMBOLS, NOTES AND ABBREVIATION
SHEET FA1.00	FIRE ALARM SITE PLAN
SHEET FA2.01	FIRE ALARM FLOOR PLANS
SHEET FA4.01	FIRE ALARM SPEC,DETAILS, RISER DIAGRAM AND CALCULATIONS

GENERAL NOTES

1. APPLICABLE STANDARD NFPA 72, as adopted and amended in CBC Chapter 35
2. INSTALLATION OF THE SYSTEMS SHALL NOT BE STARTED UNTIL DETAILED DESIGN DOCUMENTS AND SPECIFICATION, INCLUDING STATE FIRE MARSHAL LISTING NUMBERS FOR EACH COMPONENT OF THE SYSTEM, HAS BEEN APPROVED BY DSA.
3. UPON COMPLETION OF SYSTEM INSTALLATION, A SATISFACTORY TEST OF THE ENTIRE SYSTEM SHALL BE MADE IN THE PRESENCE OF A DSA PROJECT INSPECTOR.
4. A STAMPED SET OF APPROVED FIRE ALARM DESIGN DOCUMENTS SHALL BE ON THE JOB SITE AND USED FOR INSTALLATION.
5. ANY DISCREPANCIES BETWEEN THE DRAWINGS AND THE CODE OR RECOGNIZED STANDARDS SHALL BE BROUGHT TO THE ATTENTION OF DSA AND THE ARCHITECT/ENGINEER OF THE PROJECT.
6. DSA, ARCHITECT/ENGINEER AND OWNER SHALL BE NOTIFIED A MINIMUM OF 48 HOURS PRIOR TO THE FINAL INSPECTION AND /OR TESTING.
7. ALL PENETRATIONS THROUGH RATED ASSEMBLIES REQUIRING OPENING PROTECTION SHALL BE PROVIDED WITH A PENETRATION FIRE STOP SYSTEM AS IDENTIFIED IN CBC CHAPTER 7, UL OR OTHER APPROVED LAB TESTING CRITERIA. APPROVED TYPES OF MATERIALS SHALL BE IDENTIFIED WITHIN THE PROJECT SPECIFICATIONS WITHIN THE FIRE ALARM SECTION.
8. WALL MOUNTED VISIBLE NOTIFICATION DEVICES SHALL HAVE THEIR BOTTOMS MOUNTED AT 80 MAXIMUM FROM FINISHED FLOOR.
9. WALL MOUNTED AUDIBLE NOTIFICATION DEVICES SHALL HAVE THEIR TOPS MOUNTED AT 90 MAXIMUM FROM FINISHED FLOOR AND NO CLOSER THEN 6 " TO A HORIZONTAL STRUCTURE.
10. AUDIBLE DEVICES SHALL PROVIDE A SOUND PRESSURE LEVEL OF 15 DECIBELS (dBA) ABOVE THE AVERAGE AMBIENT SOUND LEVEL OR FIVE dBA ABOVE THE MAXIMUM SOUND LEVEL HAVING A DURATION OF AT LEAST 60 SECONDS, WHICHEVER IS GREATER, IN EVERY OCCUPIABLE SPACE WITHIN THE BUILDING.
11. AUDIBLE DEVICES SHALL BE SYNCHRONIZED TEMPORAL CODE 3 PATTERN. THE CONTRACTOR SHALL ADJUST/INSTALL ALL DEVICES TO MAXIMIZE PERFORMANCE AND TO MINIMIZE FALSE ALARMS.
12. VISIBLE DEVICES SHOULD NOT EXCEED TWO FLASHES PER SECOND AND SHOULD NOT BE SLOWER THAN ONE FLASH EVERY SECOND. THE DEVICE SHALL HAVE A PULSING LIGHT SOURCE NOT LESS THAN 15 CANDELA VISIBLE DEVICES WITHIN 55' FROM EACH OTHER SHALL BE SYNCHRONIZED. * MINIMUM AND 10%+
13. UNDERGROUND AND EXTERIOR CONDUITS TO HAVE WATER TIGHT FITTINGS AND WIRE TO BE APPROVED FOR WET LOCATIONS.
14. ALL FIRE ALARM WIRING SHALL BE FPLOR FPLP (FIRE POWER LIMITED OR FIRE POWER LIMITED PLENUM) AS REQUIRED FOR APPLICATION. WIRING IN CONDUIT ABOVE GROUND MAY BE TYPE THIN OR THWN.
15. PER CEC STANDARDS, ALL WIRING IS TO BE PULLED THROUGH EACH JUNCTION BOX AND CONNECTED DIRECTLY TO EACH FIRE DEVICE. DO NOT SPLICE THE WIRE. ALL BOXES TO BE SIZED PER CEC.
16. SMOKE DETECTORS SHALL NOT BE ANY CLOSER THAN 1' FROM FIRE SPRINKLERS OR 3' FROM ANY SUPPLY DIFFUSER. IN AREA OF CONSTRUCTION OR POSSIBLE DAMAGE/CONTAMINATION ON NEWLY INSTALLED FIRE ALARM, DEVICES SHALL BE COVERED UNTIL THAT AREA IS READY TO BE TURNED OVER TO THE OWNER.
17. ALL FIRE ALARM CIRCUITS SHALL BE IN CONDUIT, SURFACE RACEWAY OR OPEN RUN ABOVE CEILINGS, UNDER FLOORS AND IN WALLS IN A NEAT AND PROTECTED MANOR AS INDICATED ON DESIGN DOCUMENTS.
18. EXPOSED CIRCUITS ARE ONLY PERMITTED WHEN NOTED AS EXPOSED ON DESIGN DOCUMENTS.
19. FIRE ALARM PANEL, REMOTES, AND COMPONENTS SHALL BE SECURED TO MOUNTING SURFACES PER MANUFACTURERS SPECIFICATIONS. NO SINGLE DEVICE SHALL EXCEED 20 LBS. WITHOUT SPECIAL MOUNTING DETAILS.
20. A DEDICATED BRANCH CIRCUIT SHALL BE PROVIDED FOR FIRE ALARM EQUIPMENT. THIS CIRCUIT SHALL BE ENERGIZED FROM THE COMMON USE AREA PANEL AND SHALL HAVE NO OTHER OUTLETS. THE BREAKER SHALL HAVE A RED LOCKING DEVICE TO BLOCK THE HANDLE IN THE "ON" POSITION. THE CIRCUIT BREAKER SHALL BE LABELED "FIRE ALARM CIRCUIT CONTROL." CIRCUIT ID TO BE LABELED AT FIRE PANEL/EXTENDERS.
21. THE INSTALLING CONTRACTOR SHALL PROVIDE A COMPLETED *SYSTEM RECORD OF COMPLETION FIGURE 7.8.2.
22. FIRE ALARM CONTROL PANELS AND REMOTE ANNUNCIATORS SHALL BE INSTALLED WITH THEIR BOTTOMS MOUNTED AT 48" ABOVE THE FINISHED FLOOR.
23. MICROPHONES ASSOCIATED WITH EMERGENCY VOICE ALARM COMMUNICATION SYSTEMS (EVAC) SHALL BE ACCESSIBLE FOR USE, INSTALLED IN COMPLIANCE WITH CBC SECTIONS 11B-305 AND 11B-308.
24. THE INSTALLING CONTRACTOR SHALL PROVIDE SYSTEM PROGRAMMING FOR SUPERVISORY MONITORING PER CBC SECTION 901.6.2.
25. SUPERVISORY MONITORING SHALL BE TESTED AND VERIFIED AS SENDING CORRECT SIGNALS IN CONJUNCTION WITH FINAL ACCEPTANCE TEST. * PER NFPA 72.
26. OWNER SHALL BE RESPONSIBLE FOR ESTABLISHING A FIRE SYSTEM MONITORING CONTRACT OR PROVISIONS.
27. ALL CARBON MONOXIDE SIGNALS SHALL SOUND A FOUR-PULSE TEMPORAL PATTERN PER NFPA 720, 5.8.6.5.1.
28. ALL EQUIPMENT SHALL BE U.L. AND C.S.F.M. LISTED.
29. ELECTRICAL CONTRACTOR SHALL FURNISH ACCESS PANELS TO AREAS THAT REQUIRE SERVICING, TROUBLESHOOTING, ETC.
30. DO NOT DEVIATE FROM CONDUIT RUNS AS SHOWN ON FLOOR PLANS WITHOUT PRIOR APPROVAL FROM SYSTEM SUPPLIER. FACTORS SUCH AS EXCESSIVE VOLTAGE DROP, ADDITIONAL PARTS, ENGINEERING, ETC., THAT ARE A RESULT OF CONDUIT RUN DEVIATIONS SHALL BE THE SOLE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
31. ALL FAN SHUTDOWN FUNCTIONS, DAMPER CLOSURES, AND ASSOCIATED MECHANICAL SYSTEM FIRE ALARM INTERFACE SHALL BE BY MECHANICAL CONTRACTOR.
32. ALL DUCT SMOKE DETECTORS SHALL BE MOUNTED BY THE MECHANICAL CONTRACTOR. DUCT SMOKE DETECTORS EXPOSED TO THE WEATHER SHALL BE WEATHER PROTECTED BY THE MECHANICAL CONTRACTOR. ALL AIR VELOCITY TESTING SHALL BE PERFORMED BY THE MECHANICAL CONTRACTOR.
33. ALL 120VAC POWER REQUIREMENTS FOR THE FIRE ALARM SYSTEM SHALL BE FURNISHED BY THE ELECTRICAL CONTRACTOR AND SHALL MEET ALL REQUIREMENTS OF THE AUTHORITIES HAVING JURISDICTION.
34. ALL FIRE ALARM DEVICE BACKBOXES, FIRE ALARM TERMINAL CABINETS, GUTTERS, JUNCTION BOXES, AND ASSOCIATED CONDUITS SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR UNLESS OTHERWISE NOTED. REFER TO FIRE ALARM SYMBOL LIST AND/OR MOUNTING DETAILS FOR ADDITIONAL INFORMATION. SYSTEM SUPPLIER PROVIDED BACKBOXES SHALL BE INSTALLED BY ELECTRICAL CONTRACTOR UNLESS OTHERWISE NOTED.
35. SMOKE DETECTOR TESTING SHALL BE ACCOMPLISHED PER THE MANUFACTURER'S INSTRUCTIONS.
36. ALL WIRING, INITIATING DEVICES AND ANNUNCIATOR PANEL SHALL BE SUPERVISED TO THE PRINCIPAL POINT OF ANNUNCIATION. THE FIRE ALARM CONTROL PANEL TO SUPERVISE THE ANNUNCIATOR PANEL, ALL INITIATING AND INDICATING DEVICE CIRCUITS.
37. ALL WIRING SHALL BE CUT FOR IN AND OUT. WIRING SHALL NOT BE LOOPED THROUGH DEVICES.
38. POINT, COMMON ANNUNCIATION, AND T-TAPPING ARE PROHIBITED.
39. PROVIDE 3/4" CONDUIT FROM FIRE ALARM CONTROL PANEL TO TELEPHONE BACKBOARD FOR OWNER PROVIDED CENTRAL STATION MONITORING.
40. ALL CONDUIT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
41. ALL FLOW SWITCHES SHALL BE 2 WIRE WITH NON-ELECTRONIC RETARD TYPE SIMILAR TO THE SYSTEM SENSOR MODEL "HFD SERIES" ONLY.
42. ALL DEVICES IN THE ALARM SYSTEM SHALL BE COMPATIBLE AND INSTALLED PER MANUFACTURER'S SPECIFICATIONS.
43. FIRE ALARM SYSTEM SHALL BE UL LISTED (UUJS).
44. CBC 907.6.5.3 (SFM AMENDMENT) REQUIRES FIRE ALARM TO... "TRANSMIT THE ALARM, SUPERVISORY AND TROUBLE SIGNALS TO AN APPROVED SUPERVISORY STATION IN ACCORDANCE WITH NFPA 72. THE SUPERVISORY STATION SHALL BE LISTED AS EITHER UUFX (CENTRAL STATION) OR UUJS (REMOTE AND PROPRIETARY) BY THE UNDERWRITERS LABORATORY INC. (UL) OR OTHER APPROVED LISTING AND TESTING LABORATORY OR SHALL COMPLY WITH THE REQUIREMENTS OF STANDARD, FM 3011)."
45. SUBSTITUTION OF SYSTEM COMPONENTS OR MANUFACTURER WILL REQUIRE THE CONTRACTOR TO SEPARATELY OBTAIN APPROVAL WITH THE CSFM AT CONTRACTOR'S EXPENSE AND SHALL MEET ALL REQUIREMENTS OF THE SYSTEM AS DESIGNED AND PRE-APPROVED. ALL PROPOSED SUBSTITUTIONS SHALL BE LISTED WITH THE CALIFORNIA STATE FIRE MARSHAL.
46. FINAL ACCEPTANCE TEST TO INCLUDE TESTING THE CONNECTION BETWEEN THE FIRE ALARM PANEL AND THE SUPERVISING STATION.
47. PRIOR TO DEMOLITION, CONTRACTOR SHALL TEST THE INTERCOM SYSTEM TO ENSURE FULL FUNCTIONALITY. GENERATE A LIST OF FAULTY EQUIPMENT AND PROVIDE TO THE OWNER AND THE ARCHITECT. PROVIDE PRICING FOR ANY REQUIRED EQUIPMENT REPAIRS OR REPLACEMENT.
48. CONTRACTOR SHALL DISCONNECT EXISTING FIRE ALARM SYSTEM FROM THE EXISTING INTERCOM SYSTEM. ENSURE THE INTERCOM SYSTEM IS COMPLETELY FUNCTIONAL AFTER DISCONNECTION.
49. CONTRACTOR SHALL CLEARLY MARK THE ABANDON SECTION OF PUBLIC ADDRESS SYSTEM.
50. PROVIDE A FIRE ALARM DOCUMENTATION CABINET PER NFPA72,7.7.2.1.
51. SHOULD ANY EXISTING CONDITIONS SUCH AS DETERIORATION OR NON-COMPLYING CONSTRUCTION BE DISCOVERED WHICH IS NOT COVERED BY THE DSA APPROVED DOCUMENTS WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH TITLE 24, CALIFORNIA CODE OF REGULATION CHANGE DOCUMENT, OR A SEPERATE 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 (CAC 4-317(C)).
52. CHANGES TO THE DIVISION OF THE STATE ARCHITECT -APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY ADDENDA OR CONSTRUCTION CHANGE DOCUMENTS FOR CHANGES TO THE STRUCTURAL, ACCESSIBILITY OR FIRE -SAFETY PORTIONS OF THE PROJECT. CHANGES SHALL BE SUBMITTED TO AND APPROVED BY DSA PRIOR TO COMMENCEMENT OF THE WORK SHOWN THEREON CAC 4-338(C)).
53. PROJECT INSPECTOR TO APPROVE SYSTEM VOICE-EVACUATION INTELLIGIBILITY DURING TESTING PHASE.
54. ALL PENETRATION THROUGH FIRE RATED WALLS SHALL BE PROTECTED FROM THE SPREAD OF FIRE WITH AN APPROVED FIRE STOP SYSTEM EQUAL TO OR GREATER THAN THE FIRE RATING OF THE STRUCTURE /SURFACE BEING PENETRATED AS IDENTIFIED IN CBC CHAPTER 7, UL OR OTHER LAB TESTING CRITERIA, APPROVED TYPES OF MATERIALS SHALL BE IDENTIFIED WITHIN THE ELECTRICAL DRAWING AND SPEC SECTION.

