

Applicable Code: 2019 CBC

16 Chapters 13, 26, and 30:

with the above requirements.

MEP Component Anchorage Note

All permanent equipment and components.

to be restrained in a manner approved by DSA.

02/05/2020

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-

2. Temporary, movable or mobile equipment that is permanently attached (e.g. hard wired) to the building

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

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

A. Components weighing less than 400 pounds and having a center of mass located 4 feet or less above

B. Components weighing less than 20 pounds, or in the case of distributed systems, less than 5 pounds per

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

Piping, ductwork, and electrical distribution systems shall be braced to comply with the forces and displacements prescribed in ASCE 7-16 Section 13.3 as defined in ASCE 7-16 Sections 13.6.5, 13.6.6, 13.6.7, 13.6.8; and

The method of showing bracing and attachments to the structure for the identified distribution system are as noted below. When bracing and attachments are based on a preapproved installation guide (e.g., OSHPD OPM for 2013 CBC or later), copies of the bracing system installation guide or manual shall be available on the jobsite prior to the start of and during the hanging and bracing of the distribution systems. The Structural Engineer of

Mechanical Piping (MP), Mechanical Ducts (MD), Plumbing Piping (PP), Electrical Distribution Systems (E):

MP MD PP E Option 1: Detailed on the approved drawings with project specific notes and

MP MD PP E Option 2: Shall comply with the applicable OSHPD Pre-Approval (OPM #)

connections except plugs for 110/220 volt receptacles having a flexible cable.

connections must allow movement in both transverse and longitudinal directions:

the adjacent floor or roof level that directly support the component.

foot, which are suspended from a roof or floor or hung from a wall.

Record shall verify the adequacy of the structure to support the hanger and brace loads.

Piping, Ductwork, and Electrical Distribution System Bracing Note

2019 CBC, Sections 1617A.1.24, 1617A.1.25 and 1617A.1.26.

utility services such as electricity, gas or water. "Permanently attached" shall include all electrical

AC - ALTERNATING CURRENT ACH - ABOVE COUNTER HEIGHT AFF - ABOVE FINISHED FLOOR OR GRADE AIC - AMPS INTERRUPTING CAPACITY AL - ALUMINUM AIS - AUTOMATIC TRANSFER SWITCH BCT - BONDING CONDUCTOR FOR TELECOMMUNICATIONS. BGES - BUILDING GROUND ELECTRODE SYSTEM BRKR - BREAKER BOD - BOTTOM OF DEVICE C OF CONDUIT CAB - CABINET CCE - CALIFORNIA ELECTRIC CODE CKT - CIRCUIT COD - CENTER OF DEVICE CR - CONTROLLED RECEPTACLE CT - CURRENT REANSFORMER DC - DIRECT CURRENT (E) OF EXISTING EEOR - ELECTRICAL ENGINEER OF RECORD EGC - EQUIPMENT GROUNDING CONDUCTOR ENC - ENCLOSURE (F) - FUTURE FACTU - FIRE ALARM CONTROL PANEL FACTU - FIRE ALARM CONTROL UNIT FSD - FIRE SMOKE DAMPER G - EQUIPMENT GROUNDING CONDUCTOR GFC - GROUND FAULT CIRCUIT INTERRUPT J JUNCTION BOX LAUN - LAUNDRY LOP - LIGHTING CONTROL PANEL LIG - LIGHTING CONTROL PANEL LOP - LIGHTING CONTROL PANEL LO	A	- AMMETER, AMPERE
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LUF - LIGHTING CONTROL FANEL  LTG - LIGHTING CONTROL FANEL  MBJ - MAIN BONDING JUMPER  MCB - MAIN CIRCUIT BREAKER  MFR - MANUFACTURER  MLO - MAIN LUG ONLY  MOCP - MAXIMUM OVERCURRENT PROTECTION  MSB - MAIN SWITCH BOARD  MTS - MANUAL TRANSFER SWITCH  NEC - NATIONAL ELECTRIC CODE  NEMA - NATIONAL ELECTRIC MANUFACTURER'S ASSOCIATION  N - NEUTRAL  (N) - NEW  OFCI - OWNER FURNISHED, CONTRACTOR INSTALLED  OFOI - OWNER FURNISHED, OWNER INSTALLED  PB - PULLBOX  PNL - PANELBOARD  PLR - PLUG LOAD RELAY  RCPT - RECEPTACLE  RM - ROOM  SWBD - SWITCHBOARD  SBJ - SYSTEM BONDING JUMPER  SSBJ - SUPPLY SIDE BONDING JUMPER  T - THERMOSTAT OR TELE CONDUIT  TBB - TELECOMMUNICATIONS BONDING  TGB - TELECOMMUNICATIONS GROUND BUS  TOD - TOP OF DEVICE  TR - TAMPER  TYP - TYPICAL  V - WOLTMETER, VOLT  W - WAIT  WW - WIREWAY	ENC	
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SSBJ - SUPPLY SIDE BONDING JUMPER T - THERMOSTAT OR TELE CONDUIT TBB - TELECOMMUNICATIONS BONDING TGB - TELECOMMUNICATIONS GROUND BUS TMGB - TELECOMMUNICATIONTIONS MAIN GROUND BUS TOD - TOP OF DEVICE TR - TAMPER TYP - TYPICAL V - VOLTMETER, VOLT W - WATT WW - WIREWAY		
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TGB - TELECOMMUNICATIONS GROUND BUS TMGB - TELECOMMUNICATIONTIONS MAIN GROUND BUS TOD - TOP OF DEVICE TR - TAMPER TYP - TYPICAL V - VOLTMETER, VOLT W - WATT WW - WIREWAY	—   т	- THERMOSTAT OR TELE CONDUIT
TMGB - TELECOMMUNICATIONTIONS MAIN GROUND BUS TOD - TOP OF DEVICE TR - TAMPER TYP - TYPICAL V - VOLTMETER, VOLT W - WATT WW - WIREWAY		
TOD - TOP OF DEVICE TR - TAMPER TYP - TYPICAL V - VOLTMETER, VOLT W - WATT WW - WIREWAY		
TR - TAMPER TYP - TYPICAL V - VOLTMETER, VOLT W - WATT WW - WIREWAY		
TYP - TYPICAL V - VOLTMETER, VOLT W - WATT WW - WIREWAY		
W - WATT WW - WIREWAY	TYP	- TYPICAL
WW - WIREWAY		
	WP WP	- WIREWAY - WEATHERPROOF (NEMA 3R)
XFMR - TRANSFORMER		,

