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LEGEND

1). Detail Legend

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- 1). Air Compressor Wiring Diagram
- 2). Exhaust Fan (Toilet) Control Diagram- 277V lights, 120V fan
- 3). Exhaust Fan Electrical with Starter
- 4). Exterior Lighting Controls
- 5). Gas Valve
- 6). Generator Emergency Off
- 7). Occupancy Sensor with Normal And Emergency Lighting Control
- 8). Occupancy Sensor with Normal Lighting Control
- 9). Site and Soffit Lighting Control Layout
- 10). Room Controller Mounting Detail

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- 1). Typical 6' Cabinet Installation Detail
- 2). Typical Cabinet Power and Grounding Detail
- 3). Typical IT Room Cable Access

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- 1). 2 Hour Fire Wall Penetration Cable Tray
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- 3). Conduit Above Ceiling
- 4). Conduit Crossing at Expansion Joint
- 5). Conduit Penetration with Differential Temperature Greater Than 20°C
- 6). Conduit Support Detail Concrete

- 7). Conduit Support Detail Steel
- 8). Electrical Box Mounting in Grid Ceiling
- 9). Elevator Pit Elevation
- 10). Exposed Conduit Penetration
- 11). Exposed Conduit Penetration
- 12). Exterior Wall Penetration Detail
- 13). Fixed Barrier Bollard
- 14). Flush Mounted Device in CMU Wall
- 15). Hand Dryer Installation Detail
- 16). Handhole Installation Detail
- 17). Mounting Stanchion for Electrical Gear Fixed Top and Bottom
- 18). Mounting Stanchion for Electrical Gear Lite Gear-Fixed Bottom Only
- 19). Mounting Stanchion for Electrical Gear Lite Gear-Fixed Bottom Only
- 20). Mounting Stanchion for Electrical Gear Lite Gear-Roof
- 21). Mounting Stanchion for Electrical Gear Lite Gear- Slab Roof
- 22). Osprey Platform
- 23). Pendant Cord Outlet
- 24). Surface Mount Receptacle CMU Wall
- 25). Tele-Power Pole Mounting
- 26). Transformer Pad Detail
- 27). Under Canopy Mounting
- 28). Underground Conduit with Pavement Patch
- 29). Underground Conduit
- 30). Underground Entrance (Communications Only)
- 31). Unistrut Conduit Rack

FIRE ALARM

- 1). Aerial Fire Alarm Cable Termination into Portable Building
- 2). Box Mounting in Lift or Interlocking Type Ceiling with Systems Installed in Conduit
- 3). Fire Alarm Duct Smoke Detector Details
- 4). Fire Alarm Terminal Cabinet on Permanent Building Overhead
- 5). Fire Alarm Terminal Cabinet on Permanent Building Underground
- 6). Fire Alarm Terminal Cabinet
- 7). Mounting and ADA Height Requirements Pullstations and Visual Devices
- 8). Underground Fire Alarm Cable Termination into Portable Building

GROUNDING

- 1). Building Grounding Detail
- 2). Electrical Distribution System Grounding Detail
- 3). Generator Power System Grounding (Not a Separately Derived System)
- 4). Generator Power System Grounding (Separately Derived System)
- 5). Ground Bar
- 6). Ground Rod Test Well
- 7). Single Phase Transformer Grounding
- 8). Transformer Grounding

LIGHTING

- 1). Fixture Mounting Aluminum Pole on Concrete Base
- 2) Lay-In Fixture detail
- 3). LED High Bay Lighting Fixture Mounting Detail
- 4). MUSCO Precast Base Foundation Installation
- 5). MUSCO Precast Base Foundation
- 6). MUSCO Schematic Wiring Diagram with MPI Fixture
- 7). MUSCO Sports Lighting Pole
- 8). Recessed Troffer Fixture Mounting

9).Surface Mounted Exit Light

NAMING CONVENTIONS

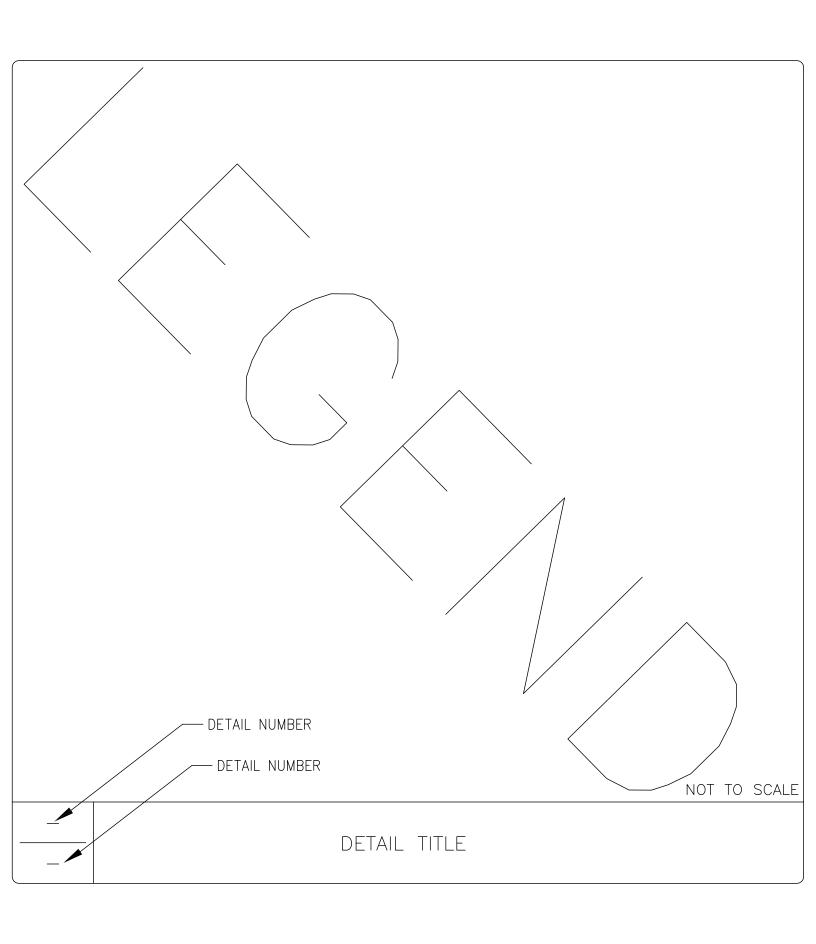
- 1). Equipment Placard
- 2). Wall Plate Labeling
- 3). Wall Plate Labeling

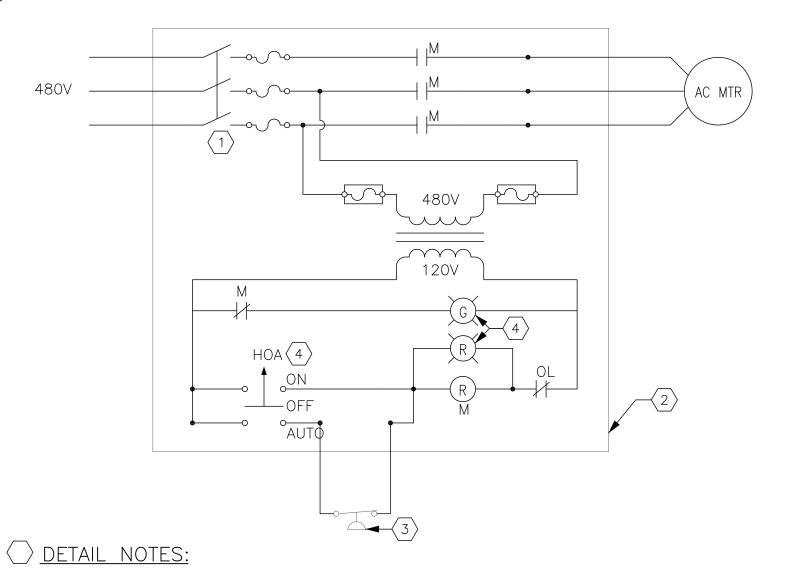
POWER

- 1). Cantilevered Transformer (Wall) Mounting
- 2). Flush Mounted Replacement Panels
- 3). Kitchen Stanchion
- 4). Panel Schedule
- 5). Safety Switch Mounting Condensing Unit
- 6). Surface Mounted Panels with Transformer
- 7). Suspended Transformer Mounting
- 8). Terminal Cabinet for Branch Circuit Extension

UL FIRE PENETRATION

- 1). Typical UL Fire Penetration Cable Tray Floor or Wall F=2 and F=3 HR, T=0 HR
- 2). Typical UL Fire Penetration Wall F=1 or 2 HR, T=0 HR
- 3). Typical UL Fire Penetration F=2 HR, T=0 HR
- 4). Typical UL Fire Penetration F=4 HR, T=0 HR
- 5). Typical UL Fire Penetration F=2 HR, T=0 HR
- 6). Typical UL Fire Penetration F=3 HR, T=0 HR





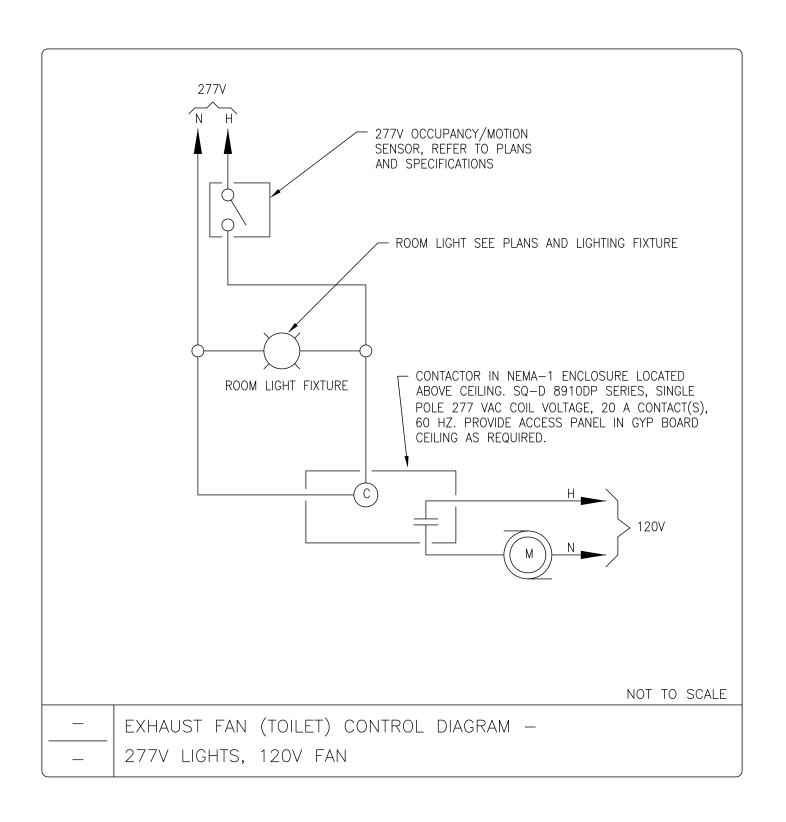
- 1. INTERLOCK DOOR WITH LOCAL DISCONNECT LEVER TO PREVENT DOOR FROM BEING OPENED WITH LEVER IN THE ON POSITION. PROVIDE MEANS TO OVERRIDE INTERLOCK FOR MAINTENANCE.
- 2. NEMA 4X STAINLESS STEEL ENCLOSURE WITH LOCKABLE DOOR.
- 3. EXISTING PRESSURE SWITCH ON AIR COMPRESSOR, SERVICE AND MODIFY AS REQUIRED.
- 4. MOUNTED IN DOOR FRONT.