ELEVATION MOUNTING DETAIL



NOTES:

* THE ENTIRE LENS OF STROBE LIGHTS MUST BE BETWEEN 80" AND 96" ABOVE FLOOR FINISH (AFF)
* IF CEILING HEIGHTS EXCEED 30 FEET, STROBE LIGHTS MUST BE SUSPENDED AT OR BELOW 30 FEET
* MANUAL FIRE ALARM BOXES SHALL BE INSTALLED IN ACCORDANCE WITH SECTIONS 907.3.1 THROUGH 907.3.5

MANUAL FIRE ALARM BOXES SHALL BE LOCATED NOT MORE THAN 5 FEET FROM THE ENTRANCE TO EACH EXIT. ADDITIONAL MANUAL FIRE ALARM BOXES SHALL BE LOCATED SO THAT THE TRAVEL DISTANCE TO THE NEAREST BOX DOES NOT EXCEED 200 FEET.

THE HEIGHT OF THE MANUAL FIRE ALARM BOXES SHALL BE A MINIMUM OF 42 INCHES AND A MAXIMUM OF 48 INCHES, MEASURED VERTICALLY, FROM THE FLOOR LEVEL TO THE HIGHEST POINT OF THE ACTIVATING HANDLE OR LEVER OF THE BOX. MANUAL FIRE ALARM BOXES SHALL ALSO COMPLY WITH SECTION 2019 CBC P11B-309.4

EXCEPTIONS: [DSA-AC] IN EXISTING BUILDINGS THERE IS NO REQUIREMENT TO RETROACTIVELY RELOCATE EXISTING MANUAL FIRE ALARM BOXES TO A MINIMUM OF 42 INCHES AND A MAXIMUM OF 48 INCHES FROM THE FLOOR LEVEL TO THE ACTIVATING HANDLE OR LEVER OF THE BOX.

SEQUENCE OF OPERATIONS

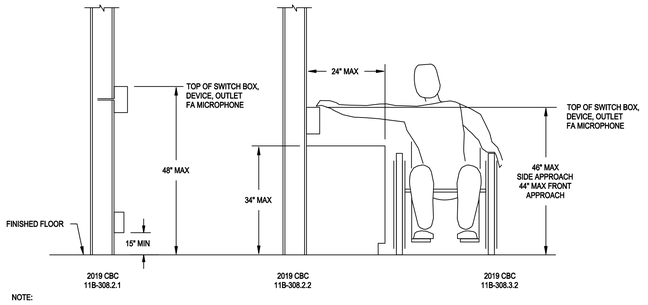
DEVICE / ACTION	MANUAL PULL STATION	AREA SMOKE DETECTOR	HEAT DETECTOR	120VAC POWER FAILURE
SOUND ALARM AT "FACP"	**YES**	**YES**	**YES**	NO
SOUND TROUBLE BUZZER AT "FACP"	NO	NO	NO	**YES**
ANNUNCIATE AT "FACP" AND THE REMOTE ANNUNCIATOR (ALARM OR TROUBLE)	**YES**	**YES**	**YES**	**YES**
ACTIVATE AUDIBLE / VISUAL ALARM SIGNAL THROUGHOUT BUILDING	**YES**	**YES**	**YES**	NO
ACTIVATE CONTROL RELAY TO SHUTDOWN HVAC UNIT	NO	**YES**	NO	NO
CLOSE COMBINATION FIRE/SMOKE DAMPERS	**YES**	**YES**	**YES**	NO
ACTIVATE SIGNAL FOR OFF-SITE MONITORING	**YES**	**YES**	**YES**	**YES**

FIRE ALARM SCOPE

FIRE ALARM SCOPE OF THIS PROJECT IS TO PROVIDE FIRE ALARM ADDRESSABLE CONTROL RELAY OR MULTI-VOLTAGE RELAY AS REQUIRED FOR SHUT-DOWN OF EACH MECHANICAL HVAC UNIT INCLUDING EACH COMBINATION SMOKE FIRE DAMPERS AT THE MECHANICAL ROOMS OF BOTH BOY'S AND GIRLS LOCKER ROOMS AT BUILDING F. ALL UNITS SHALL BE CONNECTED TO AREA SMOKE DETECTION SYSTEM TO SHUT OFF THE UNIT UPON DETECTION OF SMOKE AND ACTIVATE THE FIRE ALARM SYSTEM. INSTALL IN STRICT ACCORDANCE WITH THE 2019 CALIFORNIA MECHANICAL CODE. SECTION 608.