Revised: 02/14/2020

#### **ELECTRICAL SPECIFICATIONS** PART 1 - GENERAL A. NEMA PB 1, CEC, AND UL 67. 1.1 INTENT OF PLANS A. ELECTRICAL PLAN DRAWINGS SHOW ONLY GENERAL LOCATIONS OF EQUIPMENT, DEVICES, AND RACEWAY UNLESS SPECIFICALLY DIMENSIONED. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER ROUTING OF RACEWAY, SUBJECT TO THE APPROVAL OF THE ENGINEER. MAKE ADJUSTMENTS AS NECESSARY TO WIRING, CONDUIT, DISCONNECTS, BRANCH CIRCUIT PROTECTION, AND OTHER AFFECTED MATERIAL OR EQUIPMENT TO ACCOMMODATE ACTUAL EQUIPMENT SUPPLIED FOR THIS PROJECT. 1.2 CODES, PERMITS, AND REGULATIONS a. FASTENED WITH HINGED FRONT TRIM. A. DO ALL WORK AND INSTALL PRODUCTS IN ACCORDANCE WITH APPLICABLE NECA REQUIREMENTS, THE b. TRIM SIZE: REQUIREMENTS OF APPLICABLE STATE AND LOCAL LAWS, CODES AND ORDINANCES. THE CONTRACTOR SHALL ADHERE TO THE SPECIFIC PRODUCT AND INSTALLATION REQUIREMENTS OF THE UTILITY COMPANIES. CONFLICTS, IF ANY, WILL BE RESOLVED AT THE DISCRETION OF THE ENGINEER. B. IT IS OF THE UTMOST IMPORTANCE THAT THE INSTALLING CONTRACTOR HAVE A MASTERY OF THE PROJECT-5. INTERIOR. SPECIFIC REQUIREMENTS SHOWN IN SPECIFICATIONS AND PLANS. IT IS STRONGLY ADVISED THAT THE CONTRACTOR CONTACT THE EEOR FOR CLARIFICATION OR RFI THE EEOR IF FURTHER INFORMATION IS REQUIRED. THE EEOR SHALL REQUIRE REVISIONS TO BE MADE IN THE FIELD IF THE INSTALLATION DOES NOT FALL WITHIN THESE PROJECT-SPECIFIC GUIDELINES, NO ALLOWANCE SHALL BE MADE FOR INSTALLATIONS NOT ADHERING TO THESE REQUIREMENTS. 6. DOOR HINGES: CONCEALED. 7. LOCKING DEVICE: a. FLUSH TYPE. 1. BEFORE ANY MATERIAL IS FABRICATED OR SHIPPED, FURNISH TO THE ENGINEER FULL DETAILS, SHOP DRAWINGS, DIMENSIONS, CATALOG CUTS, SCHEMATIC (ELEMENTARY) DIAGRAMS, AND OTHER DESCRIPTIVE MATTER AS REQUIRED TO FULLY DESCRIBE THE EQUIPMENT SPECIFIED. FOR SERVICE ENTRANCE EQUIPMENT, METER BASE, AND OTHER RELATED MATERIALS, OBTAIN WRITTEN APPROVAL INTERIOR OF DOOR. OF SUBMITTALS FROM THE SERVING UTILITY BEFORE SUBMITTING TO THE ENGINEER. 1.4 TESTING RELATED SUBMITTALS A. TEST PROCEDURES: SUBMIT THE PROCEDURES TO BE FOLLOWED DURING THE OPERATIONAL READINESS TEST. PROCEDURES SHALL INCLUDE TEST DESCRIPTIONS, FORMS, AND CHECKLISTS TO BE USED TO CONTROL AND DOCUMENT THE REQUIRED TESTS. UPON COMPLETION OF EACH REQUIRED TEST. FUTURE POSITIONS. DOCUMENT THE TEST BY SUBMITTING A COPY OF THE SIGNED OFF TEST PROCEDURES. 1.5 DIVISION OF WORK BETWEEN ELECTRICAL AND MECHANICAL SCREW FOR EACH CIRCUIT.

#### INCORRECTLY ASSUMING ANOTHER TRADE WILL BE PERFORMING YOUR WORK. CONFIRM YOUR SCOPE OF WORK WITH THE GENERAL CONTRACTOR. PART 2 – PRODUCTS

ı	NOTE	
	A.	unless otherwise indicated, provide all first-quality new materials, free from any defects,
		AND SUITABLE FOR THE INTENDED USE AND THE SPACE PROVIDED. PROVIDE MATERIALS APPROVED BY UL
		WHEREVER STANDARDS HAVE BEEN ESTABLISHED BY THAT ORGANIZATION. FURNISH AND INSTALL ALL
		INCIDENTAL ITEMS NOT SPECIFICALLY SHOWN OR SPECIFIED WHICH ARE REQUIRED TO PROVIDE THE
		COMPLETE SYSTEMS SPECIFIED HEREIN. WHERE TWO OR MORE UNITS OF THE SAME CLASS OF MATERIAL
		OR EQUIPMENT ARE REQUIRED, PROVIDE PRODUCTS OF A SINGLE MANUFACTURER. COMPONENT PARTS
		OF MATERIALS OR EQUIPMENT NEED NOT BE PRODUCTS OF THE SAME MANUFACTURER.
)	EQI	JIPMENT FINISH