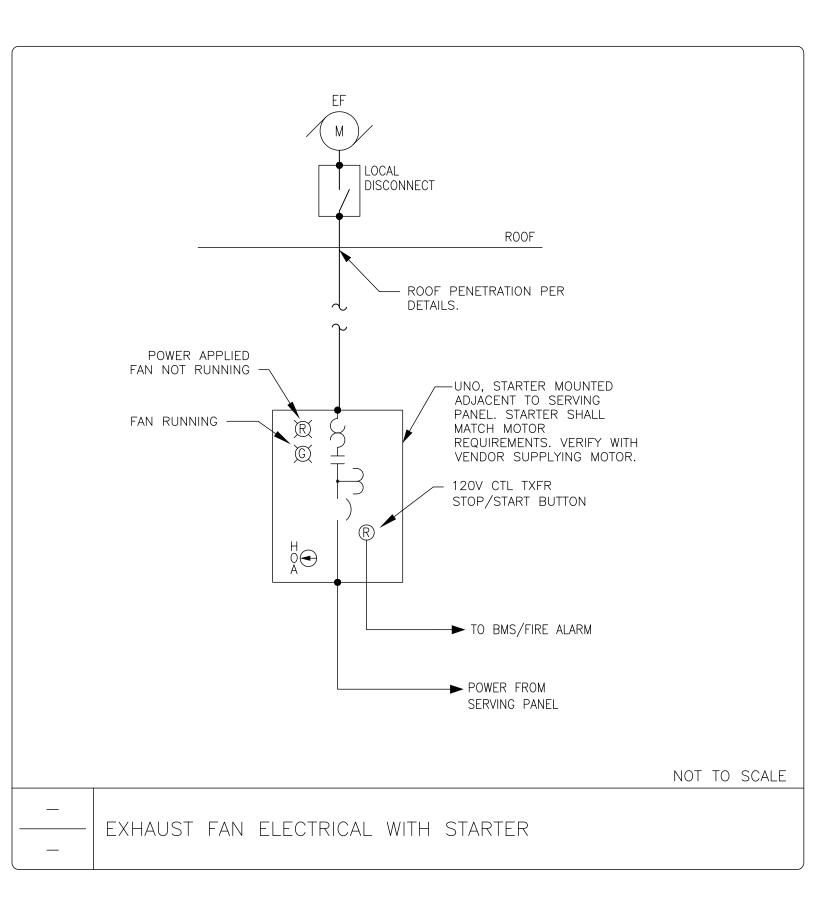
LINETYPES:

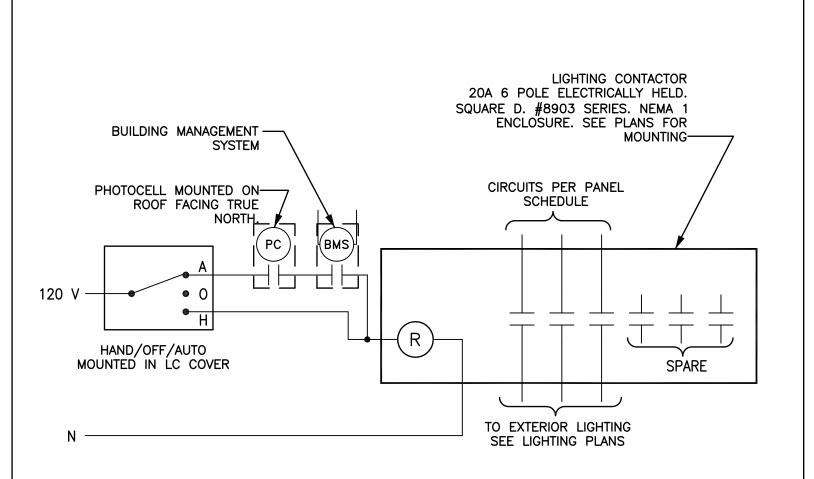
————— FIELD WIRING

NOT TO SCALE

— AIR COMPRESSOR WIRING DIAGRAM







LC - LIGHTING CONTACTOR

PC - PHOTOCELL CONTROL

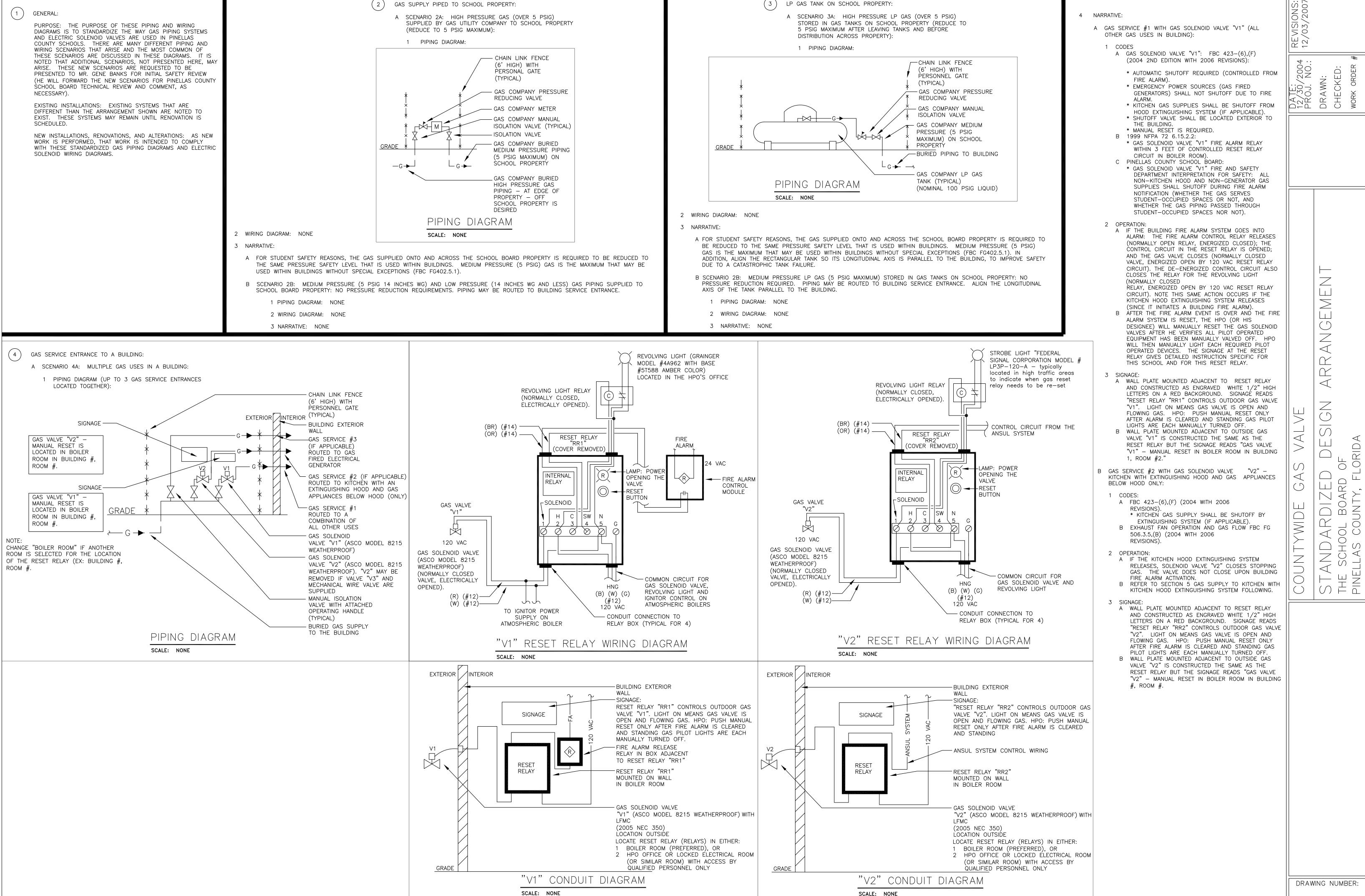
BMS - BUILDING MANAGEMENT SYSTEM

HOA - HAND-OFF-AUTO CONTROL.

NOT TO SCALE

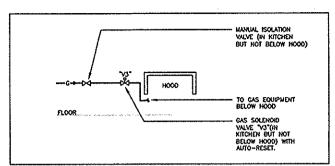
EXTERIOR LIGHTING CONTROLS

_



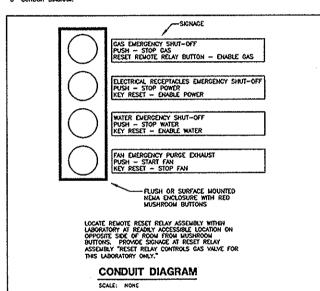
GV-

- GAS SUPPLY TO THE KITCHEN WITH KITCHEN HOOD EXTRACUSERNC SYSTEM AND GAS APPLIANCES BELOW HOOD (ONLY):
 - A SCENARIO SA: GAS VALVE AT HOOD
 - 1 DEPOS NACOLU-



PIPING DIAGRAM SCALE: NONE

- 2 WIRING DIAGRAM
- A SAME AS VALVE "VI" WIRING DIAGRAM, EXCEPT WITHOUT FIRE ALARM RELAY.
- 3 CONDUIT DIAGRAM.



- A GAS SERVICE #2 WITH GAS SOLEHOLD VALVE "V3".

- OASSIMATE

 OAS SERVICE \$2 WITH CAS SOLENOID VALVE "V3".

 1 COOS

 A 2001 NPA 06 8.2.3:

 * KITCHEN HOOD EDWLUST FAN SHALL CONTINUE TO OPERATE AFTER EXTINUESHING SYSTEM HAS ACTIVATED, UNLESS ITS TESTING REQUIRES A DEFERENT SCOURNES.

 B 2001 NPA 08 8.3.2:

 * WHEN THE KITCHEN HOOD EXTINUESHING SYSTEM ACTIVATES, UNLESS ITS TESTING REQUIRES A DEFERENT SCOURNE.

 B 2001 NPA 08 8.3.2:

 * WHEN THE KITCHEN HOOD EXTINUESHING SYSTEM ACTIVATES, SUPPLY ARE SYSTEM'S THAT DESCHARGE RITERALLY MITO THE HOOD SHALL BE SHUT OFF.

 SOLENOIS FAN OPERATION AND USE TOWN FER FE SOLENOIS FAN OPERATION HOOD SOLENOIS FAN OPERATION.

 A SINCE WALL SWITCH (WITH LABEL "KITCHEN HOOD OPERATION" OPERATES THE KITCHEN HOOD SUPPLY AND EXPANSIT FANS. A CT (RIG: RELAV-NI-A-BOX WITH HOA HAND-OFF-AITDIOATIC MANUAL MANTEHWAYES HAS SEENES) TO INDICATE DOWNST FAN OPERATION, AFTER THE CHARMIST FANS WITH RIS'S IN SERIES) TO INDICATE DOWNST FAN OPERATION, AFTER THE CHARMIST FANS OPERATE. A MULTIPLE POLE CONTACTION IS EMBELD AND A SEPARATE 120/1/40 GAS SOLENOID VALVE "V3" (MITHOUT RESET RELAY) IS EMERGED AND OPENS ALLOWING GAS FLOW TO ECOUPLEST BELOW THE KITCHEN HOOD. INCENTS MECHANICAL STORY OF EXAMEN CONTACTION ALSO OPENSES HE COL OPERATED SHANT THE CONTACTION ALSO OPENSES HE COL OPERATED SHANT FIRE OPENATE. AND OPENSES ALLOWING GAS FLOW TO ECOUPLEST BELOW THE KITCHEN HOOD. THE MULTIPLE POLE CONTACTION ALSO OPENSES HE COL OPENSED SHAND OF THE KITCHEN HOOD STOPENS ARE TIMED OFF. THE CONTACTION AS EMBELD OFF. THE CONTACTION AS EMBELD OFF. THE CONTACTION AND OPENSES AND THE STREED OFF. THE CONTACTION AND OPENSES AND THE SALE COMPONION AND OPENSES WITH THE KITCHEN HOOD STANDONG PAULY "V1".

 ONDE THAT GAS VALVE "V3" TURNS ON AND OFF WHEN THE K

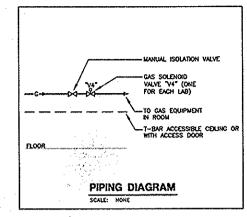
- ELECTRIC INSTITUM PILOTS ONLY (NO STANDAY PILOTS).
 WHEN THE KITCHEN HOOD EXTINGUISHING SYSTEM OPERATES, AN INSTITUM ON THE ALAMIM MODULE IS ACTIVATED OPERATING THE GENERAL ALARM FOR THIS BUILDING. THE FIRE ALAMIM SYSTEM CLOSES CAS VALVE "VI" (STOPPING GAS) WHEN THE BUILDING COES INTO ALARM.