FIRE WATCH NOTE

A FIRE WATCH SHALL BE ESTABLISHED AND THE FIRE DEPARTMENT & FIRE CODE OFFICIAL SHALL BE NOTIFIED IMMEDIATELY WHENEVER THE FIRE PROTECTION / ALARM SYSTEM IS RENDERED OUT OF SERVICE. A FIRE WATCH SHALL BE STAGED WHENEVER THE BUILDING IS OCCUPIED (PARTIAL OR WHOLE) PER DSA IR F-2 AND CFC 901.7.



NOTE:

1. THIS DETAIL APPLIES TO MOUNTING OF ANY MECHANICAL AND ELECTRICAL DEVICE WHICH CONTAINS AN OPERABLE PART THAT IS ADJUSTABLE BY THE OCCUPANT. THIS DOES NOT APPLY TO SENSORS OR CONTROLS THAT ARE ONLY ADJUSTABLE THROUGH THE BUILDING AUTOMATION SYSTEM (IE: TEMPERATURE AND HUMIDITY SENSORS).
2. FORWARD OR FRONT APPROACH FOR DEVICES MOUNTED ABOVE COUNTERS ASSUMES THAT DIRECTLY BELOW THE DEVICE, THE COUNTER HAS A 30" MIN. WIDTH x 27" MIN. HIGH x 19" MIN. DEEP CLEAR OPENING.

MOUNTING OVER OBSTRUCTION DETAIL

WIRE SCHEDULE

WIRE DESIGNATION	WIRE IN CONDUIT	WIRE IN CONDUIT UNDERGROUND/WET LOC.	UNDERGROUND/WET WIRE DESIGNATION
INIT. LOOP Z	2 CONDUCTOR #18 FPL TWISTED/ UNSHIELDED WITH OVERALL JACKET	2 CONDUCTOR #18 FPL TWISTED/ UNSHIELDED WITH OVERALL JACKET	INIT. LOOP UM
POWER CKT. P	2 CONDUCTOR #14 THHN STRANDED	2 CONDUCTOR #12 THWN STRANDED	POWER CKT. P
AUDIBLE LOOP B	2 CONDUCTOR #18 FPL TWISTED/ SHIELDED WITH OVERALL JACKET	2 CONDUCTOR #18 FPL TWISTED/ SHIELDED WITH OVERALL JACKET	POWER CKT. B
NETWORK CONTROL C	2 CONDUCTOR #12 THHN STRANDED	2 CONDUCTOR #12 THWN STRANDED	POWER CKT. C

NOTE:

ALL WIRE MODEL NUMBERS ARE WEST PENN.
EQUIVALENT BY OTHER MANUFACTURER IS ACCEPTABLE.

FIRE ALARM REQUIREMENTS

THE CONTRACTOR SHALL PROVIDE AND SUBMIT THE FIRE ALARM SHOP DRAWINGS TO THE ARCHITECT FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION OF THE FIRE ALARM SYSTEM. THE SUBMITTAL SHALL CONTAIN THE FOLLOWING:

A. SHOP DRAWINGS: COMPLETE 1/8" SCALE FLOOR PLANS SHOWING ALL DEVICES, COMPONENTS, CONDUIT AND WIRING INDICATING A COMPLETE AND OPERABLE SYSTEM AS DESIGNED AND SPECIFIED. REPRODUCED COPIES OF BID SET FIRE ALARM PLANS ARE NOT ACCEPTABLE AS SHOP DRAWINGS. SHOP DRAWINGS MUST ALSO INDICATE DEVICE MOUNTING HEIGHTS, ROOM NAMES AND NUMBERS AND THE LOCATION OF ALL FIRE RATED WALLS.
B. ELECTRICAL CONTRACTOR'S AND FIRE ALARM SYSTEM INSTALLER'S NAME, ADDRESS, PHONE NUMBER AND C-10 LICENSE NUMBER.
C. LIST OF SYSTEM COMPONENTS, EQUIPMENT AND DEVICES, INCLUDING MANUFACTURERS' MODEL NUMBER(S) AND CALIFORNIA STATE FIRE MARSHALL LISTING NUMBERS.
D. ORIGINAL COPIERS OF MANUFACTURERS' SPECIFICATION SHEETS FOR ALL EQUIPMENT AND DEVICES INDICATED.
E. VOLTAGE DROP CALCULATIONS – INCLUDE THE FOLLOWING INFORMATION FOR THE WORST CASE:
   1. POINT-TO-POINT OR OHMS LAW CALCULATIONS.
   2. IDENTIFICATION OF ZONE USED IN CALCULATIONS.
   3. VOLTAGE DROP PERCENT (NOT TO EXCEED MANUFACTURERS' REQUIREMENTS).
      a. NOTE: IF VOLTAGE DROP EXCEEDS 10%, INDICATE MANUFACTURERS' LISTED OPERATING RANGE(S) OR EQUIPMENT AND DEVICES.
   4. NOTE CIRCUIT NUMBER FOR WORST CASE CALCULATION.
F. BATTERY TYPE(S), AMPS HOURS AND LOAD CALCULATIONS – INCLUDE THE FOLLOWING INFORMATION:
   1. NORMAL OPERATION: 100% OF APPLICABLE DEVICES FOR 24 HOURS = CONTROL PANEL AMPS PLUS LIST OF AMPS PER DEVICE WHICH DRAW POWER FROM THE PANEL DURING STANDBY POWER – I.E.:
      a. ZONE MODULES
      b. DETECTORS
      c. OTHER DEVICES (IDENTIFY)
   2. ALARM CONDITION: 100% OF APPLICABLE DEVICES FOR 15 MINUTES = CONTROL PANEL AMPS PLUS LIST OF AMPS PER DEVICE WHICH DRAW POWER FROM THE PANEL DURING STANDBY POWER – I.E.:
      a. ZONE MODULES
      b. SIGNAL MODULES
      c. DETECTORS
      d. SIGNAL DEVICES
      e. ANNUNCIATOR
      f. OTHER DEVICES (IDENTIFY)
   3. NORMAL OPERATION + ALARM OPERATION
      a. TOTAL AMP HOURS REQUIRED.
      b. TOTAL AMP HOURS PROVIDED.

APPLICABLE CODES

PARTIAL LIST OF APPLICABLE CODES AS OF JANUARY 1, 2020 *
2019 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR *
2019 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR
(2018 INTERNATIONAL BUILDING CODE, VOL. 1 & 2, AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR
(2017 NATIONAL ELECTRICAL CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR
(2018 IAPMO UNIFORM MECHANICAL CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR
(2018 IAPMO UNIFORM PLUMBING CODE AND 2019 CALIFORNIA AMENDMENTS)
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2019 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR
(2018 INTERNATIONAL FIRE CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR
(2018 INTERNATIONAL EXISTING BUILDING CODE AND 2019 CALIFORNIA AMENDMENTS)
2019 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR
2019 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR
TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

PARTIAL LIST OF APPLICABLE STANDARDS
NFPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE (CA AMENDED): 2016 EDITION
NFPA 2001 STANDARD ON CLEAN AGENT FIRE EXTINGUISHING SYSTEMS FOR PROTECTION OF COMMERCIAL COOKING EQUIPMENT; 2005 EDITION (R2010)
UL 464 AUDIBLE SIGNALING DEVICES FOR FIRE ALARM AND SIGNALING SYSTEMS, INCLUDING ACCESSORIES; 2003 EDITION
UL 521 STANDARD FOR HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS; 1999 EDITION
UL 1971 STANDARD FOR SIGNALING DEVICES FOR THE HEARING IMPAIRED; 2002 EDITION (R2010)

FOR A COMPLETE LIST OF APPLICABLE NFPA STANDARDS REFER TO 2019 CBC (SFM) CHAPTER 35 AND CALIFORNIA FIRE CODE CHAPTER 80.

SEE CALIFORNIA BUILDING CODE, CHAPTER 35, FOR STATE OF CALIFORNIA AMENDMENTS TO THE NFPA STANDARDS.

SEE CALIFORNIA FIRE CODE , CHAPTER 33 FOR FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION.

* ALL PARTS OF THE 2019 CALIFORNIA BUILDING CODE BECOME EFFECTIVE JANUARY 1, 2020 EXCEPT THE EFFECTIVE DATE FOR THE USE OF THE 2019 BUILDING ENERGY EFFICIENCY STANDARDS (TITLE 24, PART 1, CHAPTER 10) IS JANUARY 8, 2019 AND THE EFFECTIVE DATE FOR THE USE OF THE CALIFORNIA ADMINISTRATIVE CODE (TITLE 24, PART 1, CHAPTER 4) IS JANUARY 8, 2019.

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100% CONSTRUCTION DOCUMENT

KEY PLAN — PLAN NORTH — TRUE NORTH

Engineer

REGISTERED PROFESSIONAL ENGINEER
MATTHEW R. SICHORE
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ELECTRICAL
STATE OF CALIFORNIA

12/31/2022

Architect

CLIENT
NMUSD
PROJECT NUMBER
P2101400ME
DATE 02/08/2021
REVISIONS

#	DESCRIPTION	DATE

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FIRE ALARM SYMBOLS, NOTES AND ABBREVIATIONS

FA0.01



KEY NOTES

1. EXISTING FIRE ALARM CONTROL PANEL "FACP" SIMPLEX 4100U AS INDICATED. FIELD VERIFY THE EXACT LOCATION. REFERENCE DOCUMENT PER A# 04-105319.
2. EXISTING 24"X24"X 12" PULLBOX MOUNTED TO REMAIN PROTECTED IN PLACE.
3. EXISTING 2" CONDUIT AND FIRE ALARM CABLE TO REMAIN AS INDICATED.
4. EXISTING FIRE ALARM VOICE EVACUATION CONTROL PANEL "VECP" AS SHOWN. FIELD VERIFY THE EXACT LOCATION. REFERENCE DOCUMENT PER A# 04-118036.
5. EXISTING FIRE ALARM TERMINAL CABINET (FATC-F), EXISTING FIRE ALARM POWER SUPPLY (FAPS-F) AND EXISTING FIRE ALARM AMPLIFIER (AMP-F) LOCATED AS SHOWN. FIELD VERIFY THE EXACT LOCATION. REFERENCE DOCUMENT PER A# 04-118036.