A. CLOSE COORDINATION BETWEEN THE ELECTRICAL AND MECHANICAL TRADES IS A PART OF THE WORK

THAT IS REQUIRED BY THIS CONTRACT. NO ALLOWANCE WILL BE MADE FOR OMISSIONS BASED ON

- A. UNLESS OTHERWISE INDICATED, FINISH FOR ELECTRICAL EQUIPMENT AND ENCLOSURES SHALL BE MANUFACTURER'S STANDARD GRAY OR ANSI 61 GRAY OVER A PRIMER AND RUST INHIBITOR.
- 2.3 OUTLET AND DEVICE BOXES A. SHEET STEEL: ONE-PIECE DRAWN TYPE, ZINC- OR CADMIUM-PLATED. 2.4 CONDUIT AND TUBING
- A. GALVANIZED RIGID STEEL CONDUIT (GRS): MEET REQUIREMENTS OF ANSI C80.1 AND UL 6. MATERIAL: HOT-DIP GALVANIZED, WITH CHROMATED PROTECTIVE LAYER.

a. INSULATION:

- B. FLEXIBLE METAL, LIQUID-TIGHT CONDUIT: TEMPERATURE RATED FOR 80°C.
- 3. MATERIAL: GALVANIZED STEEL, WITH AN EXTRUDED PVC JACKET.
- A. GALVANIZED RIGID STEE MEET REQUIREMENTS OF UL 514B. TYPE: THREADED, GALVANIZED. SETSCREW FITTINGS NOT PERMITTED.
- . MATERIAL: MALLEABLE IRON WITH INSULATED THROAT. 2.6 CONDUCTORS A. ELECTRICAL TERMINALS AND TERMINATIONS: IT IS ASSUMED THAT ALL TERMINATIONS IN THE FIELD SHALL HAVE MINIMUM RATED 75°C RATED TERMINALS. THE CONTRACTOR SHALL FIELD VERIFY ALL TERMINALS FOR CONNECTION IN COMPLIANCE WITH CEC 110.14. THE CONTRACTOR SHALL INFORM THE ENGINEER
- OF RECORD OF ANY TERMINALS DEVIATING FROM A RATING OF 75°C. ALL CONDUCTORS ARE RATED FOR 75°C ON PLANS UNLESS OTHERWISE NOTED B. ALL CONDUCTORS SHOWN SHALL BE NEW UNLESS OTHERWISE INDICATED. 1. DESCRIPTION: FLEXIBLE, INSULATED AND UNINSULATED, DRAWN ALUMINUM CURRENT-CARRYING CONDUCTOR WITH AN OVERALL INSULATION LAYER OR JACKET, OR BOTH, RATED 600 VAC OR LESS.
- TYPE THHN AND TYPE THWN-2: COMPLY WITH UL 83. TYPE XHHW-2: COMPLY WITH UL 44. A. DESCRIPTION: RUBBER / STEEL PIPE SUPPORT FOR SUPPORT OF CONDUIT SYSTEMS.
- B. MATERIALS: CURB BASE SHALL BE MADE OF RUBBER AND POLYURETHANE PREPOLYMER WITH A UNIFORM LOAD CAPACITY OF 500 POUNDS PER LINEAR FOOT OF SUPPORT. STEEL FRAME, STRUT GALVANIZED PER ASTM A653 OR STRUT GALVANIZED PER ASTM A653 FOR BRIDGE SERIES DIMENSIONS: 6 INCHES WIDE BY 6 ½" INCHES TALL BY 9 ½" LONG.
- ATTACHING HARDWARE: ZINC-PLATED THREADED ROD, NUTS AND ATTACHING HARDWARE PER ASTM B633. TYPE OF ROOFTOP SUPPORTS RUBBER BLOCK SUPPORTS – DURA-BLOK™ MODEL # DMB BASE DIMENSIONS: 6-INCH WIDE BY 4-INCH TALL BY 9.6 -INCH LENGTH, ACCESSORIES ARE FASTENED DIRECTLY INTO RUBBER MATERIAL WITH WEATHER RESISTANT TYPE 12 LAG SCREWS. 2. CONTINUOUS BLOCK CHANNEL SUPPORTS – DURA-BLOK™ DB-SERIES OR DB6-SERIES: DIMENSIONS 6-
- INCH WIDE BY 6.5 -INCH TALL BY 9.6 -INCH LENGTH. ASSEMBLY HAS 1"GAPS BETWEEN BLOCKS FOR FREE FLOW OF WATER. STANDARD STRUT ACCESSORIES CAN BE USED FOR ATTACHMENT.

# 2.8 LIGHTING AND POWER DISTRIBUTION PANELBOARD

- SHORT-CIRCUIT CURRENT EQUIPMENT RATING: FULLY RATED; SERIES CONNECTED UNACCEPTABLE 1. NEMA 3R, INDUSTRIAL USE, UNLESS OTHERWISE SHOWN.
- MATERIAL: GALVANIZED SHEET STEEL. WIRING GUTTER: MINIMUM 4-INCH SQUARE; BOTH SIDES, TOP AND BOTTOM.
- SURFACE MOUNTED: SAME AS BOX. FLUSH MOUNTED: ¾-INCH LARGER THAN BOX ON ALL SIDES. :. FINISH: RUST INHIBITOR PRIME, WITH MANUFACTURER'S STANDARD BAKED ENAMEL OR LACQUER.
- a. FACTORY ASSEMBLED, COMPLETE WITH CIRCUIT BREAKERS. b. CAPABLE OF CIRCUIT BREAKER REPLACEMENT WITHOUT DISTURBING ADJACENT CIRCUIT
- BREAKERS OR WITHOUT REMOVING MAIN BUS. SPACES: COVER OPENINGS WITH EASILY REMOVABLE METAL COVER.
- b. DOORS OVER 30 INCHES IN HEIGHT: MULTIPOINT. . IDENTICAL KEYLOCKS, WITH TWO MILLED KEYS EACH LOCK. 8. CIRCUIT DIRECTORY: METAL FRAME WITH TRANSPARENT PLASTIC FACE AND ENCLOSED CARD ON
- . MATERIAL: TIN-PLATED ALUMINUM, FULL SIZED THROUGHOUT LENGTH.
- E. PROVIDE FOR MOUNTING OF FUTURE CIRCUIT BREAKERS ALONG FULL LENGTH OF BUS REGARDLESS OF NUMBER OF UNITS AND SPACES SHOWN. MACHINE, DRILL, AND TAP AS REQUIRED FOR CURRENT AND F. GROUND: COPPER, INSTALLED ON PANELBOARD FRAME, BONDED TO BOX WITH AT LEAST ONE TERMINAL
- G. LUGS AND CONNECTION POINTS: SUITABLE FOR EITHER COPPER OR ALUMINUM CONDUCTORS. H. CIRCUIT BREAKERS: 1. NEMA AB 1 AND UL 489. 2. THERMAL-MAGNETIC, QUICK-MAKE, QUICK-BREAK, MOLDED CASE, OF THE INDICATING TYPE SHOWING ON/OFF AND TRIPPED POSITIONS OF OPERATING HANDLE.