- 3 SIGNACE:
 A KITCHEN HOOD WALL SWITCH FOR FANS
 KITCHEN HOOD OPERATION.
 B "GAS SOLENGD VALVE "V3" CONTROLLED FROM
 KITCHEN HOOD MULTIPLE POLE CONTACTOR AND

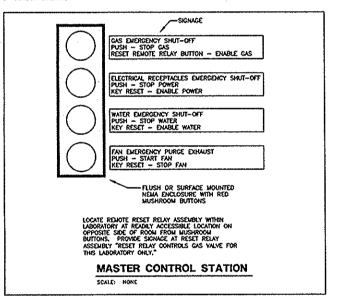
6 GAS SUPPLY TO A LABORATORY ROOM OR A HOME ECONOMICS ROOM:

A SCENARIO GA: GAS VALVE TO LABORATORY

1 PIPING BUCKANE



- 2 WIRING DUCRAW:
- A LABORATORY RESET RELAY CONTROL THE SAME AS FOR VALVE "VI", EXCEPT WITHOUT FIRE ALARM RELAY.
- 3 CONDUIT DIAGRAM;



- NARRATIVE-
- A CAS SERVICE #1 WITH SEPARATE CAS VALVE "V4" (ONE FOR EACH EABORATORY).

- DICH LABORATION).

 1 CODES

 A SHUT-OFF GAS VALVE ADJACENT TO LABORATORY
 DOOR OR WITHON 15 FEET OF INSTRUCTION'S STATION
 (FBC 423.14.1, 2004 WITH 2005
 REVISIONS).

 8 ELECTRIC RECEPTACLES ADJACENT TO LABORATORY
 DOOR OR WITHON 15 FEET OF INSTRUCTION'S STATION
 (FBC 423.14.1, 2004 WITH 2005
 REVISIONS).
 AND (FBC 423.17.4, 2004 WITH 2006
 REVISIONS).
- AND (FB. "AMAINING PROPERTY OF THE PROPERTY EXHAUST (PURCE) SYSTEM (1999 SREF 5.(14),(p),4).
- 5.(14)(p),4).

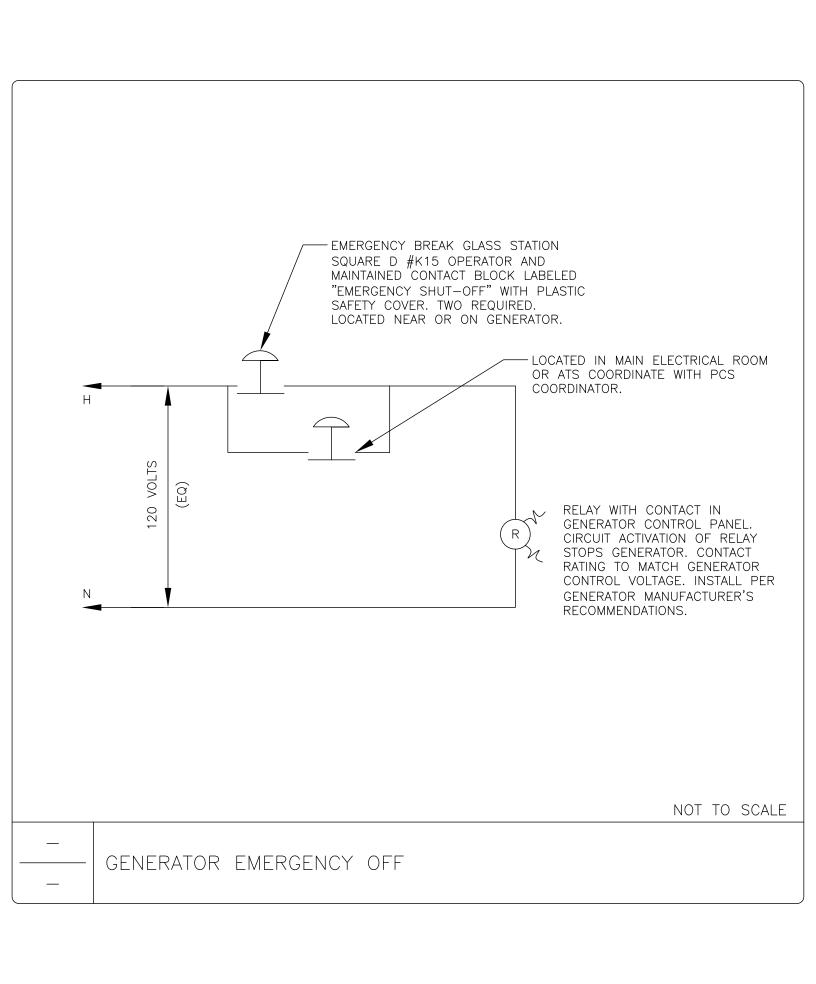
 2 OPERATION
 A MANUAL SHUTDOWN OF CAS, ELECTRIC RECEPTACLES,
 WATER VALVES, AND COMPRESSED AR OUTLETS (IF
 APPLICABLE) IS AVAILABLE FOR LOCAL USE.
 B THE RESET RELAY BOX IN THE CLASSROOM
 (REMOTELY LOCATED FROM THE PUSH BUTTONS) AND
 WITH ITS OWN SKINGE, IS USED TO MANUALLY
 EMBLE CAS AFTER CAS COLTETS ARE MANUALLY
 TURNED OFF.
 C THE FIRE ALAYM SYSTEM IS NOT ACTIVATED BY ONLY
 LOCAL LABORATORY CONTROL.
 D THE EMPERGENCY ENGLISH (PURCE) FAN SYSTEM WAL
 OPERATE BEST WITH THE MANUAL OPENING OF
 WINDOWS FOR OFTHMUM MARCHP OUTSIDE AR
 DURDNER A LABORATORY PURCE EDHUST.

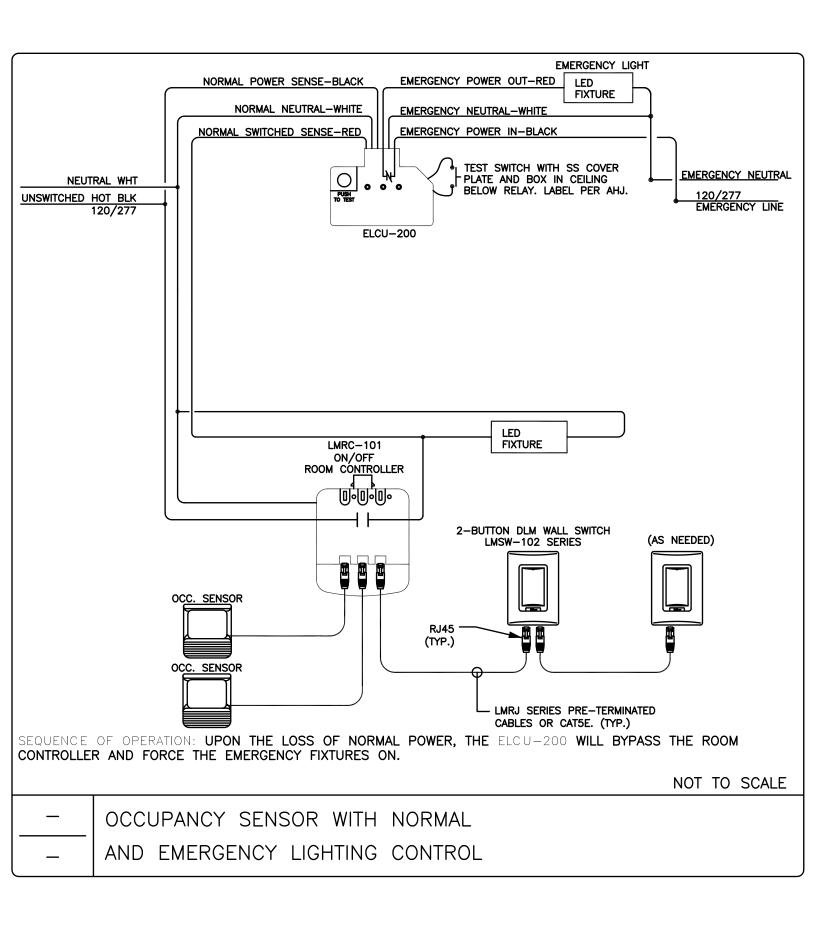
- 3 SIGNAGE
 A EMERGENCY PUSH BUTTON SIGNS, AS INDICATED.
 B RESET RELAY SIGN, AS INDICATED.

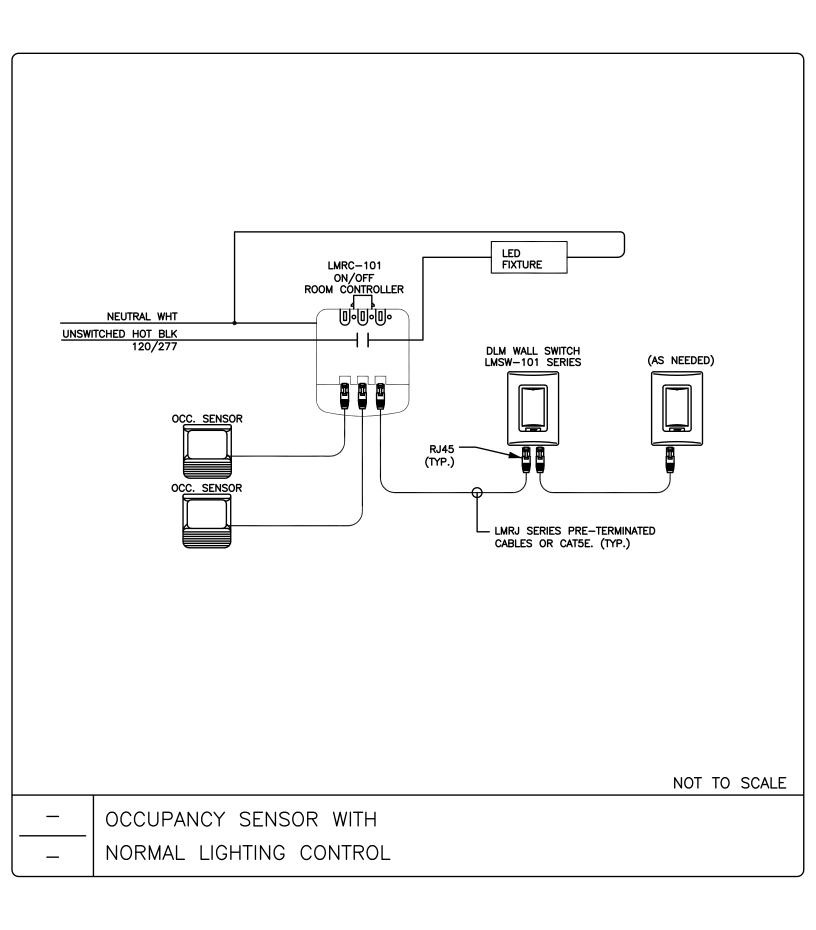
NE I \overline{O} Ž œ AR Z O VAL $\overline{\Omega}$ DE P GAS COUNTYWIDE GAS STANDARDIZED THE SCHOOL BOARD OF PINELLAS COUNTY, FLO

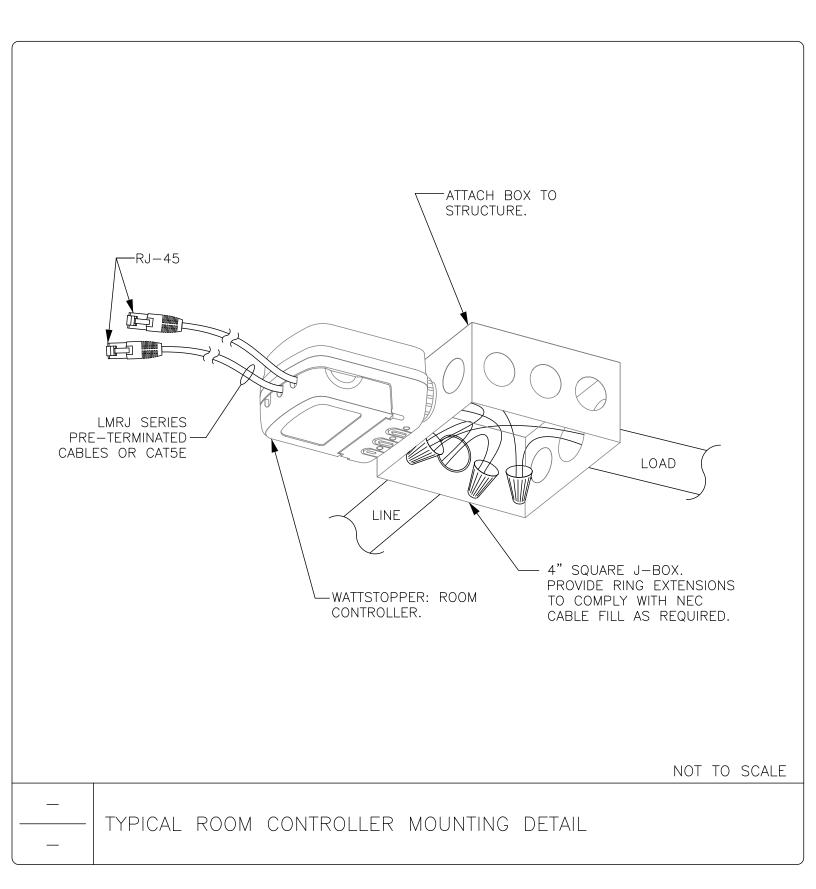
DATE: 12/36/2004 PROJ. NO.: DRAWN: CHECKED: WORK ORDER #