1 FIRE ALARM SITE PLAN
1" = 60'-0"

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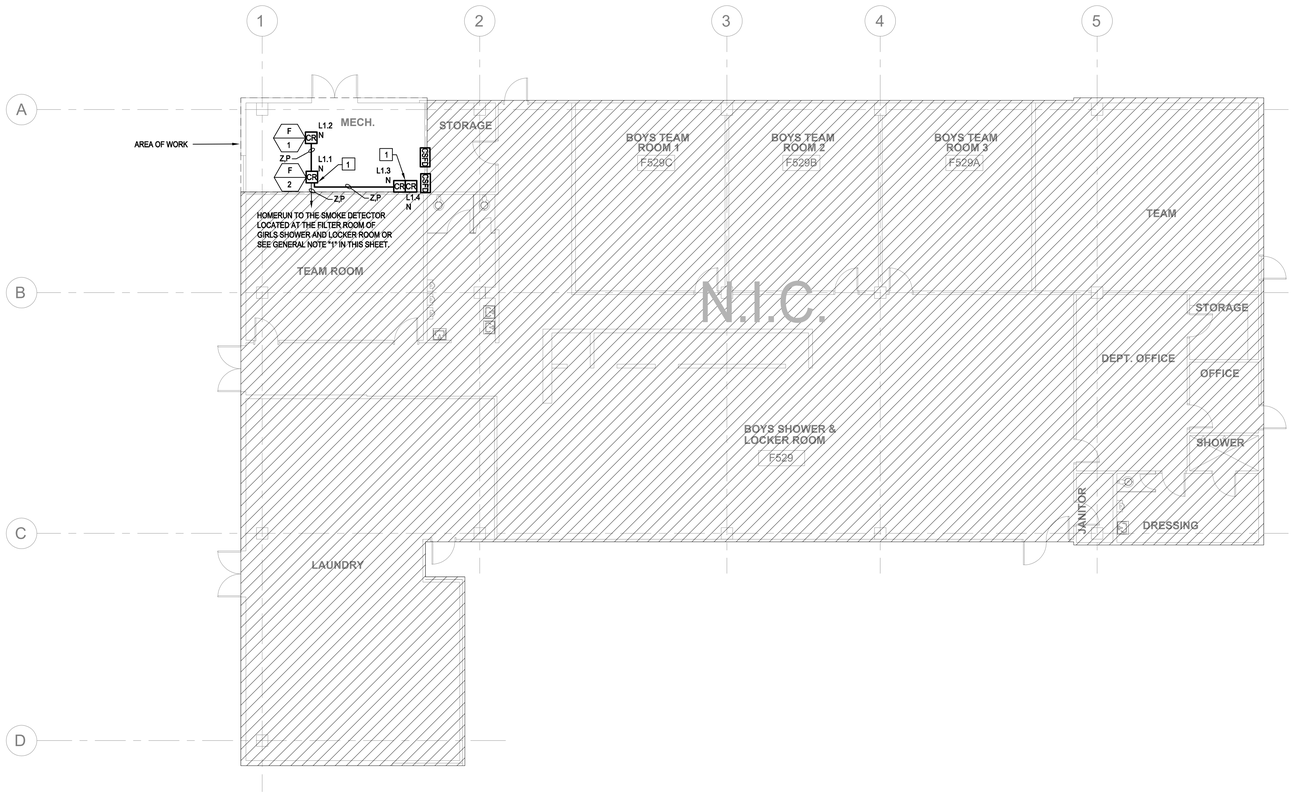
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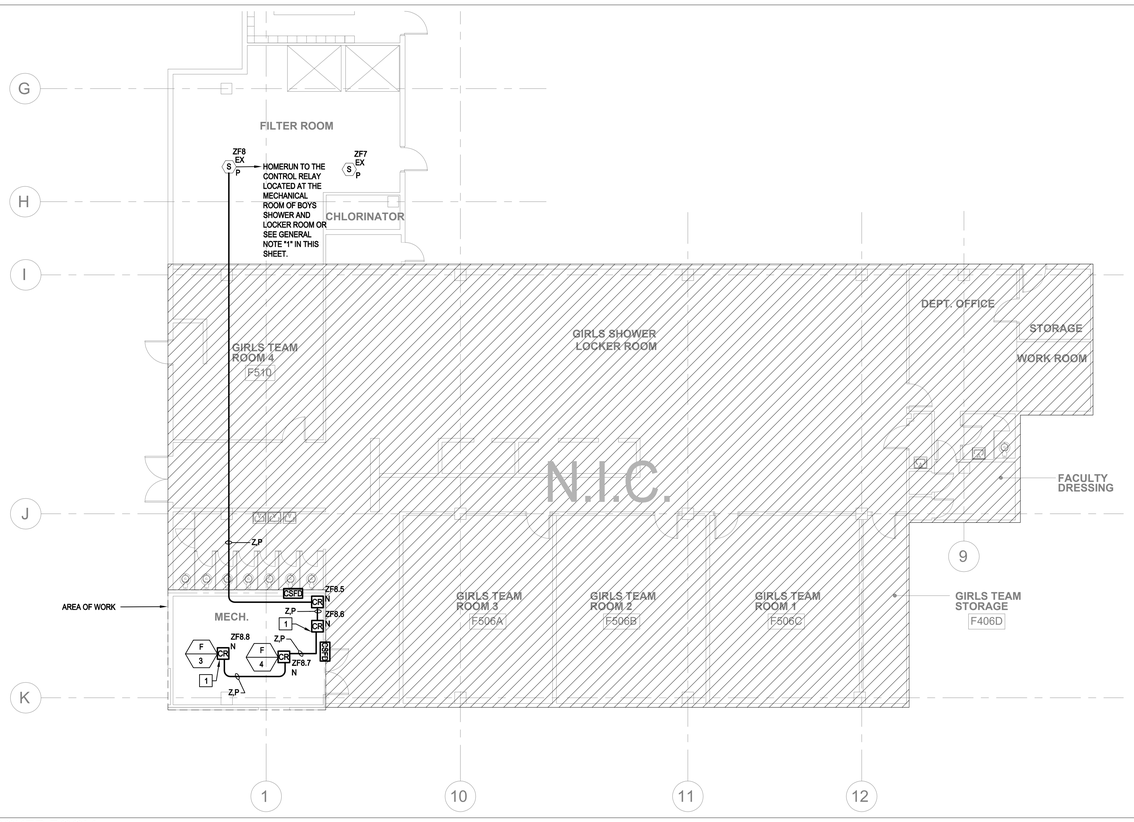
FIRE ALARM SITE PLAN

FA1.00



NORTH

2 BOYS LOCKER ROOM
1/8" = 1'-0"



NORTH

1 GIRLS LOCKER ROOM
1/8" = 1'-0"

GENERAL NOTES

1. PROVIDE CONNECTION BETWEEN THE NEW FIRE ALARM ADDRESSABLE CONTROL RELAY AND NEAREST ADDRESSABLE EXISTING INITIATING DEVICES WITH SHORTER CONDUIT ROUTE IF THAT IS APPLICABLE AND FULFILL THE CODE COMPLIANCE ON A CASE BY CASE BASIS. COORDINATE WITH CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION.

KEY NOTES

1 PROVIDE FIRE ALARM ADDRESSABLE CONTROL RELAY OR MULTI-VOLTAGE RELAY AS REQUIRED FOR SHUT-DOWN OF EACH MECHANICAL HVAC UNIT AND EACH COMBINATION SMOKE FIRE DAMPERS. ALL UNITS SHALL BE CONNECTED TO AREA SMOKE DETECTION SYSTEM TO SHUT OFF THE UNIT UPON DETECTION OF SMOKE AND ACTIVATE THE FIRE ALARM SYSTEM. INSTALL IN STRICT ACCORDANCE WITH THE 2019 CALIFORNIA MECHANICAL CODE. SECTION 608.

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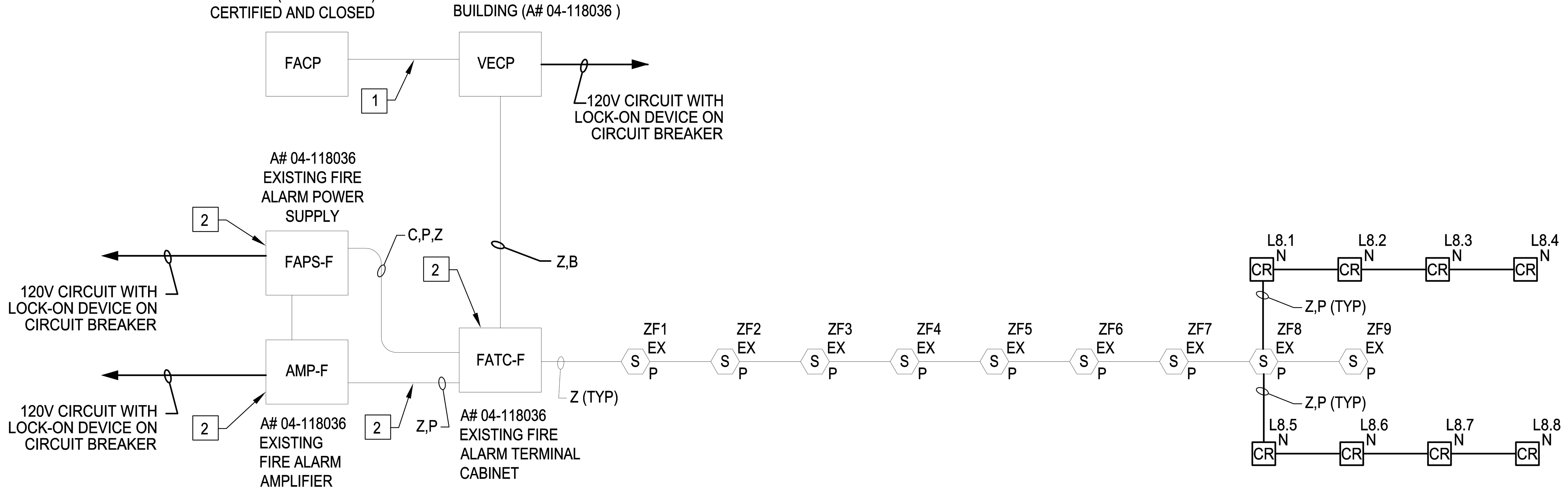
CLIENT
NMUSD
PROJECT NUMBER
P2101400ME
DATE 02/08/2021
REVISIONS

#	DESCRIPTION	DATE

100% CONSTRUCTION DOCUMENT

FIRE ALARM FLOOR PLANS

FA2.01



RISER KEY NOTES

1. EXISTING INTERCONNECTION OF EXISTING VOICE EVACUATION CONTROL PANEL "VECP " AND EXISTING FIRE ALARM CONTROL PANEL "FACP" PANEL ON CAMPUS FOR SYSTEM INTERFACE.