3. NONINTERCHANGEABLE, IN ACCORDANCE WITH CEC.

4. PROVISIONS FOR HANDLE PADLOCKING, UNLESS OTHERWISE SHOWN.

5. BOLT-ON CIRCUIT BREAKERS IN ALL PANELBOARDS. 6. MULTI-POLE CIRCUIT BREAKERS DESIGNED TO AUTOMATICALLY OPEN ALL POLES WHEN AN OVERLOAD OCCURS ON ONE POLE. 7. DO NOT SUBSTITUTE SINGLE-POLE CIRCUIT BREAKERS WITH HANDLE TIES FOR MULTIPLE BREAKERS. 8. DO NOT USE TANDEM OR DUAL CIRCUIT BREAKERS IN NORMAL SINGLE-POLE SPACES.

## PART 3 - EXECUTION

- A. COORDINATE ELECTRICAL WORK WITH THE OWNER AND THE WORK OF OTHER TRADES TO AVOID CONFLICTS, ERRORS, DELAYS, AND UNNECESSARY INTERFERENCE DURING CONSTRUCTION. 3.2 PROTECTION DURING CONSTRUCTION
- A. FOLLOWING INSTALLATION, PROTECT MATERIALS, EQUIPMENT, AND INSULATION FROM CORROSION, PHYSICAL DAMAGE, AND MOISTURE. CAP CONDUIT RUNS DURING CONSTRUCTION WITH MANUFACTURED SEALS. KEEP OPENINGS IN BOXES OR EQUIPMENT CLOSED DURING CONSTRUCTION. 3.3 MATERIAL AND EQUIPMENT INSTALLATION A. FOLLOW THE MANUFACTURER'S INSTALLATION RECOMMENDATIONS UNLESS OTHERWISE INDICATED.
- FOLLOW THE ENGINEER'S DECISION, WHEREVER ANY CONFLICT ARISES. KEEP COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AVAILABLE ON THE JOBSITE FOR REVIEW AT ALL TIMES. INSTALL FREESTANDING EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. SECURE FREESTANDING EQUIPMENT RIGIDLY TO FLOORS OR MOUNTING PADS WITH ANCHOR BOLTS, EXPANSION SHIELDS, OR OTHER APPROVED MEANS.
- 3.4 CUTTING AND PATCHING A. DO NOT CUT OR NOTCH ANY STRUCTURAL MEMBER OR BUILDING SURFACE WITHOUT SPECIFIC APPROVAL OF THE ENGINEER. FOLLOWING SUCH WORK, RESTORE SURFACES NEATLY TO NEW CONDITION USING SKILLED CRAFTSMEN OF THE TRADES INVOLVED. 3.5 CLEANING AND TOUCH-UP PAINTING
- A. KEEP THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIAL OR RUBBISH. UPON COMPLETION OF WORK, REMOVE MATERIALS, SCRAPS, AND DEBRIS FROM THE PREMISES AND FROM THE INTERIOR AND EXTERIOR OF ALL DEVICES AND EQUIPMENT. REFINISH DAMAGED SURFACES TO NEW CONDITION USING SKILLED CRAFTSMEN OF THE TRADES INVOLVED.
- 3.6 RACEWAY SYSTEM A. UNLESS OTHERWISE SPECIFIED OR INDICATED, WIRING SHALL CONSIST OF INSULATED CONDUCTORS INSTALLED IN RACEWAYS OF THE TYPES INDICATED: B. EXTERIOR, EXPOSED: GALVANIZED RIGID STEEL. C. INTERIOR, FXPOSFD:
- . GALVANIZED RIGID STEEL: ALL AREAS EXCEPT AS INDICATED BELOW. D. FOR EQUIPMENT WHERE FLEXIBLE CONNECTION IS REQUIRED TO MINIMIZE VIBRATION: FLEXIBLE METAL LIQUID-TIGHT CONDUIT
- 2. LENGTH: 18-INCH MINIMUM, 48-INCH MAXIMUM OF SUFFICIENT LENGTH TO ALLOW MOVEMENT OR ADJUSTMENT OF EQUIPMENT. E. SUPPORT BOXES INDEPENDENTLY OF CONDUIT BY ATTACHMENT TO BUILDING STRUCTURE OR STRUCTURAL ARED INICTALL RAP HANGERS IN FRAM SCREWS ON WOOD, BOLTS AND EXPANSION SHIFLDS ON CONCRETE OR BRICK, TOGGLE BOLTS ON
- HOLLOW MASONRY UNITS, AND MACHINE SCREWS OR WELDED THREADED STUDS ON STEELWORK. 3.7 RACEWAY INSTALLATION CONDUIT AND TUBING SIZES SHOWN ARE BASED ON THE USE OF COPPER CONDUCTORS. MAINTAIN RACEWAY ENTIRELY FREE OF OBSTRUCTIONS AND MOISTURE.
- GROUP RACEWAYS INSTALLED IN SAME AREA. FOLLOW STRUCTURAL SURFACE CONTOURS WHEN INSTALLING EXPOSED RACEWAYS. AVOID OBSTRUCTION OF PASSAGEWAYS. RUN EXPOSED RACEWAYS PARALLEL OR PERPENDICULAR TO WALLS,
- STRUCTURAL MEMBERS, OR INTERSECTIONS OF VERTICAL PLANES. INSTALL WATERTIGHT FITTINGS IN OUTDOOR, UNDERGROUND, OR WET LOCATIONS. F. ALL METAL CONDUIT TO BE REAMED, BURRS REMOVED, AND CLEANED BEFORE INSTALLATION OF
- CONDUCTORS, WIRES, OR CABLES. 3.8 RACEWAY PENETRATIONS