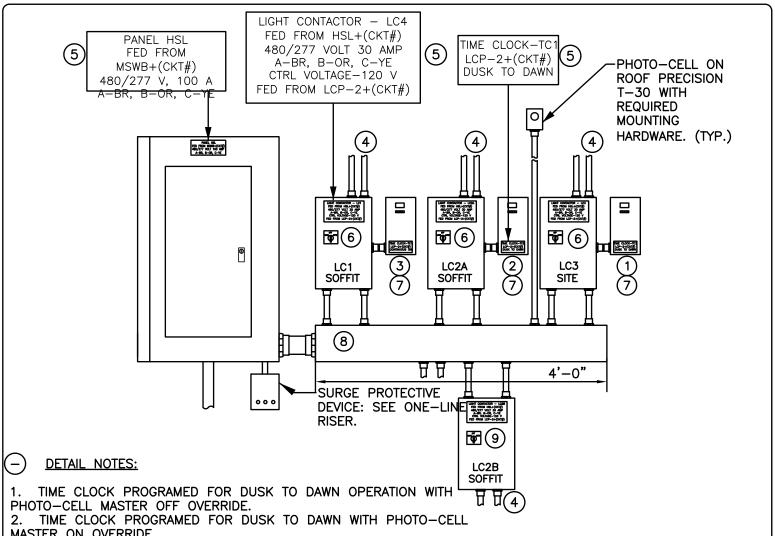
GV-2







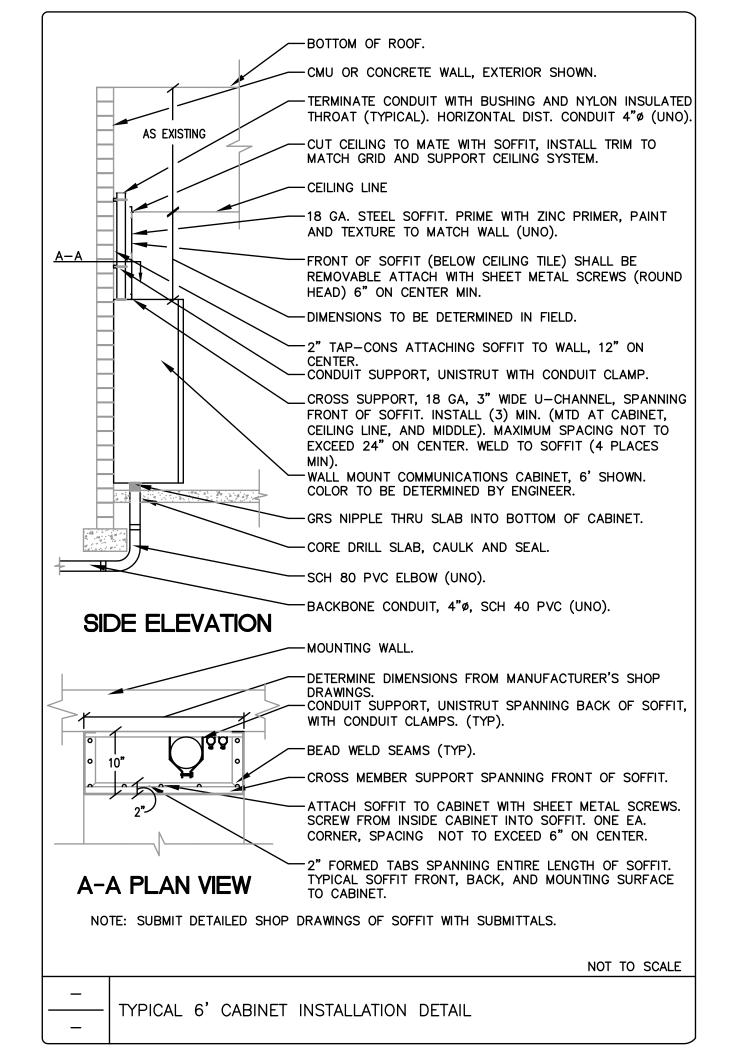


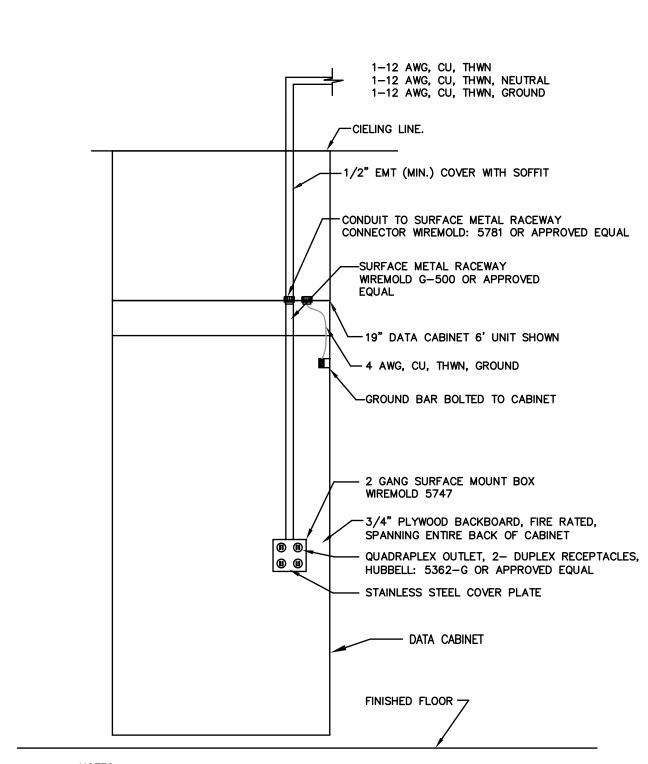


- MASTER ON OVERRIDE.
- TIME CLOCK PROGRAMED PER OWNER OPERATION WITH PHOTO-CELL MASTER ON OVERRIDE.
- PROVIDE CONDUIT AND CABLING FOR CONNECTION TO ENERGY MANAGEMENT CONTROL SYSTEM AS REQUIRED. FIELD COORDINATE WITH OWNER.
- TYPICAL INFORMATION TO BE PROVIDED ON EQUIPMENT PLACARD. SEE DETAIL FOR PLACARD SPECS.
- 6. LIGHTING CONTACTOR, SQUARE-D CLASS 8903, (6) 30 A CONTACTS, NEMA 1 ENCLOSURE WITH HAND-OFF-AUTO, SQ-D #9999 SC2 MOUNTED IN DOOR.
- 7. TIME CLOCK: PARAGON EC 7000 SERIES, 120 V CONTROL VOLTAGE.
- 8. WIRE WAY: 6"X6", NEMA-1, WITHOUT KNOCKOUTS, SQ-D; LDB SERIES. PROVIDE ALL ACCESSORIES AND MOUNTING HARDWARE AS REQUIRED. LABEL AS DIRECTED BY OWNER. SEE PLAN FOR LOCATION
- 9. LIGHTING CONTACTOR, SQUARE-D CLASS 8903, (12) 30 A CONTACTS, NEMA 1 ENCLOSURE WITH HAND-OFF-AUTO, SQ-D #9999 SC2 MOUNTED IN DOOR.

NOT TO SCALE

SITE AND SOFFIT LIGHTING CONTROL LAYOUT



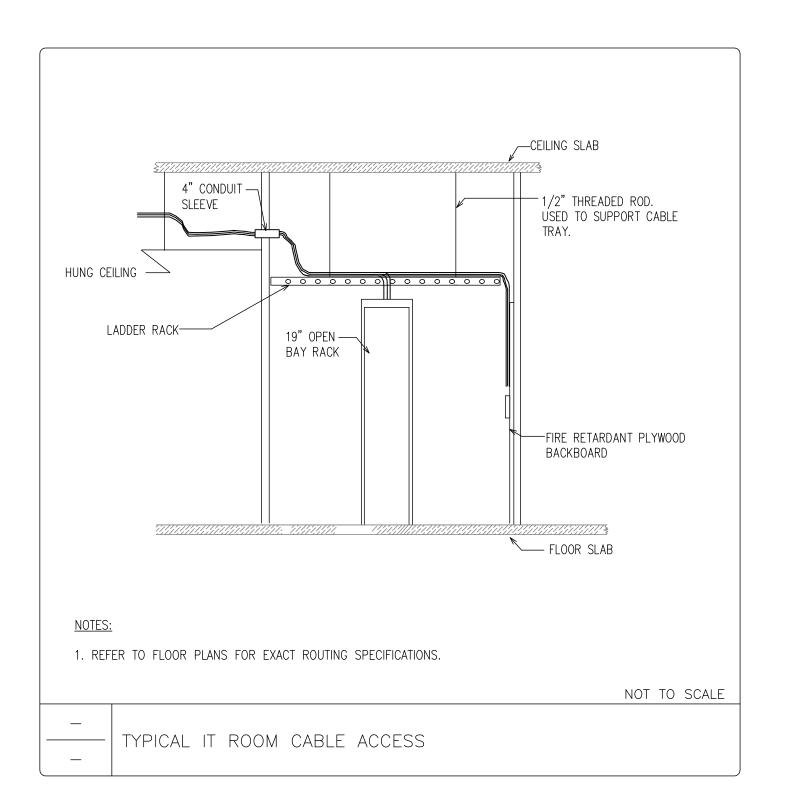


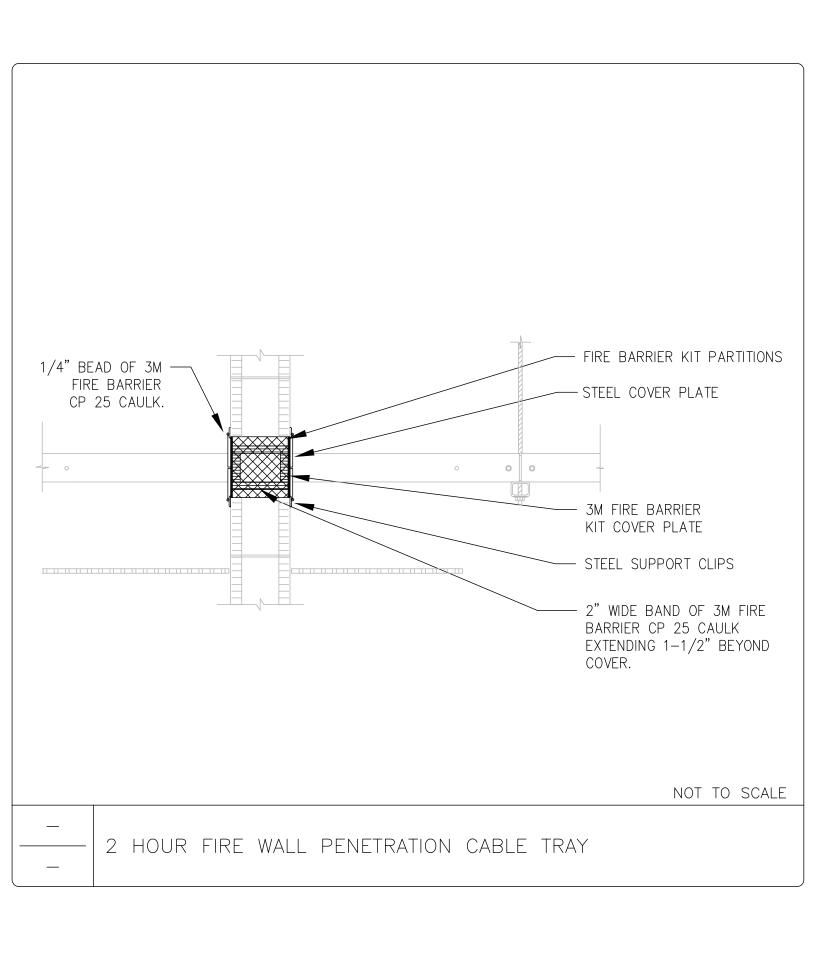
NOTES:

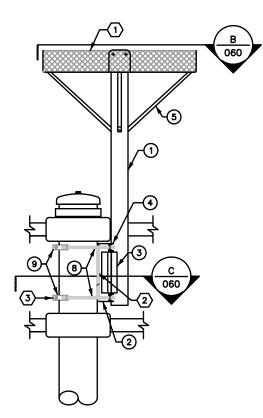
- 1 WALL MOUNT CABINETS, BOLT TO CONCRETE BLOCK WALL AT 8 POINTS (MIN.) USE CONCRETE ANCHORS AND BOLTS.
- 2 FREE STANDING CABINETS, INSTALL BRACKETS TO WALL AT 4 POINTS (MIN.).
- 3 OBSERVE ADDITIONAL CARE TO ALIGN CABINET PROPERLY DURING MOUNTING. IMPROPER MOUNTING MAY CAUSE MISALIGNMENT OF DOOR.