2. EXISTING FIRE ALARM TERMINAL CABINET (FATC-F), EXISTING FIRE ALARM POWER SUPPLY (FAPS-F) AND EXISTING FIRE ALARM AMPLIFIER (AMP-F). REFERENCE SITE PLAN SHEET FA1.00 KEY NOTE 5 INDICATES THE LOCATION OF BUILDING AREA CABINET. FIELD VERIFY THE EXACT LOCATION WITH DISTRICT.

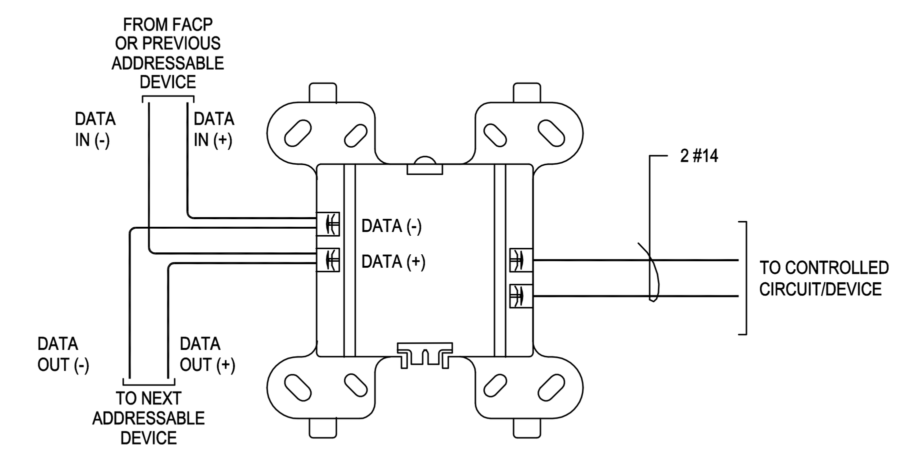
1 FIRE ALARM PARTIAL RISER DIAGRAM
NOT TO SCALE

VECP BATTERY CALCULATION SHEET

VECP
LOCATION: ADMIN BUILDING

QUANTITY			UNIT STANDBY CURRENT(A)	TOTAL STANDBY CURRENT(A)	UNIT ALARM CURRENT(A)	TOTAL ALARM CURRENT(A)
EX	1	CONTROL PANEL	0.340000	0.340000	0.340000	0.340000
EX	1	NETWORK MODULE	0.110000	0.110000	0.110000	0.110000
EX	9	SMOKE DETECTOR	0.000300	0.002700	0.000300	0.002700
NEW	8	CONTROL RELAY	0.000300	0.002400	0.000300	0.002400
		SUB TOTAL		0.455		0.455
		STANDBY CURRENT x 24 Hrs. (AH)		10.922 AH		
		ALARM CURRENT x 15 MINUTES (AH)		0.114 AH		
		TOTAL (AH)		11.036 AH		
		25% DERATING		2.759 AH		
		TOTAL DEMAND (AH)		13.795 AH		
		BATTERY REQUIRED /PROVIDED (EXISTING)		26 AH		

3 FIRE ALARM CONTROL RELAY MODULE DETAIL
NOT TO SCALE



2 FIRE ALARM CONTROL RELAY MODULE DETAIL
NOT TO SCALE

PART 1 -- GENERAL

1.1 SCOPE RELATED DOCUMENTS

A. THE WORK COVERED BY THIS SECTION OF THE SPECIFICATIONS INCLUDE THE FURNISHING OF ALL LABOR, EQUIPMENT, MATERIALS AND PERFORMANCE OF ALL OPERATIONS ASSOCIATED WITH THE INSTALLATION OF THE FIRE ALARM SYSTEMS AS OUTLINED. ALL ITEMS REQUIRED TO COMPLETE THE INSTALLATION WHETHER DETAILED HERE IN THE SPECIFICATION OR ON THE DRAWINGS SHALL BE INCLUDED IN THIS CONTRACT.

B. THE REQUIREMENTS OF THE CONDITIONS OF THE CONTRACT, SUPPLEMENTARY CONDITIONS, AND GENERAL REQUIREMENTS APPLY TO THE WORK SPECIFIED IN THIS SECTION.

C. THE ENTIRE INSTALLATION, INCLUDING MATERIALS AND EQUIPMENT SHALL MEET OR EXCEED THE MINIMUM STANDARDS AND REQUIREMENTS OF THE FOLLOWING:

1. 2019 CALIFORNIA ADMINISTRATIVE CODE (CAC), PART 1, TITLE 24 CCR *

2. 2019 CALIFORNIA BUILDING CODE (CBC), PART 2, TITLE 24 CCR (2018 INTERNATIONAL BUILDING CODE, VOL. 1 & 2, AND 2019 CALIFORNIA AMENDMENTS)

3. 2019 CALIFORNIA ELECTRICAL CODE (CEC), PART 3, TITLE 24 CCR (2017 NATIONAL ELECTRICAL CODE AND 2019 CALIFORNIA AMENDMENTS)

4. 2019 CALIFORNIA MECHANICAL CODE (CMC), PART 4, TITLE 24 CCR (2018 IAPMO UNIFORM MECHANICAL CODE AND 2019 CALIFORNIA AMENDMENTS)

5. 2019 CALIFORNIA PLUMBING CODE (CPC), PART 5, TITLE 24 CCR (2018 IAPMO UNIFORM PLUMBING CODE AND 2019 CALIFORNIA AMENDMENTS)

6. 2019 CALIFORNIA ENERGY CODE (CEC), PART 6, TITLE 24 CCR

7. 2019 CALIFORNIA FIRE CODE (CFC), PART 9, TITLE 24 CCR (2018 INTERNATIONAL FIRE CODE AND 2019 CALIFORNIA AMENDMENTS)

8. 2019 CALIFORNIA EXISTING BUILDING CODE (CEBC), PART 10, TITLE 24 CCR (2018 INTERNATIONAL EXISTING BUILDING CODE AND 2019 CALIFORNIA AMENDMENTS)

9. 2019 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGREEN), PART 11, TITLE 24 CCR

10. 2019 CALIFORNIA REFERENCED STANDARDS CODE, PART 12, TITLE 24 CCR

11. TITLE 19 CCR, PUBLIC SAFETY, STATE FIRE MARSHAL REGULATIONS

PARTIAL LIST OF APPLICABLE STANDARDS ARE FOLLOWING:

1. NFPA 72 NATIONAL FIRE ALARM AND SIGNALING CODE (CA AMENDED): 2016 EDITION

2. NFPA 2001 STANDARD ON CLEAN AGENT FIRE EXTINGUISHING SYSTEMS FOR PROTECTION OF COMMERCIAL COOKING EQUIPMENT; 2005 EDITION (R2010)

3. UL 464 AUDIBLE SIGNALING DEVICES FOR FIRE ALARM AND SIGNALING SYSTEMS, INCLUDING ACCESSORIES; 2003 EDITION

4. UL 521 STANDARD FOR HEAT DETECTORS FOR FIRE PROTECTIVE SIGNALING SYSTEMS; 1999 EDITION

5. UL 1971 STANDARD FOR SIGNALING DEVICES FOR THE HEARING IMPAIRED; 2002 EDITION (R2010)

6. FOR A COMPLETE LIST OF APPLICABLE NFPA STANDARDS REFER TO 2019 CBC (SFM) CHAPTER 35 AND CALIFORNIA FIRE CODE CHAPTER 80.

7. SEE CALIFORNIA BUILDING CODE, CHAPTER 35, FOR STATE OF CALIFORNIA AMENDMENTS TO THE NFPA STANDARDS.

8. SEE CALIFORNIA FIRE CODE , CHAPTER 33 FOR FIRE SAFETY DURING CONSTRUCTION AND DEMOLITION.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS) CALIFORNIA STATE FIRE MARSHALL

A. THE CONTRACTOR SHALL PREPARE EIGHT (8) SETS OF BLUE--LINE DRAWINGS, EIGHT (8) SETS OF SUBMITTAL BOOKLETS, FOR SUBMITTAL TO THE ENGINEER FOR APPROVAL.

B. THE FOLLOWING SHALL BE INCLUDED ON ALL DRAWINGS:

1. BUILDING FLOOR PLAN OF EACH BUILDING DRAWN TO 1/8" SCALE MINIMUM. BUILDING FLOOR PLAN SHALL SHOW LOCATION OF ALL DEVICES, CONDUIT AND INTERCONNECTING WIRES. DEVICE SYMBOLS SHALL BE THE SAME AS ON THE ORIGINAL BID SET OF DRAWINGS. SHOW ALL FIRE RATED CORRIDORS, OCCUPANCY SEPARATIONS AND AREA SEPARATION WALLS. SHOW ALL ROOM IDENTIFICATION NUMBERS/USE.