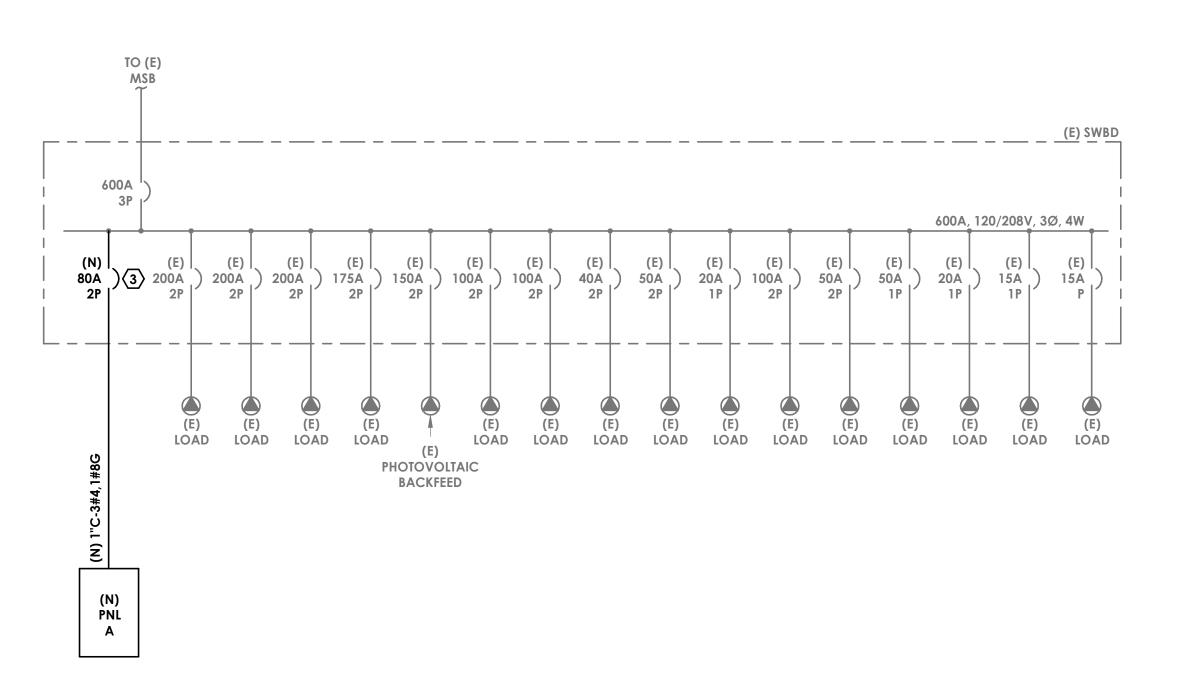
TOTAL LOAD (AMPS)

A. MAKE AT RIGHT ANGLES, UNLESS OTHERWISE SHOWN. B. NOTCHING OR PENETRATION OF STRUCTURAL MEMBERS, INCLUDING FOOTINGS AND BEAMS, NOT