NOT TO SCALE

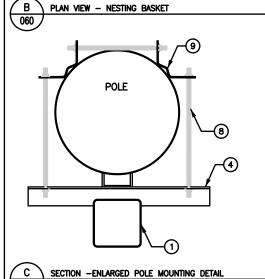
TYPICAL CABINET POWER AND GROUNDING DETAIL







A ELEVATION - SIDE VIEW			
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*******	== 		
		(6)	
	i ii		



MUSCO FURNISHED BILL OF MATERIALS		
ITEM	QTY	DESCRIPTION
1	1	POST TUBE
2	1	SADDLE CHANNEL
3	2	GUSSET
4	2	FOOT CHANNEL
5	4	TUBE BRACE
6	1	LONG DECK STRAP
7	2	SHORT DECK STRAP
8	6	THREADED BOLT ASSEMBLY - GALV.
9	4	'W' BRACKET
		•

NOTE: REFER TO MUSCO SHOP DRAWINGS FOR EXACT DIMENSIONS, CONNECTION DETAILS, AND MATERIAL SPECIFICATIONS.

- 1. DIAMOND MESH NESTING BASKET FURNISHED BY THE OWNER. THE CONTRACTOR SHALL PROVIDE IN HIS BID ROUND TRIP TRANSPORTATION OF THE MUSCO PROVIDED BIRD PLATFORM BETWEEN THE PINELLAS COUNTY SCHOOLS DISTRICT BUILDING (WALTER POWNALL) AND JOB SITE FOR MOUNTING OF NESTING BASKET. COORDINATE DELIVERY LOGISTICS WITH THE PINELLAS COUNTY PROJECT COORDINATOR.
- PROVIDE GALVANIZED STEEL TAPERED SPACER PLATE EQUAL IN WIDTH AS THE SADDLE CHANNEL TO LEVEL BIRDS NEST AND PROVIDE REQUIRED CLEARANCES.
- 3. LOCATE BRACKET ASSEMBLY AND TIGHTEN BOLTED CONNECTIONS AS PER MANUFACTURER'S RECOMMENDATIONS.

GENERAL NOTES:

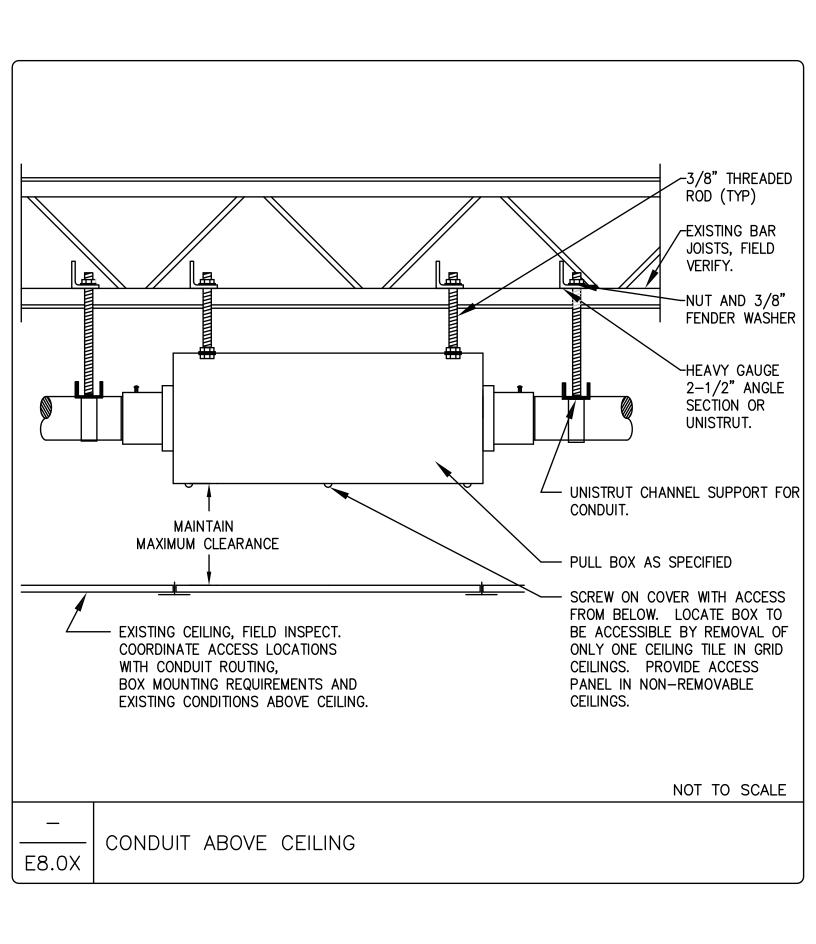
- 1. REFER TO "MUSCO FURNISHED BILL OF MATERIALS" FOR COMPONENTS FURNISHED BY MUSCO AND INSTALLED BY CONTRACTOR. UNLESS OTHERWISE NOTED, ALL OTHER MATERIALS REQUIRED TO COMPLETE PROPER INSTALLATION OF THE BIRD NEST PLATFORM SHALL BE PROVIDED BY CONTRACTOR.
- 2. UNLESS OTHERWISE NOTED, ALL COMPONENTS SHALL BE ASSEMBLED AT THE JOB SITE.
- 3. THE CONTRACTOR SHALL UNLOAD MUSCO FURNISHED MATERIALS, INSPECT FOR DAMAGE AT TIME OF DELIVERY, AND PROPERLY STORE IN A SECURE DRY AREA. ANY DAMAGE OBSERVED AT TIME OF DELIVERY SHALL BE REPORTED TO THE PCS PROJECT COORDINATOR PRIOR TO RELEASE OF MATERIALS.

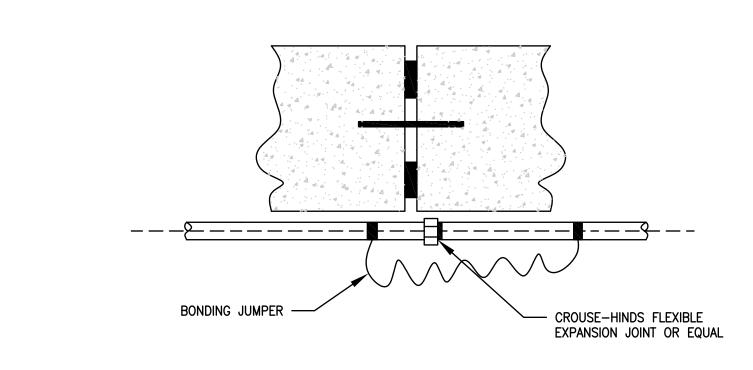
NOT TO SCALE

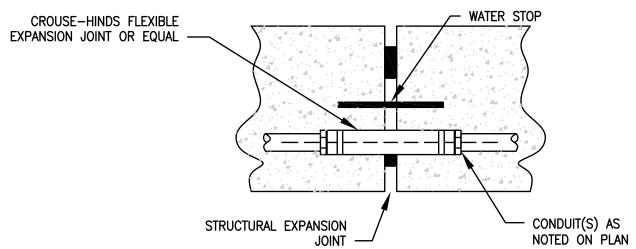
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060