2. SITE PLAN SHOWING ALL BUILDINGS, CONDUIT AND INTERCONNECTING WIRES.

3. COMPLETE SYMBOL LEGEND (SAME SYMBOLS AS BID SET), SHOWING ALL SYMBOLS, WIRE, MANUFACTURER, MODEL NUMBER, BACK--BOX, MOUNTING HEIGHT AND CSFM LISTING NUMBER.

4. TYPICAL MOUNTING HEIGHT DETAILS.

5. VOLTAGE DROP USING POINT TO POINT OR OHMS LAW CALCULATIONS. VOLTAGE DROP SHALL NOT EXCEED 10 (Ohm)CIRCUIT.

6. BATTERY CALCULATIONS WITH BATTERIES USED:

NORMAL _ 100% FOR APPLICABLE EQUIPMENT AND DEVICES FOR A PERIOD OF 24 HOURS.

ALARM _ 1002' FOR APPLICABLE EQUIPMENT AND DEVICES FOR A PERIOD OF 15 MINUTES.

7. CODES AS USED IN THE DESIGN OF THIS PROJECT.

8. DSA APPLICATION NUMBER AND DISTRICT FILE NUMBER.

9. CLASSIFICATION PER BUILDING. EX: MANUAL, AUTOMATIC, ETC.

10. TYPICAL FIRE PENETRATION DETAIL SHOWING METHODS AND CODES USED.

11. WIRING RISER DIAGRAM INCLUDING BUT NOT LIMITED TO, DEVICES, WIRING, ZONING, EOL'S, ETC.

12. SEQUENCE OF OPERATIONS SCHEDULE.

13. GENERAL NOTES PERTAINING TO THIS PROJECT.

C. THE FOLLOWING SHALL BE INCLUDED IN THE SUBMITTAL BOOK:

1. COVER SHEET: PROJECT NAME, PROJECT LOCATION, ARCHITECT/ENGINEER OF RECORD, SYSTEM SUPPLIER/SYSTEM INSTALLER WITH C_10 LICENSE NUMBER, UL LISTING NUMBER WITH EXPIRATION DATES.

2. TABLE OF CONTENTS: PAGE NUMBERS OF ALL SPECIFICATION SHEETS AND CSFM LISTING NUMBERS.

3. SPECIFICATION SHEETS FOR EACH PIECE OF EQUIPMENT.

4. CSFM LISTING SHEETS.

1.3 EQUIPMENT QUALIFICATION

A. THE SPECIFICATION IS BASED UPON EQUIPMENT AS OUTLINED MANUFACTURER . THE SYSTEM SUPPLIED SHALL BE A MICROPROCESSOR -- BASED DIRECT WIRED, MULTI--PRIORITY PEER--TO PEER NETWORKED SYSTEM. THE SYSTEM SUPPLIED SHALL BE A MICROPROCESSOR--BASED DIRECT WIRED, MULTI--PRIORITY PEER-- TO--PEER NETWORKED SYSTEM. THE SYSTEM SHALL UTILIZE INDEPENDENTLY ADDRESSED, MICROPROCESSOR--BASED EST FIRE ALARM DETECTORS, DEVICES AND MODULES AS DESCRIBED IN THIS SPECIFICATION. IT SHALL BE COMPLETE WITH ALL NECESSARY HARDWARE, SOFTWARE AND MEMORY SPECIFICALLY TAILORED FOR THIS INSTALLATION.

B. ALL EQUIPMENT SHALL CONFORM TO ALL APPLICABLE CODES AND ORDINANCES, AND SHALL BE LISTED BY UNDERWRITERS LABORATORIES AND THE CALIFORNIA STATE FIRE MARSHALL.

1.4 QUALIFICATION OF BIDDERS

A. TO QUALIFY AS AN ACCEPTABLE BIDDER, WHETHER THE BID IS SUBMITTED TO THE OWNER, HIS AGENT, A GENERAL CONTRACTOR OR A SUB_CONTRACTOR, THE SYSTEM BIDDER OR CONTRACTOR SHALL BE A QUALIFIED U.L. LISTED FIRE ALARM CONTRACTOR (AT TIME OF BID) AND SHALL HOLD A VALID C_10 LICENSE ISSUED BY THE CONTRACTORS STATE LICENSE BOARD OF CALIFORNIA. THE SYSTEM BIDDER OR INSTALLING CONTRACTOR SHALL HEREIN BE REFERRED TO AS THE CONTRACTOR. THE CONTRACTOR SHALL ALSO HOLD A STATE OF CALIFORNIA CONSUMER AFFAIRS LICENSE _ BUREAU OF COLLECTION AND INVESTIGATIVE SERVICES. THE CONTRACTOR SHALL ALSO HAVE ON STAFF, A MINIMUM OF THREE NICET CERTIFIED TECHNOLOGISTS (AT TIME OF BID). THIS IS TO INSURE THAT LICENSED INSTALLERS FAMILIAR WITH THIS TYPE OF INSTALLATION WILL BE USED ON THIS PROJECT. THE CONTRACTOR SHALL BE THE FACTORY AUTHORIZED DISTRIBUTOR (AT TIME OF BID), FOR THE BRAND OF EQUIPMENT BEING INSTALLED. THE CONTRACTOR SHALL HAVE BEEN IN THE BUSINESS OF SUPPLYING, INSTALLING AND SERVICING ADDRESSABLE FIRE ALARM SYSTEMS FOR THE PAST 15 YEARS, IN THE STATE OF CALIFORNIA. THE CONTRACTOR SHALL BE ABLE TO REFER TO AT LEAST 20 PROJECTS OF THIS NATURE RENDERING SATISFACTORY SERVICE WITH CONTACT PERSONS, PHONE NUMBERS AND ADDRESSES. THE CONTRACTOR SHALL MAINTAIN A FULLY EQUIPPED SERVICE ORGANIZATION CAPABLE OF FURNISHING ADEQUATE REPAIR SERVICE TO THE EQUIPMENT. THE CONTRACTOR SHALL MAINTAIN AN INVENTORY OF ALL MAJOR COMPONENTS IN STOCK AT ALL TIMES.

THE CONTRACTOR'S OFFICE SHALL BE LOCATED WITHIN 50 MILES OF THE JOB--SITE. THIS WILL INSURE AN ADEQUATE SERVICE RESPONSE, IN A TIMELY MATTER. THE CONTRACTOR SHALL MAINTAIN ON STAFF FOR THE DURATION OF THE PROJECT A MINIMUM OF TWO EST_3 AND FIRE WORKS CERTIFIED INSTALLERS. CONTRACTORS NOT PRE APPROVED IN WRITING 21 DAYS PRIOR TO BID HOUR AND DATE WILL NOT BE CONSIDERED FOR THIS PROJECT. CONTRACTORS NAMED IN 1.03C ABOVE, ARE CONSIDERED TO BE PRE-- APPROVED FOR THIS PROJECT, AND WILL BE ABLE TO SATISFY WARRANTIES ALREADY IN PLACE, WHEN ADDING ONTO THE FIRE WORKS CENTRAL MONITORING SYSTEM PROGRAM.

B. THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR IS TO PROVIDE ALL DRAWINGS, SUBMITTALS, WIRE, DEVICES, EQUIPMENT, INSTALLATION TO CONDUIT SYSTEM FURNISHED AND INSTALLED UNDER SECTION 26000, PROGRAMMING, FINAL TEST OUT AND CERTIFICATION. ALL SPECIALTY FIRE ALARM BACK--BOXES FOR THE CONDUIT SYSTEM INSTALLATION PROVIDED UNDER SECTION 26000, SHALL BE PROVIDED UNDER THIS SECTION. TERMINAL CABINETS, PULL BOXES, ETC. SHALL BE FURNISHED AND INSTALLED UNDER SECTION 26000.

PART 2 -- SYSTEM LAYOUT

2.1 SYSTEM DESCRIPTION

A. THE FIRE ALARM SYSTEM AS OUTLINED ON THE DRAWINGS, SHALL BE A FIRE LIFE SAFETY SYSTEM AS MANUFACTURER. IT SHALL BE COMPLETE WITH ALL NECESSARY HARDWARE, SOFTWARE AND MEMORY SPECIFICALLY TAILORED FOR THIS PROJECT.

B. ALL EQUIPMENT NEEDED FOR A COMPLETE OPERABLE SYSTEM, (WHETHER SPECIFICALLY INDICATED OR NOT) SHALL BE INCLUDED IN THIS SECTION. IT SHALL BE THE INSTALLING CONTRACTORS RESPONSIBILITY FOR A COMPLETE AND OPERABLE SYSTEM UPON COMPLETION OF THIS PROJECT.

2.2 AUTOMATIC ALARM OPERATIONS

A. THE FIRE ALARM SYSTEM OPERATION SUBSEQUENT TO THE ALARM INITIATION VIA PULL STATION, SMOKE DETECTOR, HEAT DETECTOR, SPRINKLER FLOW SWITCH, ETC., SHALL BE AS FOLLOWS:

1. ALL AUDIBLE ALARM INDICATING DEVICES SHALL SOUND THE TEMPORAL SIGNAL CODE IN SYNCHRONIZATION WITH EACH OTHER, UNTIL SILENCED AT THE CONTROL PANEL OR AT THE REMOTE ANNUNCIATOR.

2. ALL VISUAL ALARM INDICATING DEVICES SHALL FLASH PER NFPA REQUIREMENTS IN SYNCHRONIZATION WITH EACH OTHER, UNTIL RESET AT THE CONTROL PANEL OR AT THE REMOTE ANNUNCIATOR.