- 3.9 RACEWAY SUPPORT A. SUPPORT FROM STRUCTURAL MEMBERS ONLY, AT INTERVALS NOT EXCEEDING CEC REQUIREMENTS, AND IN ANY CASE NOT EXCEEDING 10 FEET. DO NOT SUPPORT FROM PIPING, PIPE SUPPORTS, OR OTHER
- B. WALL BRACKETS AND ASSOCIATED HARDWARE IN CONTACT WITH CONCRETE OR MASONRY SHALL BE STAINLESS STEEL. PROVIDE GALVANIZED STEEL AT ALL OTHER LOCATIONS. STRAP HANGERS AND CEILING
- TRAPEZE INCLUDING HARDWARE, SHALL BE GALVANIZED STEEL C. PROVIDE AND ATTACH WALL BRACKETS, STRAP HANGERS, OR CEILING TRAPEZE AS FOLLOWS:
- WOOD: WOOD SCREWS. HOLLOW MASONRY UNITS: TOGGLE BOLTS 3. CONCRETE OR BRICK: EXPANSION SHIELDS, OR THREADED STUDS DRIVEN IN BY POWDER CHARGE,
- WITH LOCK WASHERS AND NUTS. 4. STEELWORK: MACHINE SCREWS. 3.10 RACEWAY BENDS
- A. INSTALL CONCEALED RACEWAYS WITH A MINIMUM OF BENDS IN THE SHORTEST PRACTICAL DISTANCE. B. AVOID FIELD-MADE BENDS AND OFFSETS, BUT WHERE NECESSARY, MAKE WITH ACCEPTABLE HICKEY OR
- BENDING MACHINE. DO NOT HEAT METAL RACEWAYS TO FACILITATE BENDING. 3.11 EXPANSION/DEFLECTION FITTINGS A. PROVIDE ON ALL RACEWAYS AT STRUCTURAL EXPANSION JOINTS 3.12 TERMINATION AT ENCLOSURES
- A. SHEET METAL BOXES, CABINETS, AND ENCLOSURES: 1. GALVANIZED RIGID STEEL CONDUIT:
  - a. PROVIDE ONE LOCK NUT EACH ON INSIDE AND OUTSIDE OF ENCLOSURE. b. INSTALL GROUNDING BUSHING.
- c. PROVIDE BONDING JUMPER FROM GROUNDING BUSHING TO EQUIPMENT GROUND BUS OR GROUND PAD; IF NEITHER GROUND BUS NOR PAD EXISTS, CONNECT JUMPER TO LAG BOLT ATTACHED TO METAL ENCLOSURE.
- d. INSTALL INSULATED BUSHING ON ENDS OF CONDUIT WHERE GROUNDING IS NOT REQUIRED. e. PROVIDE INSULATED THROAT WHEN CONDUIT TERMINATES IN SHEET METAL BOXES HAVING THREADED HUBS.
- A. CONNECTIONS AND TERMINATIONS:
- INSTALL WIRE NUTS ONLY ON SOLID CONDUCTORS. INSTALL NYLON SELF-INSULATED CRIMP CONNECTORS AND TERMINATORS FOR CIRCUIT CONDUCTORS NO. 6 AWG AND SMALLER. TAPE INSULATE ALL UNINSULATED CONNECTIONS.
- 4. PLACE NO MORE THAN ONE CONDUCTOR IN ANY SINGLE-BARREL PRESSURE CONNECTION. INSTALL CRIMP CONNECTORS WITH TOOLS APPROVED BY CONNECTOR MANUFACTURER. COMPRESSION LUGS: a. ATTACH WITH A TOOL SPECIFICALLY DESIGNED FOR PURPOSE.
- b. TOOL SHALL PROVIDE COMPLETE, CONTROLLED CRIMP AND SHALL NOT RELEASE UNTIL CRIMP IS
- c. DO NOT USE PLIER TYPE CRIMPERS. B. CAP SPARE CONDUIT WITH UL LISTED END CAPS. C. CABINETS AND PANELS:
- REMOVE SURPLUS WIRE, BRIDLE AND SECURE. WHERE CONDUCTORS PASS THROUGH OPENINGS OR OVER EDGES IN SHEET METAL, REMOVE BURRS CHAMFER EDGES, AND INSTALL BUSHINGS AND PROTECTIVE STRIPS OF INSULATING MATERIAL TO
- PROTECT THE CONDUCTORS. D. PROVIDE ADEQUATE LENGTH PIGTAILS FOR CONDUCTORS CONNECTED BY OTHERS.
- A. UNLESS OTHERWISE INDICATED, GROUND ALL EXPOSED NON-CURRENT-CARRYING METALLIC PARTS OF ELECTRICAL EQUIPMENT, RACEWAY SYSTEMS, AND THE NEUTRAL OF ALL WIRING SYSTEMS IN ACCORDANCE WITH THE CEC, STATE, AND OTHER APPLICABLE LAWS AND REGULATIONS. B. WHERE GROUND RODS ARE INDICATED OR USED, THEY SHALL BE COPPER CLAD, NOT LESS THAN ¾-INCH
- IN DIAMETER, 10 FEET LONG, DRIVEN FULL LENGTH INTO THE EARTH. 3.15 OPERATIONAL READINESS TEST (ORT) A. PANELBOARD DIRECTORIES SHALL MEET MINIMUM CEC 408.4 REQUIREMENTS. THE CONTRACTOR SHALL IDENTIFY EACH CIRCUIT WITH ROOM NUMBER, ROOM NAME AND EQUIPMENT SERVED. STANDARD
- ABBREVIATIONS FROM THE NEC AND WEBSTER'S DICTIONARY ARE ALLOWED. (E.G., "207 JANITOR WH" OR B. LABELS SHALL BE MELAMINE, FLEXI-BRASS, OR EQUAL MATERIAL, 1.5"HX3"L, WITH 3/8"H TIMES NEW ROMAN
  - 1. BACKGROUND/LETTERING COLOR SHALL BE AS FOLLOWS: a. BLACK/WHITE (NORMAL BRANCHES) 2. EQUIPMENT LABELING (FOR ALL PROJECT TYPES) SHALL FOLLOW AFTER THE EXAMPLES SHOWN BELOW (FOR GENERATOR/ATS, PANELBOARDS, DISCONNECTS, LIGHTING CONTROL PANELS, ETC.):

PANEL A2 FED FROM PNL B1 400A, 120/208V, 3Ø

(N) BRANCH PANEL A NEMA 3R **WALK-IN ENCLOSURE** 120/208 SINGLE **AIC RATING** 10,000 MOUNTING SURFACE **BUS RATING** 100 A WIRES **CIRCUITS** MAIN BREAKER MLO (LABEL PANELBOARDS ACCORDING TO NAMING CONVENTIONS LISTED IN ELECTRICAL SPECIFICATIONS) CKT **LOAD NAME** TRIP TRIP **LOAD NAME HOME RUN** CKT **HOME RUN** 0 VA -- SPACE 1/2"C-2#8,1#10G AIR COMPRESSOR 35 A 1855 VA -- SPACE 0 VA 0 VA -- SPACE 3120 VA 1/2"C-2#8,1#10G REFRIGERATION UNIT 50 A 0 VA -- SPACE 3120 VA 0 VA -- SPACE SPACE --0 VA PHASE A PHASE B TOTAL LOAD (VA) 4975 VA 4975 VA



# **KEYNOTES (#)** NOTE PROVIDE AND INSTALL NEW BREAKER SHOWN OF THE SAME TYPE AND RATING AS

### **GENERAL NOTES** # NOTE

DO ALL WORK AND INSTALL PRODUCTS IN ACCORDANCE APPLICABLE NECA REQUIREMENTS, APPLICABLE STATE LAWS, LOCAL LAWS, CODES AND ORDINANCES, THE CONTRACTOR SHALL ADHERE TO THE SPECIFIC PRODUCT AND INSTALLATION REQUIREMENTS OF THE UTILITY COMPANIES AND MANUFACTURER'S PROVIDING MATERIALS TO THE JOB. CONFLICTS, IF ANY, WILL BE RESOLVED AT THE DISCRETION OF THE EEOR. IT IS OF THE UTMOST IMPORTANCE THAT THE INSTALLING CONTRACTOR HAVE A MASTERY OF THE PROJECT-SPECIFIC REQUIREMENTS SHOWN IN SPECIFICATIONS AND CONSTRUCTION DRAWINGS. IT IS STRONGLY ADVISED THAT THE CONTRACTOR CONTACT THE EEOR FOR CLARIFICATION OR RFI THE EEOR IF FURTHER INFORMATION IS REQUIRED. THE EEOR SHALL REQUIRE REVISIONS TO BE MADE IN THE FIELD IF THE INSTALLATION DOES NOT FALL WITHIN THESE PROJECT-SPECIFIC GUIDELINES. NO ALLOWANCE SHALL BE MADE FOR INSTALLATIONS NOT ADHERING TO THESE REQUIREMENTS.