BIRD PLATFORM MOUNTING







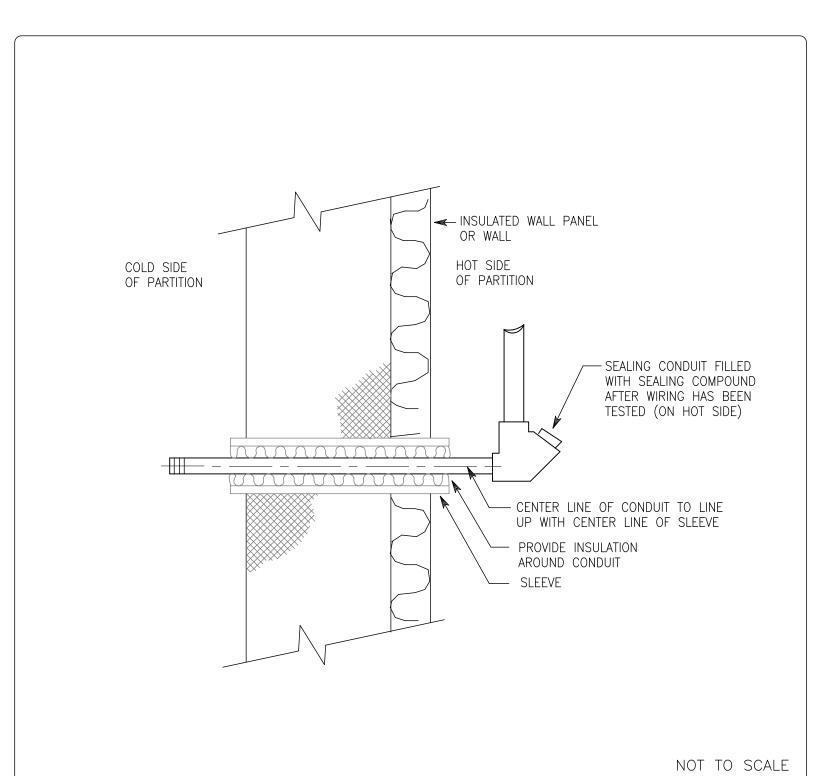
FOR NEW OR EXISTING CONSTRUCTION

NOT TO SCALE

_

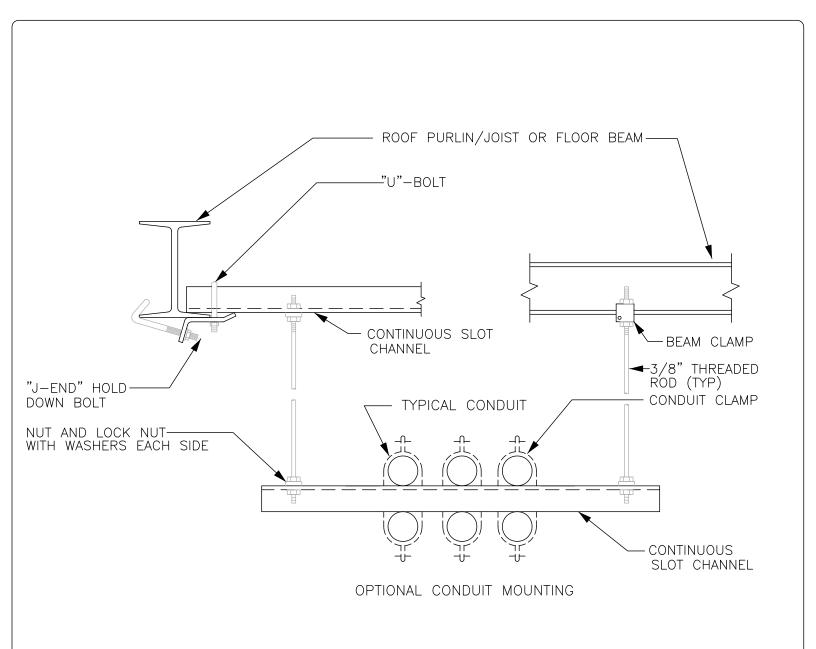
CONDUIT CROSSING AT EXPANSION JOINT

E8.0X



CONDUIT PENETRATION WITH DIFFERENTIAL

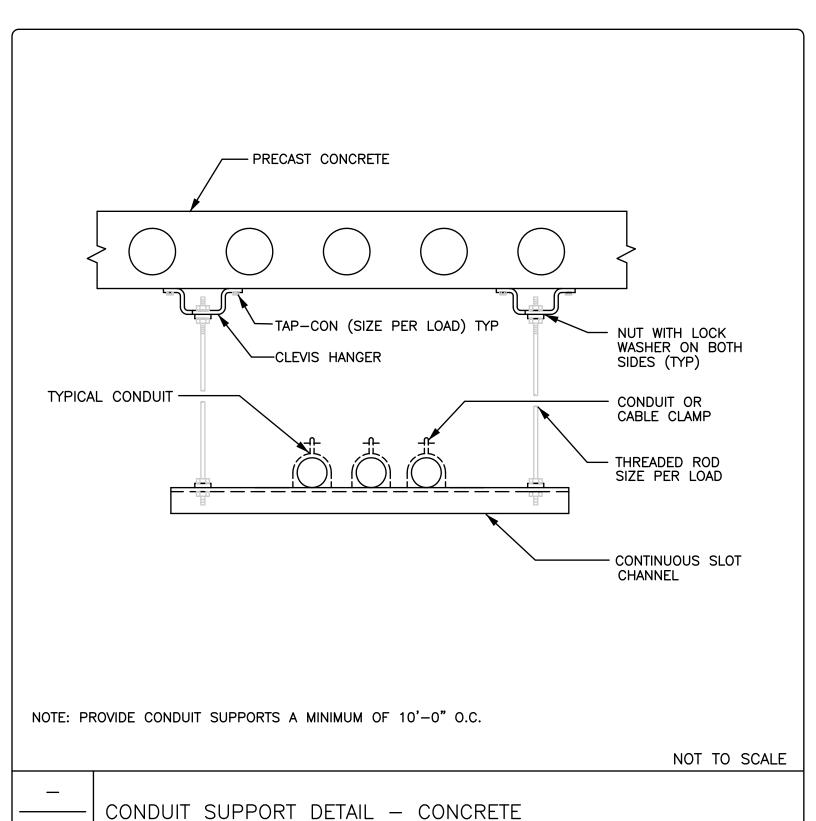
TEMPERATURE GREATER THAN 20° C

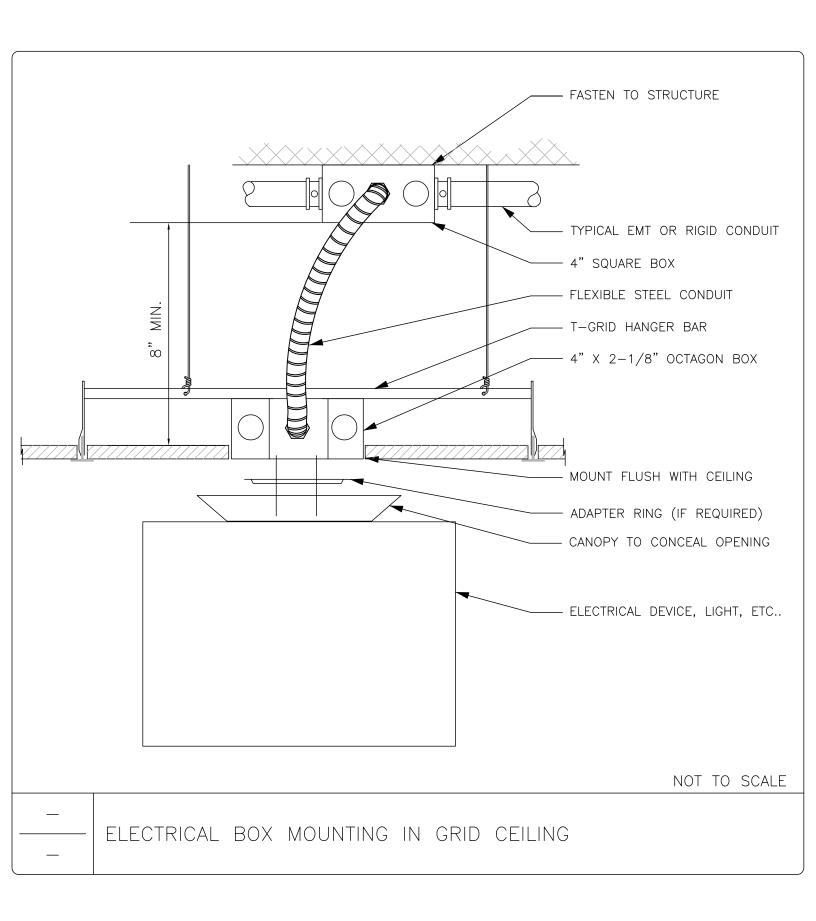


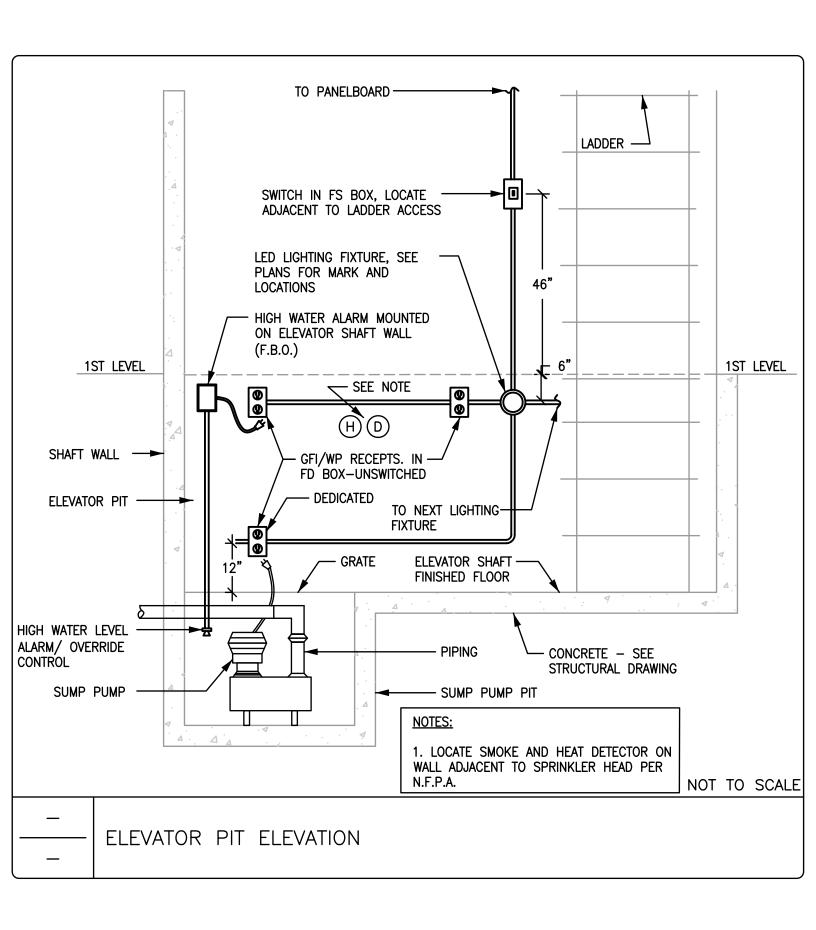
NOTE: PROVIDE CONDUIT SUPPORTS A MINIMUM OF 10'-0" O.C.