3. ALARM AUDIBLE DEVICES AND ALARM VISUAL DEVICES SHALL OPERATE ON THE SAME CIRCUIT

4. THE ALARM SIGNALS SHALL BE INHIBITED FROM BEING SILENCED FOR A PERIOD OF AT LEAST 1 MINUTE AFTER COMMENCING OPER ATION. THIS RATE IS TO BE FIELD PROGRAMMABLE FOR ACTUAL AHJ REQUIREMENTS.

5. DISPLAY TYPE AND LOCATION OF ALARM PER POINT ON THE MAIN CONTROL PANEL LCD DISPLAY.

6. DISPLAY TYPE AND LOCATION OF ALARM PER POINT ON REMOTE LCD ANNUNCIATOR.

7. LIST ON PRINTER THE TIME, DATE, TYPE AND USER DEFINED MESSAGE FOR EACH EVENT PRINTED.

8. GRAPHICALLY DISPLAY ON THE FIRE WORKS STATION, SCHOOL DIAGRAM SHOWING WHOLE SCHOOL, WITH GRAPHIC SCROLLING THRU SYSTEM PROMPTS, DOWN TO POINT OF ALARM ACTIVATION.

9. SUBSEQUENT ALARMS ARE TO REPORT TO THE MAIN CONTROL PANEL AND FIRE WORKS, SHALL INDICATE TO THE OPERATOR THAT A SUBSEQUENT ALARM IS PRESENT, AND ALSO INDICATE THE NUMBER OF SUBSEQUENT ALARMS.

10. SHUT DOWN ALL ASSOCIATED AIR HANDLERS IN ALARM ZONE.

11. DE-ENERGIZE DOOR HOLDERS TO RELEASE FIRE DOORS IN ALARM ZONE, IF APPLICABLE.

12. RECALL ELEVATORS AS REQUIRED.

2.3 AUTOMATIC SUPERVISORY OPERATION

A. ALL DATA, INITIATING, INDICATING AND SUPERVISORY LINES SHALL BE CONSTANTLY MONITORED FOR INTEGRITY. INDICATE OPENS, SHORTS, GROUNDS, AT MAIN CONTROL PANEL AND REMOTE ANNUNCIATOR.

2.4 OPERATION

A. DURING THE NORMAL STATE, THE NORMAL LED (GREEN) SHALL FLASH. THE FIRST LINE OF THE LCD SHALL DISPLAY THE TIME IN (HH: MM: SS) AS WELL AS THE NUMBER OF ACTIVE POINTS (AP) AND THE NUMBER OF DISABLED POINTS (DP) IN THE SYSTEM.

B. WHEN THE CONTROL PANEL GOES INTO ALARM CONDITION, THE NORMAL LED (GREEN) EXTINGUISHES AND THE ALARM LED (RED) SHALL LIGHT, THE BUZZER PULSATES, AND THE LCD INDICATES THE TIME, THE NUMBER OF MESSAGES WAITING, THE TYPE OF ALARM, THE POINT ID NUMBER OF DEVICE, AND THE TIME THAT THE ALARM OCCURRED. THE SECOND LINE IS DEDICATED TO THE USER SPECIFIED MESSAGE.

C. TO SILENCE THE PANEL BUZZER, THE OPERATOR SHALL PRESS THE LOCAL SILENCE BUTTON AND THE BUZZER WILL SILENCE.

D. TO SILENCE THE AUDIBLE DEVICES, THE OPERATOR SHALL PRESS THE ALARM SILENCE BUTTON. A NEW ALARM SHALL CAUSE THE AUDIBLES TO RESOUND.

E. DURING THE TROUBLE CONDITION, THE AMBER TROUBLE LED SHALL LIGHT, THE NORMAL LED SHALL GO OUT, AND THE BUZZER SHALL PULSATE. THE DISPLAY SHALL INDICATE THE POINT ID NUMBER OF THE DEVICE, THE TIME THE EVENT OCCURRED AND UP TO A 40 CHARACTER CUSTOM USER DESCRIPTION.

F. DURING THE MONITOR OR SUPERVISORY CONDITION, THE APPROPRIATE LED SHALL LIGHT, THE NORMAL LED SHALL GO OUT, AND THE BUZZER SHALL PULSATE. THE DISPLAY SHALL INDICATE THE POINT ID NUMBER OF THE DEVICE, THE TIME THE EVENT OCCURRED AND UP TO A 40 CHARACTER CUSTOM USER DESCRIPTION.

PART 3 --MATERIALS

3.0 EXISTING FIRE ALARM CONTROL PANELS ARE SIMPLEX 4100U AND FARENHYT SERIES IFP-2100 ECS.

3.1 SIGNATURE SERIES DEVICES -- GENERAL

A. EACH REMOTE DEVICE SHALL HAVE A MICROPROCESSOR WITH NON-VOLATILE MEMORY TO SUPPORT ITS FUNCTION AND SERVICEABILITY. EACH DEVICE SHALL STORE AS REQUIRED FOR ITS FUNCTIONALITY THE FOLLOWING DATA: DEVICE SERIAL NUMBER, DEVICE ADDRESS, DEVICE TYPE, PERSONALITY CODE, DATE OF MANUFACTURE, HOURS IN USE, NUMBER OF ALARMS AND TROUBLES, TIME AND DATE OF LAST ALARM, AMOUNT OF ENVIRONMENTAL COMPENSATION LEFT/USED, LAST MAINTENANCE DATE, JOB/PROJECT NUMBER, CURRENT DETECTOR SENSITIVITY VALUES, DIAGNOSTIC INFORMATION (TROUBLE CODES) AND ALGORITHMS REQUIRED TO PROCESS SENSOR DATA AND PERFORM COMMUNICATIONS WITH THE LOOP CONTROLLER.

B. DEPENDENT ON ITS FUNCTIONALITY, EACH DEVICE SHALL BE CAPABLE OF MONITORING UP TO 32 DIAGNOSTICS CODE. THIS DATA SHALL BE STORED AT THE DEVICE AND AVAILABLE FOR SYSTEM MAINTENANCE.

C. EACH DEVICE SHALL BE CAPABLE OF PERFORMING ITS INTENDED FUNCTION DEPENDENT OF THE CONTROL PANEL, TO LOWER LOOP DATA TRAFFIC. EACH DEVICE SHALL IMMEDIATELY ALERT THE LOOP CONTROLLER OF A STATUS CHANSE TO ACHIEVE A LOOP RESPONSE TIME OF LESS THAN 750MS.

D. EACH DEVICE SHALL BE CAPABLE OF ELECTRONIC ADDRESSING, EITHER AUTOMATICALLY OR APPLICATION PROGRAM DESIGNED, TO SUPPORT PHYSICAL/ELECTRICAL MAPPING AND SUPERVISION BY LOCATION. SETTING A DEVICE'S ADDRESS BY PHYSICAL MEANS SHALL NOT BE NECESSARY. EACH DEVICE SHALL BE INDIVIDUALLY ANNUNCIATED AT THE MAIN CONTROL PANEL AND REMOTE ANNUNCIATOR.

3.2 ADDRESSABLE RELAY MODULE

1. THE IDP-RELAY IS AN ADDRESSABLE RELAY MODULE FOR USE WITH THE HONEYWELL FARENHYT SERIES FRE ALARM CONTROL PANELS (FACPS).THE IDP-RELAY ALLOWS A FAREHYT FACP TO SWITCH DISCRETE CONTACTS BY CODE COMMAND. THE RELAY CONTAINS TWO ISOLATED SETS OF FORM C CONTACTS, WHICH OPERATE AS A DPDT SWITCH. NO SUPERVISION IS PROVIDED FOR THE NOTIFCATION APPLIANCE CIRCUIT.THE IDP-RELAY CONTACTS CAN BE USED FOR VIRTUALLY ANY NORMALLY OPEN OR NORMALLY CLOSED APPLICATION. EACH IDP-RELAY IS PROGRAMMED WITH A UNIQUE SIGNALING LINE CIRCUIT (SLC) LOOP ADDRESS. WHEN AN EVENT OCCURS THAT CONTROLS THE IDP-RELAY, THE RELAY IS TRIGGERED BY THE FACP.ADDRESSABLE RELAY MODULES SHALL BE AVAILABLE FOR HVAC CONTROL AND OTHER NETWORK BUILDING FUNCTIONS.THE RELAY COIL SHALL BE MAGNETICALLY LATCHED TO REDUCE WIRING CONNECTION REQUIREMENTS AND TO ENSURE THAT 100% OF ALL AUXILARY DEVICES ENERGIZE AT THE SAME TIME ON THE SAME PAIR OF WIRES.FOR MULTIPLE RELAY CONTROL A MODULE SHALL BE AVAILABLE THAT PROVIDES 6 PROGRAMMABLE FORM-C RELAY.

3.4 HVAC CONTROL

1. CONTRACTOR SHALL INSTALL AND PROGRAM FIRE ALARM SYSTEM INPUT AND OUTPUT MODULES AS REQUIRED TO EFFECTIVELY ACCOMPLISH SHUTDOWN OF HVAC UNITS AND CLOSURE OF FIRE/SMOKE DAMPERS AS INDICATED AND/OR REQUIRED BY THE MECHANICAL SYSTEM.

3.5 POWER SUPPLY

EXISTING FIRE ALARM POWER SUPPLY PANEL IS FARENHYTE RPS-2000.

3.6 SMOKE DETECTOR

EXISTING FIRE ALARM ADDRESSABLE SMOKE DETECTOR IS MANUFACTURED BY FARENHYT IDP-PHOTO MODEL INCLUDING B200S BASE.

PART 4 EXECUTION

4.1 INSTALLATION

A. WIRING SHALL BE INSTALLED IN CONDUIT AS SPECIFIED UNDER THE ELECTRICAL SECTION OF THE SPECIFICATION (SECTION 26000).

B. THE SUM OF THE CROSS _SECTIONAL AREAS OF INDIVIDUAL CONDUCTORS SHALL NOT EXCEED 40% OF THE INTERIOR CROSS SECTIONAL AREA OF THE CONDUIT. MINIMUM CONDUIT SIZE SHALL BE 3/4 INCH TRADE SIZE.