ELECTRICAL **SPECIFICATIONS** 

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REMARKS

**KEY PLAN** 

FORTUNA ELEMENTARY

PHASE 1

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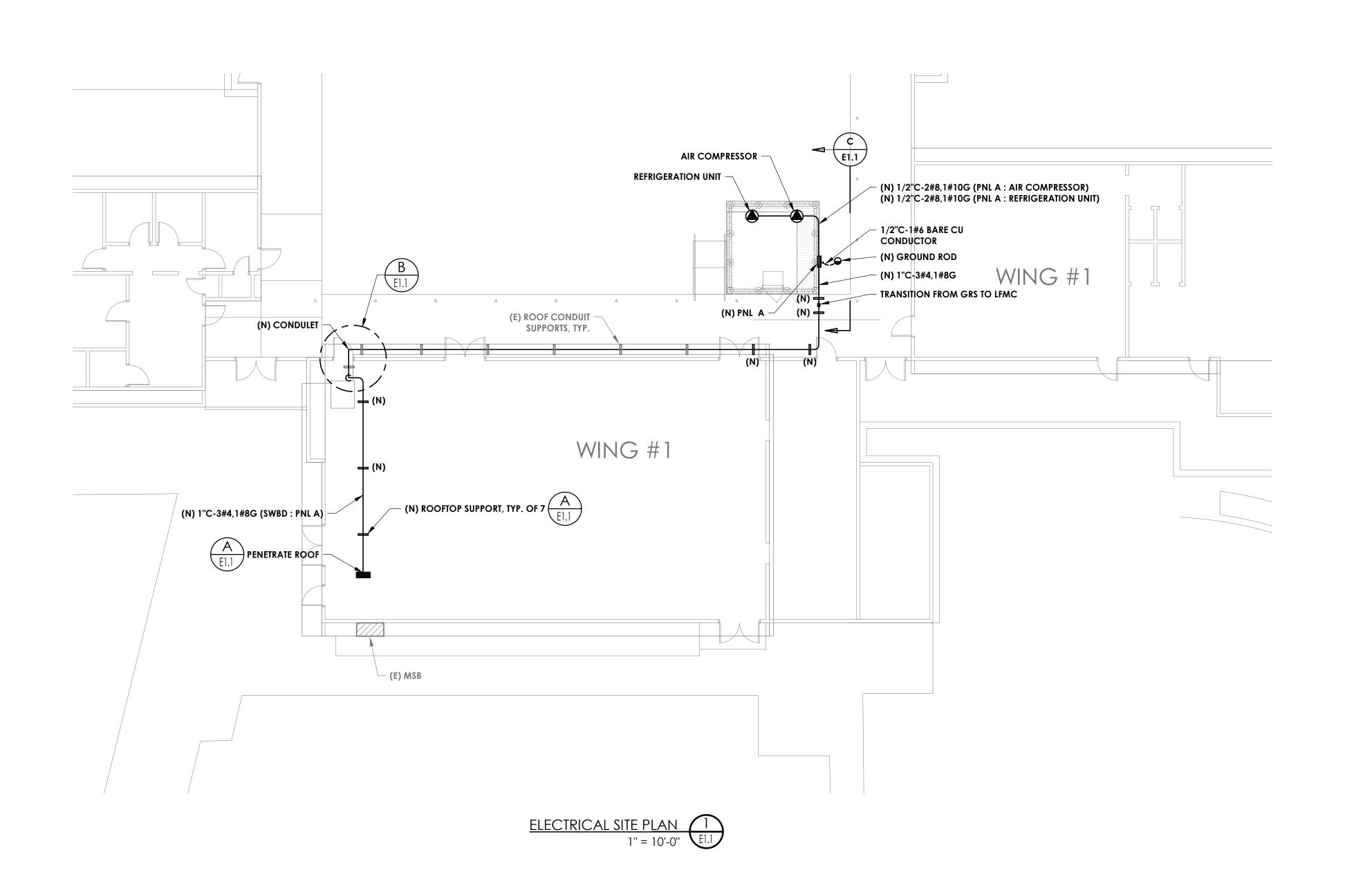
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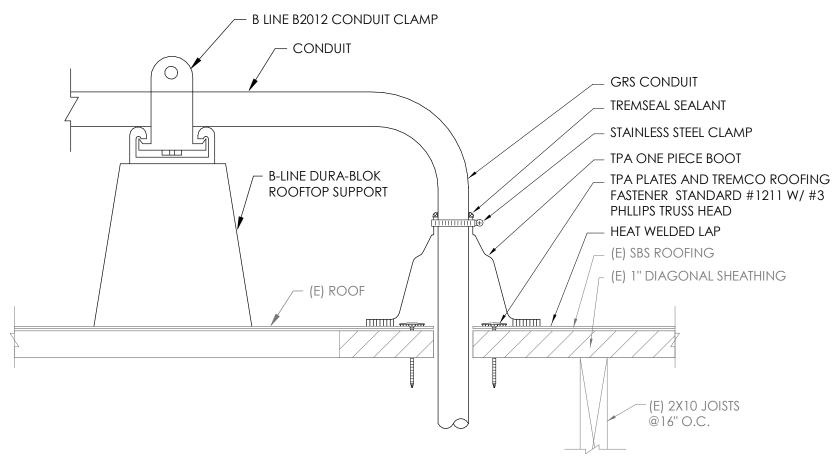
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PARTIAL ONE-LINE DIAGRAM (1)