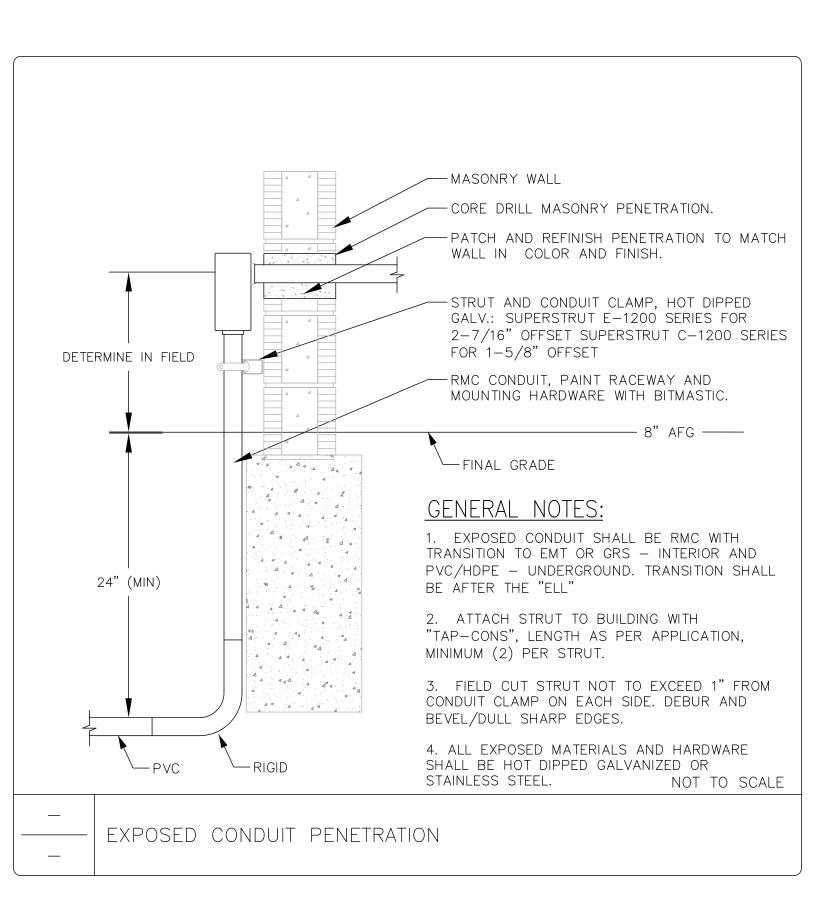
NOT TO SCALE

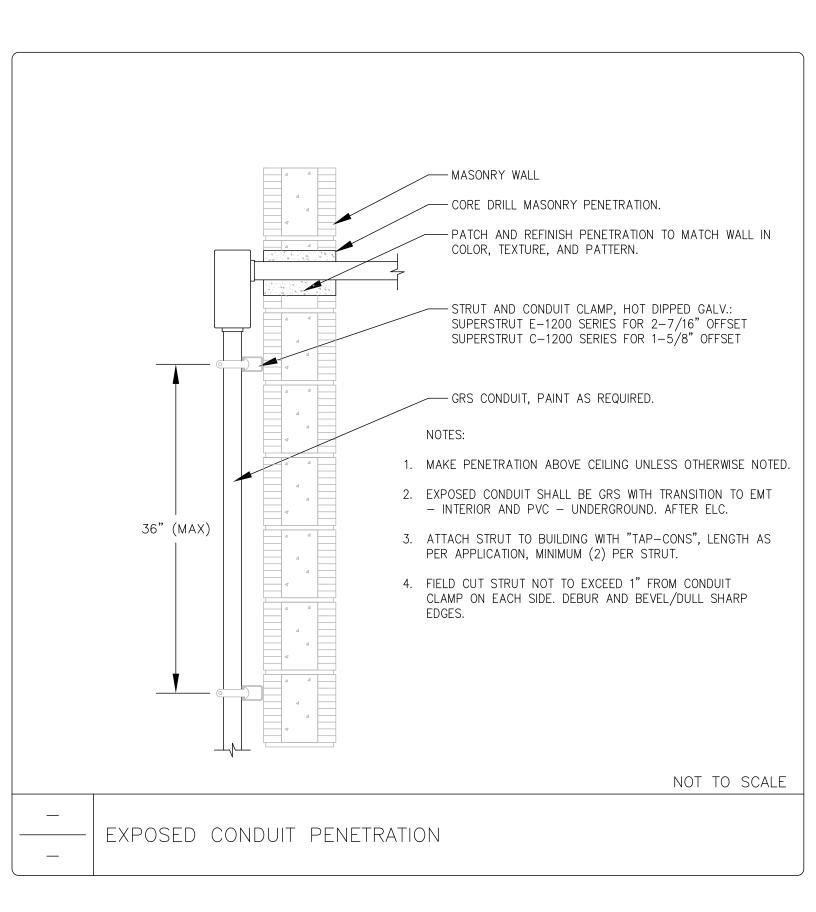
----- CONDUIT SUPPORT DETAIL

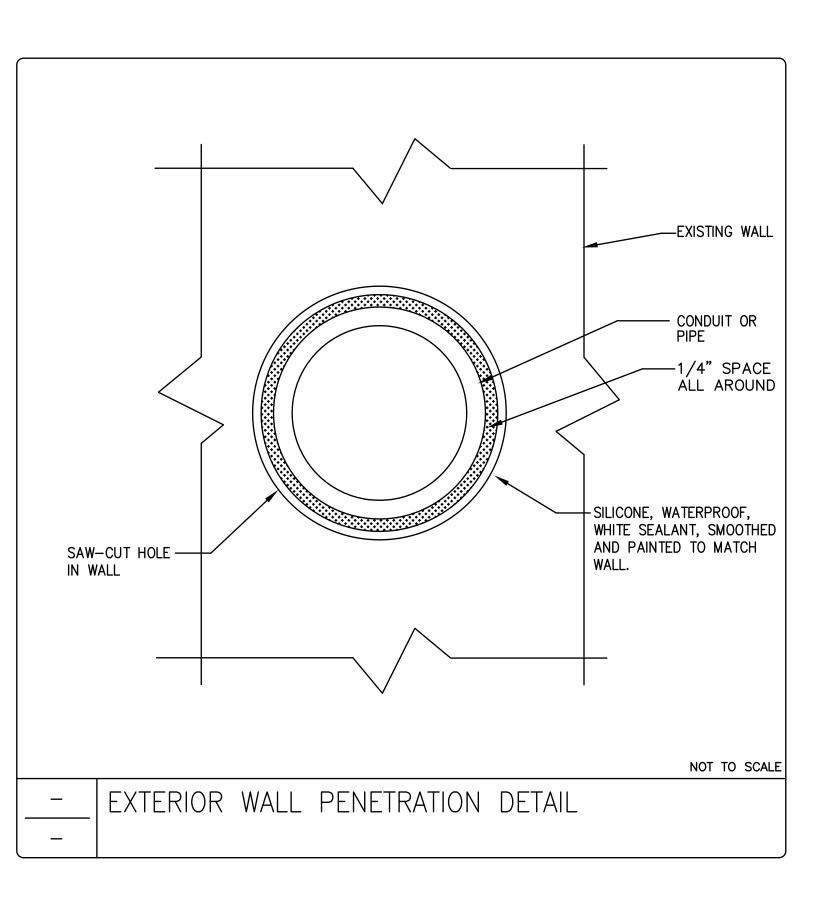


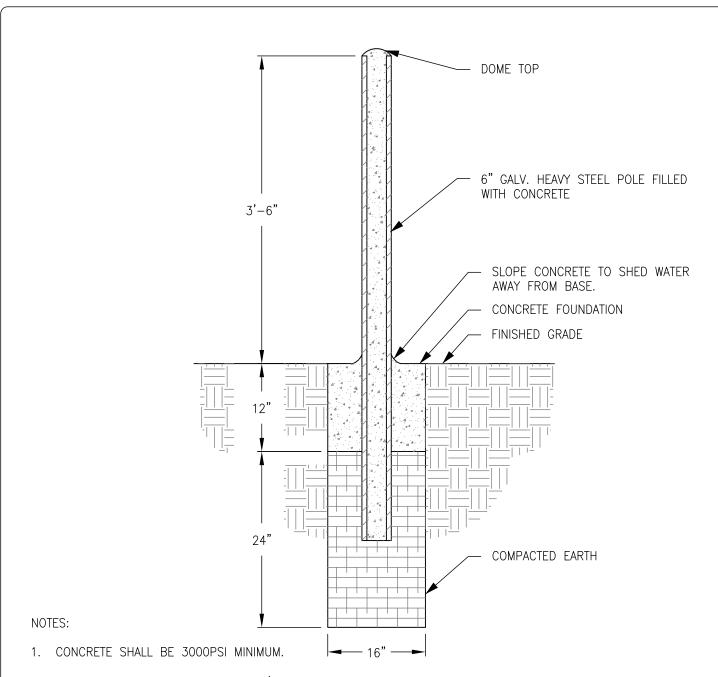








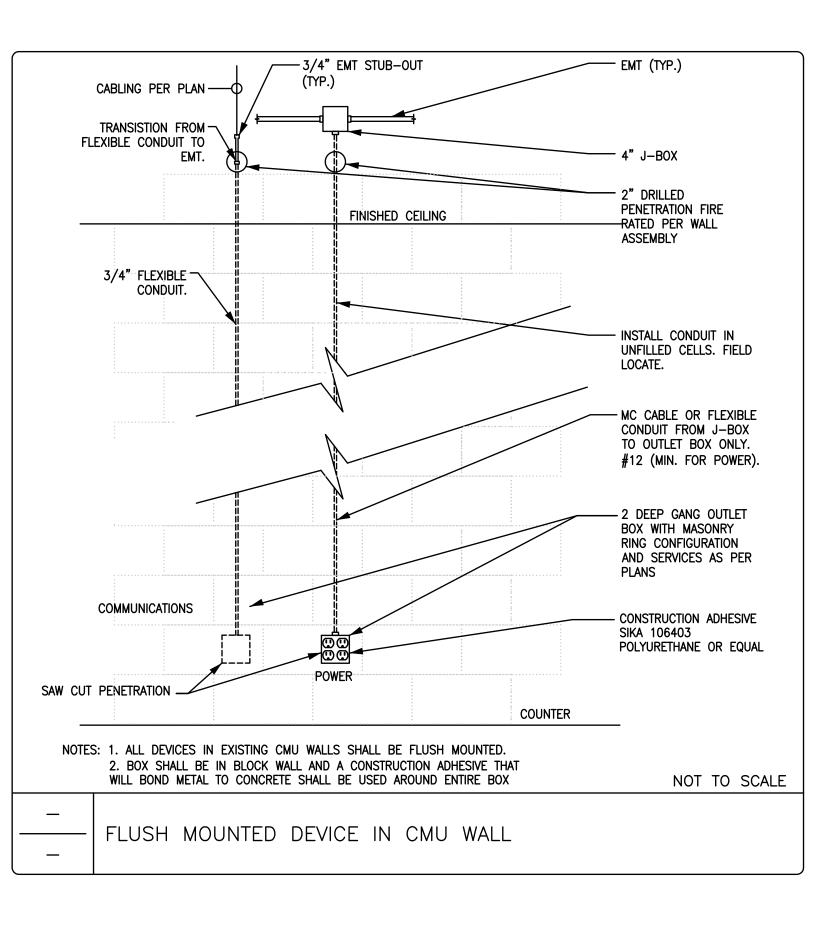


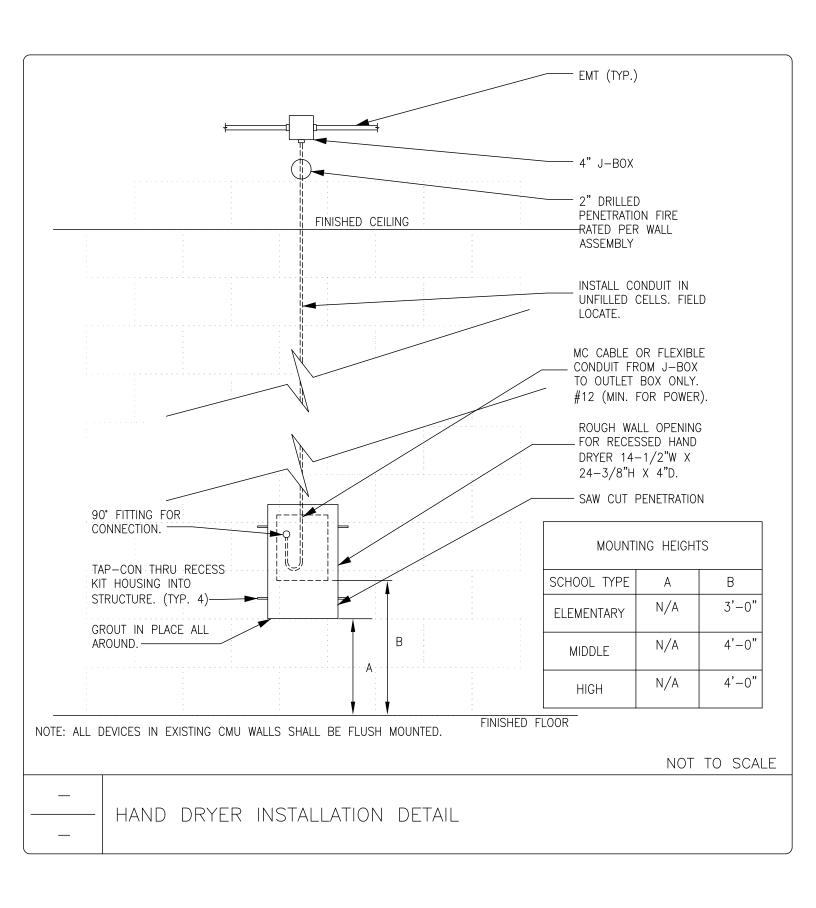


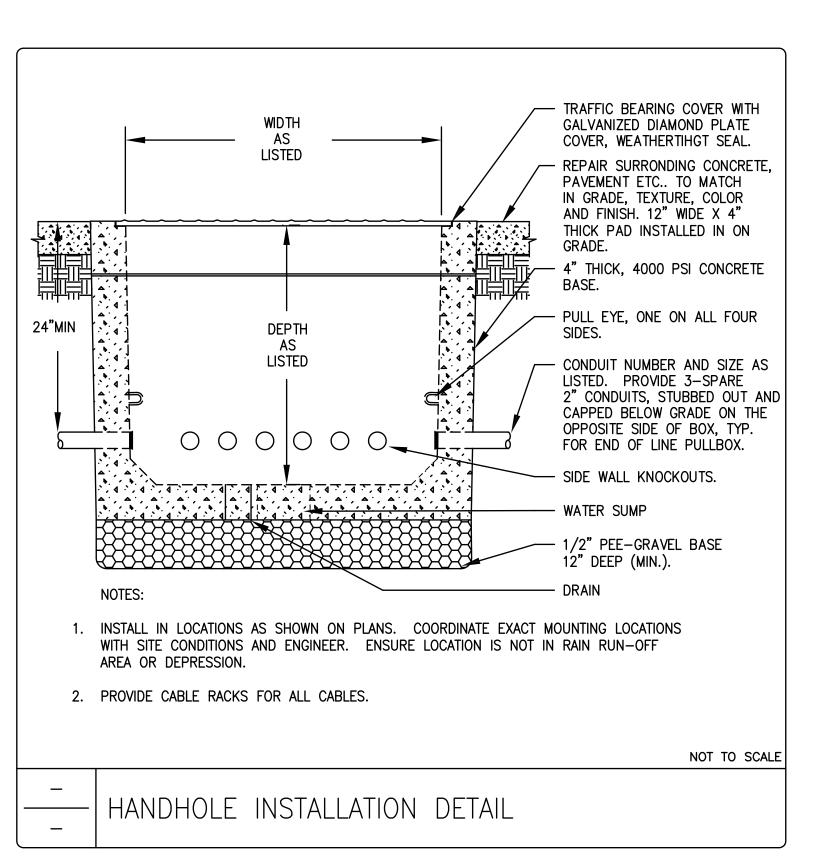
2. PAINT POLE AS DIRECTED BY OWNER'S REPRESENTATIVE.