C. WIRING SHALL BE IDENTIFIED AT TERMINAL AND JUNCTION LOCATIONS TO PREVENT UNINTENTIONAL INTERFERENCE WITH THE CIRCUITS DURING TESTING AND SERVICING.

D. JUNCTION, PULL AND TERMINAL BOXES/CABINETS SHALL BE LABELED. LABELS SHALL BE PERMANENTLY AFFIXED TO COVERS/DOORS. LABELING TO BE FURNISHED AND INSTALLED UNDER SECTION 26000.

E. WIRING COLOR CODE SHALL BE CONSISTENT THROUGHOUT THE SYSTEM AND SHALL ALLOW FOR EASY IDENTIFICATION OF INITIATING, INDICATING AND AUXILIARY CONTROL CIRCUITS.

F. WIRING AT BUILDING TERMINAL CABINETS SHALL BE TERMINATED TO SCREW BARRIER STRIPS, WITH CIRCUITS IDENTIFIED.

G. WIRING IN CONTROL, TERMINAL AND JUNCTION CABINETS SHALL BE NEATLY ARRANGED AND BUNDLED.

H. WIRING SHALL TEST FREE OF EARTH GROUNDS OR SHORTS BETWEEN CONDUCTORS.

I. THE CONTRACTOR SHALL BE RESPONSIBLE AND ASSURE THE USE OF ADEQUATE NUMBERS OF SKILLED WORKMEN, WHO ARE THOROUGHLY TRAINED AND EXPERIENCED, AND COMPLETELY FAMILIAR WITH THE SPECIFIED EQUIPMENT AND CODE REQUIREMENTS.

J. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ASSURING THAT CONDUIT SIZE, WIRE TYPE AND COLOR CODING MEETS THE SPECIFICATION, MANUFACTURERS AND CODE REQUIREMENTS.

CABLE/WIRE

1. ALL CABLE/WIRE FOR THE FIRE ALARM SYSTEM SHALL BE NEW, UNLESS OTHERWISE NOTED ON PLANS.

2. RACEWAYS CONTAINING CONDUCTORS SERVING THE FIRE ALARM SYSTEM SHALL NOT CONTAIN ANY OTHER CONDUCTORS. NO AC CURRENT CARRYING CONDUCTORS SHALL BE ALLOWED IN THE SAME RACEWAY WITH DC FIRE ALARM SYSTEM CONDUCTORS.

3. SYSTEM CABLE/WIRE AND EQUIPMENT INSTALLATION SHALL BE IN ACCORDANCE WITH GOOD ENGINEERING PRACTICES AND IN ACCORDANCE WITH THE CALIFORNIA ELECTRICAL CODE (CEC). ALL CABLE/WIRE SHALL TEST FREE FROM ALL GROUNDS AND SHORTS.

4. SPLICES SHALL NOT BE MADE IN JUNCTION BOXES. TERMINATIONS SHALL BE IN ETRMINAL CABINETS OR ON EQUIPMENT TERMINALS.

5. ALL FIRE ALARM SYSTEM CABLE/WIRE SHALL BE LABELED AT ALL POINTS OF TERMINATION. ALL LABELING SHALL BE BASED ON THE ROOM NUMBERS AS PROVIDED BY THE OWNER OR HIS REPRESENTATIVE.

6. WIRING SHALL BE INSTALLED IN ACCORDANCE WITH LOCAL, STATE, AND NATIONAL CODES AND AS RECOMMENDED BY THE MANUFACTURER OF THE FIRE ALARM SYSTEM.

7. ALL WIRE AND CABLE SHALL BE LISTED AND/OR APPROVED BY A RECOGNIZED NATIONAL TESTING LABORATORY FOR ITS INTENDED PURPOSE.

8. THE SIGNALING LINE CIRCUIT (SLC) LOOP SHALL BE INSTALLED WITH A MINIMUM #18 AWG WIRE, AND SHALL ALLOW THE USE OF NON-TWISTED AND NON-SHIELDED SOLID OR STRANDED WIRE. SYSTEMS THAT REQUIRE TWISTED AND/OR SHIELDED WIRING ARE NOT ACCEPTABLE.

9. NOTIFICATION APPLIANCE CIRCUITS (NAC) SHALL BE WIRED WITH NOT LESS THAN #16 AWG WIRE AS REQUIRED FOR PROPER END OF LINE OPERATING VOLTAGE.

10. ALL FIELD WIRING SHALL BE SUPERVISED FOR OPEN CIRCUITS AND EARTH GROUND FAULTS.

4.02 SYSTEM VERIFICATION

A. UPON COMPLETION OF THE INSTALLATION, THE FIRE ALARM CONTRACTOR SHALL PLACE INTO OPERATION AND TEST ALL OPERATIONAL FEATURES, FUNCTIONS AND DEVICES.

B. UPON COMPLETION OF TESTING, AND AFTER THE SYSTEM HAS BEEN IN OPERATION FOR A MINIMUM OF 5 DAYS WITHOUT FAILURE, THE FIRE ALARM CONTRACTOR SHALL SCHEDULE WITH THE AUTHORITY HAVING JURISDICTION (DSA INSPECTOR), ARCHITECT AND ENGINEER, A DEMONSTRATION AND FIELD ACCEPTANCE TEST.

C. FIELD ACCEPTANCE AND APPROVAL OF THE FIRE ALARM SYSTEM SHALL BE EVIDENCED IN WRITING BY THE AUTHORITY HAVING JURISDICTION.

D. PRIOR TO SCHEDULING FIELD ACCEPTANCE, THE FIRE ALARM SYSTEM CONTRACTOR SHALL CERTIFY IN WRITING, AND RECORD THE METHOD OF TESTING, THE RESULTS OF ALL TESTS AND CERTIFY THAT THE SYSTEM HAS BEEN IN OPERATION A MINIMUM OF 5 DAYS.

E. ALL TESTING SHALL BE CONDUCTED IN ACCORDANCE WITH NFPA_72, CONTRACT DOCUMENTS, MANUFACTURER'S INSTRUCTIONS AND PER THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.

4.03 GUARANTEE AND SERVICE

A. FIRE ALARM SYSTEM CONTRACTOR SHALL PROVIDE WRITTEN GUARANTEES FOR ALL FIRE ALARM EQUIPMENT AND DEVICES USED ON THIS PROJECT FOR A PERIOD OF THREE (3) YEARS FROM THE DATE OF FINAL ACCEPTANCE.

B. DURING THE GUARANTEE PERIOD THE CONTRACTOR SHALL REPAIR OR REPLACE ANY DEFECTIVE MATERIAL AT NO ADDITIONAL COST TO THE OWNER.

4.04 IN SERVICE TRAINING

A. THE FIRE ALARM CONTRACTOR SHALL PROVIDE FACTORY TRAINED REPRESENTATIVES TO DEMONSTRATE THE OPERATION OF THE FIRE ALARM SYSTEM TO THE OWNER'S PERSONNEL. THE REPRESENTATIVE SHALL HAVE A THOROUGH KNOWLEDGE OF THE EQUIPMENT AND OPERATION OF THE SYSTEM. THE CONTRACTOR SHALL PROVIDE ONE (1) 4 HOUR IN_SERVICE TR AINING SESSION.

B. THE FIRE ALARM CONTRACTOR SHALL PROVIDE TO THE AUTHORITY HAVING JURISDICTION A DEMONSTRATION OF SYSTEM OPERATION. SESSION SHALL CONSIST OF ONE (1) 4 HOUR IN_SERVICE TRAINING.

4.05 OPERATION MAINTENANCE MANUALS

A. THE FIRE ALARM CONTRACTOR SHALL PROVIDE TO THE ENGINEER, THREE (3) WEEKS AFTER THE FIELD ACCEPTANCE TEST, TWO (2) SETS OF OPERATING/MAINTENANCE MANUALS AND ONE (1) SET OF AS_BUILT DRAWINGS.

B. AS_BUILT DRAWINGS SHALL INDICATE THE LOCATION OF ALL DEVICES, APPLIANCES, CODING, ZONING, WIRING SEQUENCES, WIRING METHODS, COLOR CODING, IDENTIFICATION, LABELING AND CONNECTIONS OF THE COMPONENTS OF THE FIRE ALARM SYSTEM AS INSTALLED. THE AS--BUILTS SHALL INCLUDE A MAPPING SEQUENCE AS GENERATED BY THE FIRE ALARM CONTROL PANEL AND CONNECTED COMPUTER. SYSTEMS NOT CAPABLE OF THIS FEATURE SHALL GENERATE TRUE DEVICE MAPPING SEQUENCES AS--BUILTS ON AUTO CAD 14. THESE AS--BUILTS SHALL SHOW THE PHYSICAL LAYOUT OF ALL ADDRESSABLE DEVICES AS THEY WERE ACTUALLY INSTALLED ON THE LOOP.

END OF SECTION

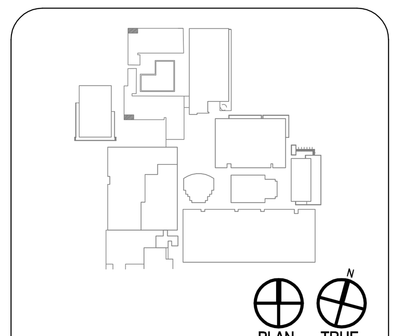
4 FIRE ALARM SPEC
NOT TO SCALE

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100% CONSTRUCTION DOCUMENT



KEY PLAN
PLAN NORTH TRUE NORTH

Engineer
REGISTERED PROFESSIONAL ENGINEER MATTHEW R. SICKOREZ E 20162 ELECTRICAL STATE OF CALIFORNIA
12/31/2022

Architect

CLIENT	NMUSD	
PROJECT NUMBER	P2101400ME	
DATE	02/08/2021	
REVISIONS		
#	DESCRIPTION	DATE

100% CONSTRUCTION DOCUMENT

FIRE ALARM SPEC, DETAILS, RISER DIAGRAM & CALCS.

FA4.01