SCHOOL DISTRICT, 500 9th STREET. FORTUNA, CA 95540 WALK-IN FREEZER REPLACEMENT

SOUTH FORTUNA **ELEMENTARY SCHOOL** 2089 NEWBURG ROAD FORTUNA, CA 95540

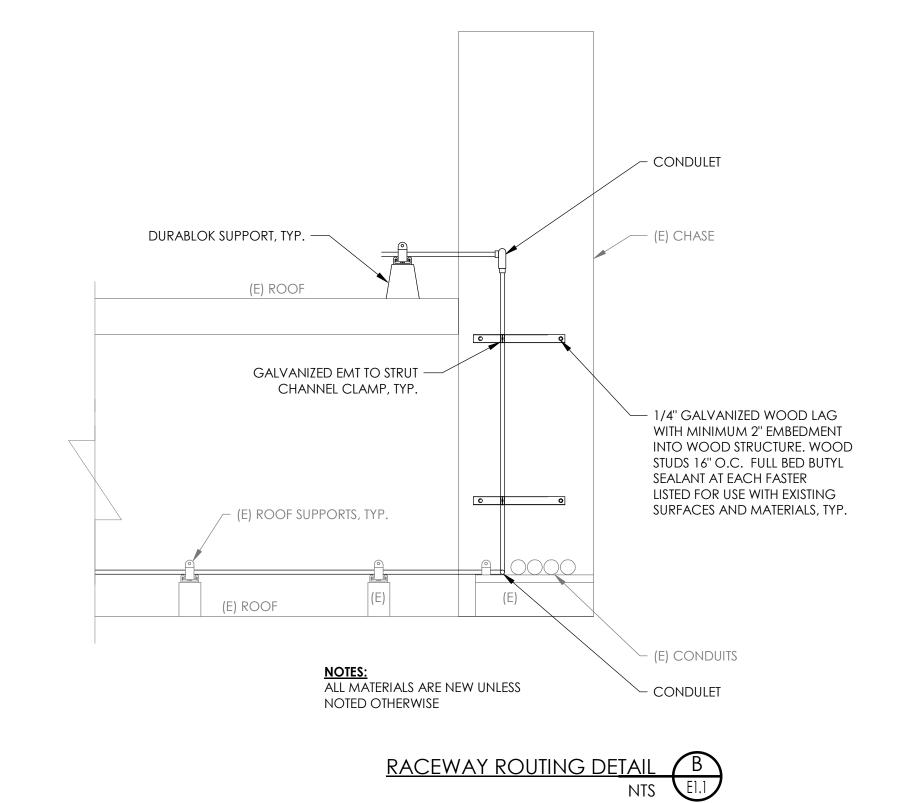




ALL MATERIALS ARE NEW UNLESS NOTED OTHERWISE.
 DO NOT CUT PREFABRICATED BOOT. IT MUST BE PULLED OVER

3. PREFABRICATED BOOTS ARE AVAILABLE IN SMALL & LARGE SIZES, AND MUST BE USED WHENEVER POSSIBLE TO FLASH PIPES 1" TO 8" IN DIAMETER.

# ROOFTOP CONDUIT PENETRATION DETAIL A NTS E1.1



5" SQ. STEEL TUBE ENCLOSURE BY OTHERS

LOCATIONS

OF CABINET

- FINISHED GRADE

- 1 5/8" DEEP 12 GA GALVANIZED STRUT CHANNEL W/

COORDINATE FINAL NUMBER, LOCATION AND BOLT

CUT STRUT CHANNEL FOR NO REVEAL OUTSIDE

5" U-BOLT AROUND 5" SQ. STEEL TUBE, TYP. OF CONDUIT SUPPORTS

CONFIGURATIONS WITH LISTED MANUFACTURER MOUNTING HOLE

- 15/16" DEEP 12 GA GALVANIZED STRUT CHANNEL W/ 5" U-BOLT

GALVANIZED FASTENER INTO 1/4" STRUT CHANNEL CONE NUT;

AROUND 5" SQ. STEEL TUBE. FASTEN CABINET USING 1/4"

- GRS TO FLMC TRANSITION — durablok conduit (A) Support, typ. SUPPORT, TYP. PROVIDE (2) HORIZONTAL STRUT SUPPORTS  $\neg$ - PROVIDE LENGTH OF LFMC TO BETWEEN ROOFBLOCKS TO KEEP THE ALLOW FOR 1'-0" OF TRAVEL IN ROOFBLOCK SECURING LFMC FROM ANY DIRECTION MOVING \_\_\_ LFMC TO GRS COUPLING — PROVIDE LENGTH OF LFMC TO STEEL STRUT CHANNEL — GRS, TYP. CLAMP, TYP. ALLOW FOR 1'-0" OF TRAVEL IN ANY DIRECTION TO REFRIGERATION EQUIPMENT — STRUT SUPPORT, NUMBER PANEL A — A\$ REQUIRED – NEMA 3R PNL A 🛑 - 1" C-#6 BARE CU CONDUCTOR GRS — SIDE - VIEW A-A - 1 5/8" GALVANIZED STRUT CHANNEL, TYP. #6 BARE CU CONDUCTOR - EXOTHERMIC CADWELD — 10'-0" GND ROD FRONT - VIEW

PANEL AND RACEWAY DETAIL C

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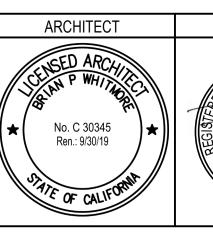


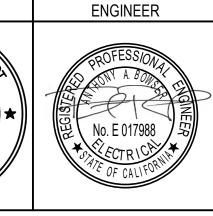
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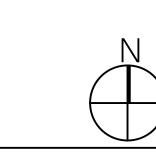
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**KEY PLAN** 

CONSTRUCTION



FORTUNA ELEMENTARY SCHOOL DISTRICT, 500 9th STREET, FORTUNA, CA 95540

PHASE 1

WALK-IN FREEZER REPLACEMENT SOUTH FORTUNA **ELEMENTARY SCHOOL** 2089 NEWBURG ROAD FORTUNA, CA 95540

ELECTRICAL SITE PLAN

Drawing Number 04.02.20 AS NOTED Project Number