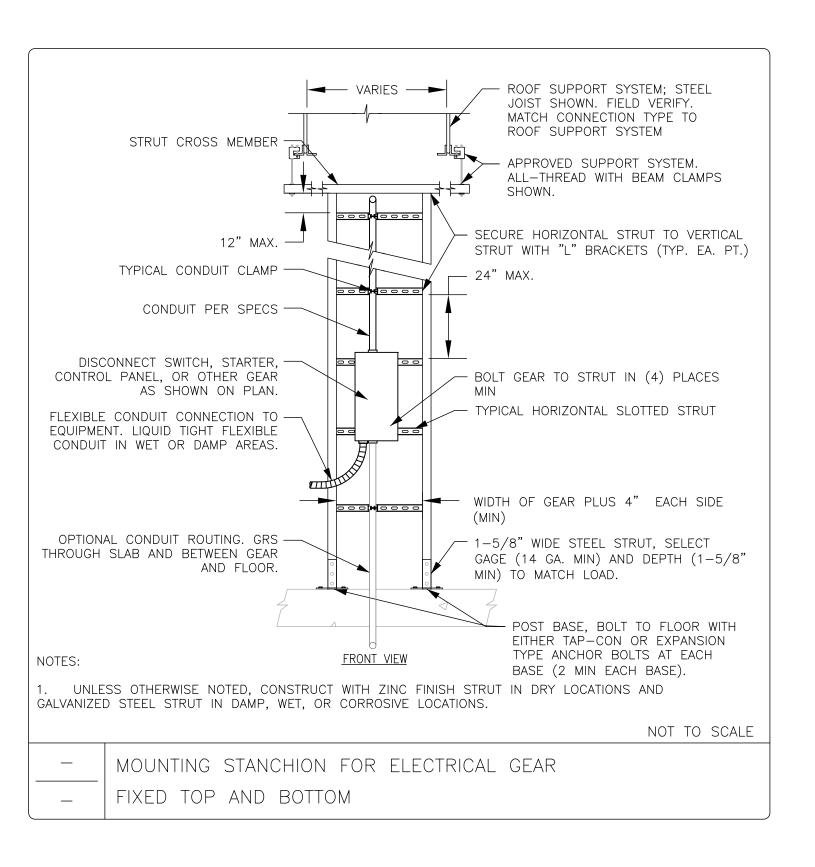
NOT TO SCALE

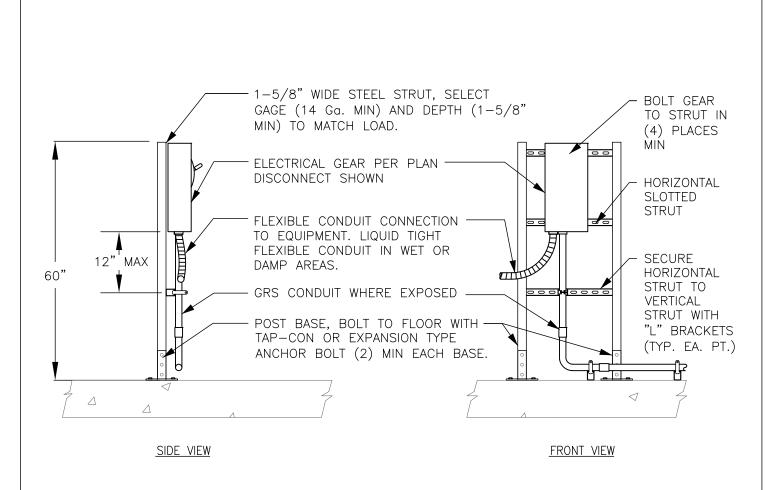
FIXED BARRIER BOLLARD









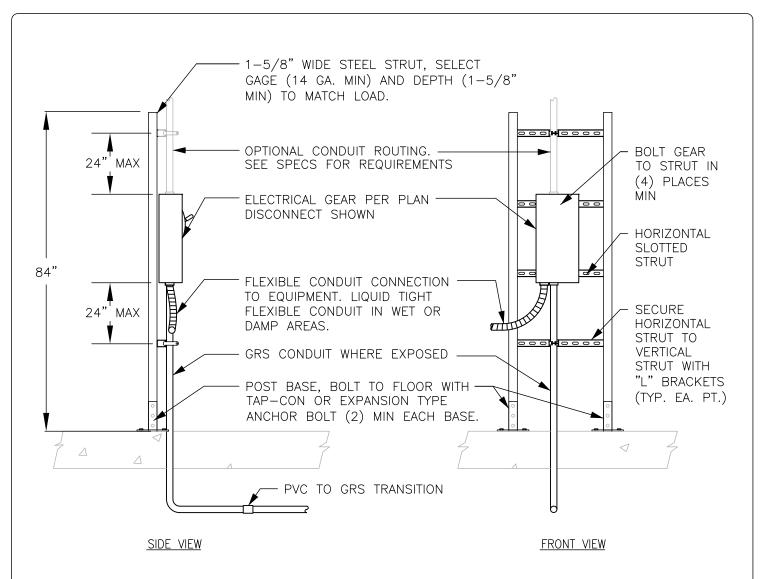


- 1. UNLESS OTHERWISE NOTED, CONSTRUCT WITH ZINC FINISH STRUT IN DRY LOCATIONS AND HOT DIPPED GALVANIZED STEEL STRUT IN DAMP, WET, OR OUTDOOR LOCATIONS.
- 2. UNLESS OTHERWISE NOTED USE TO SUPPORT ELECTRICAL GEAR WEIGHING LESS THAN 50 LBS.

NOT TO SCALE

TYP. MOUNTING STANCHION FOR ELECTRICAL GEAR

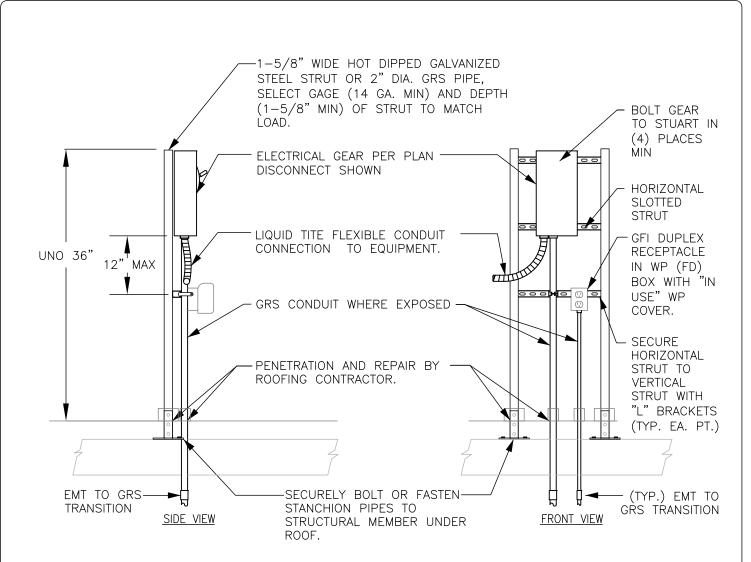
LITE GEAR - FIXED BOTTOM ONLY



- 1. UNLESS OTHERWISE NOTED, CONSTRUCT WITH ZINC FINISH STRUT IN DRY LOCATIONS AND GALVANIZED STEEL STRUT IN DAMP, WET, OR CORROSIVE LOCATIONS.
- 2. UNLESS OTHERWISE NOTED USE TO SUPPORT ELECTRICAL GEAR WEIGHING LESS THAN 50 LBS.

NOT TO SCALE

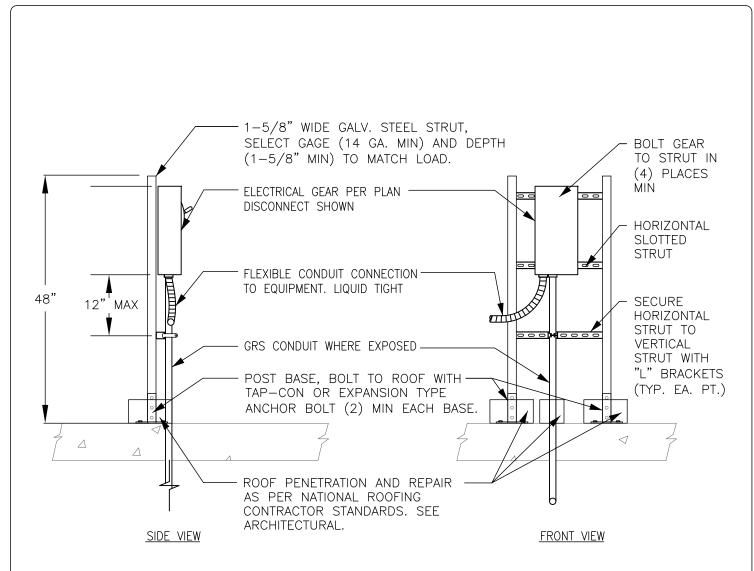
MOUNTING STANCHION FOR ELECTRICAL GEAR
 LITE GEAR — FIXED BOTTOM ONLY



- 1. UNLESS OTHERWISE NOTED, CONSTRUCT SUPPORT STANCHION WITH HOT DIPPED GALVANIZED STEEL COMPONENTS AND SS HARDWARE.
- 2. UNLESS OTHERWISE NOTED, WEIGHT NOT TO EXCEED 75 LBS (TOTAL).

NOT TO SCALE

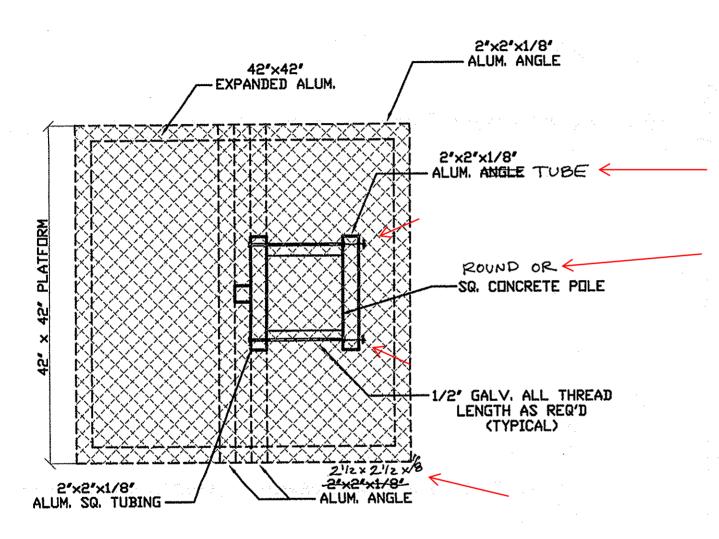
__ MOUNTING STANCHION FOR ELECTRICAL GEAR LITE GEAR — ROOF



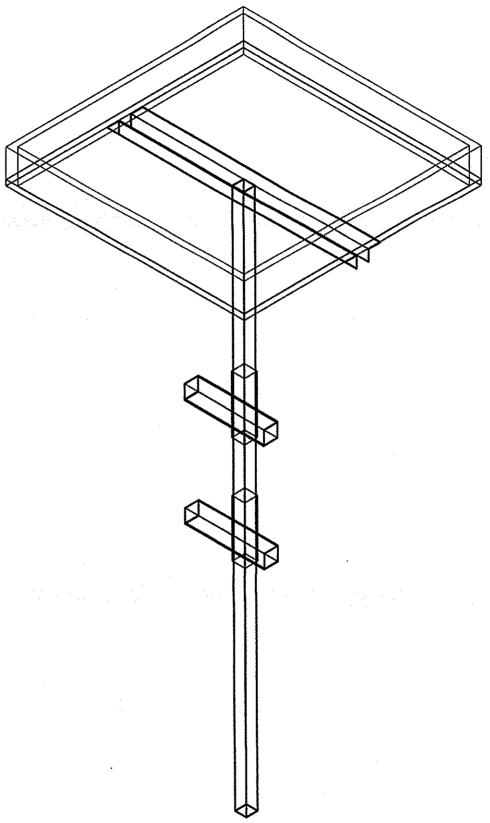
- 1. UNLESS OTHERWISE NOTED, CONSTRUCT WITH ZINC FINISH STRUT IN DRY LOCATIONS AND GALVANIZED STEEL STRUT IN DAMP, WET, OR CORROSIVE LOCATIONS.
- 2. UNLESS OTHERWISE NOTED USE TO SUPPORT ELECTRICAL GEAR WEIGHING LESS THAN 50 LBS.

NOT TO SCALE

MOUNTING STANCHION FOR ELECTRICAL GEARLITE GEAR — SLAB ROOF



OSPREY PLATFORM — TOP VIEW
SCALE: 1"=1'-0"

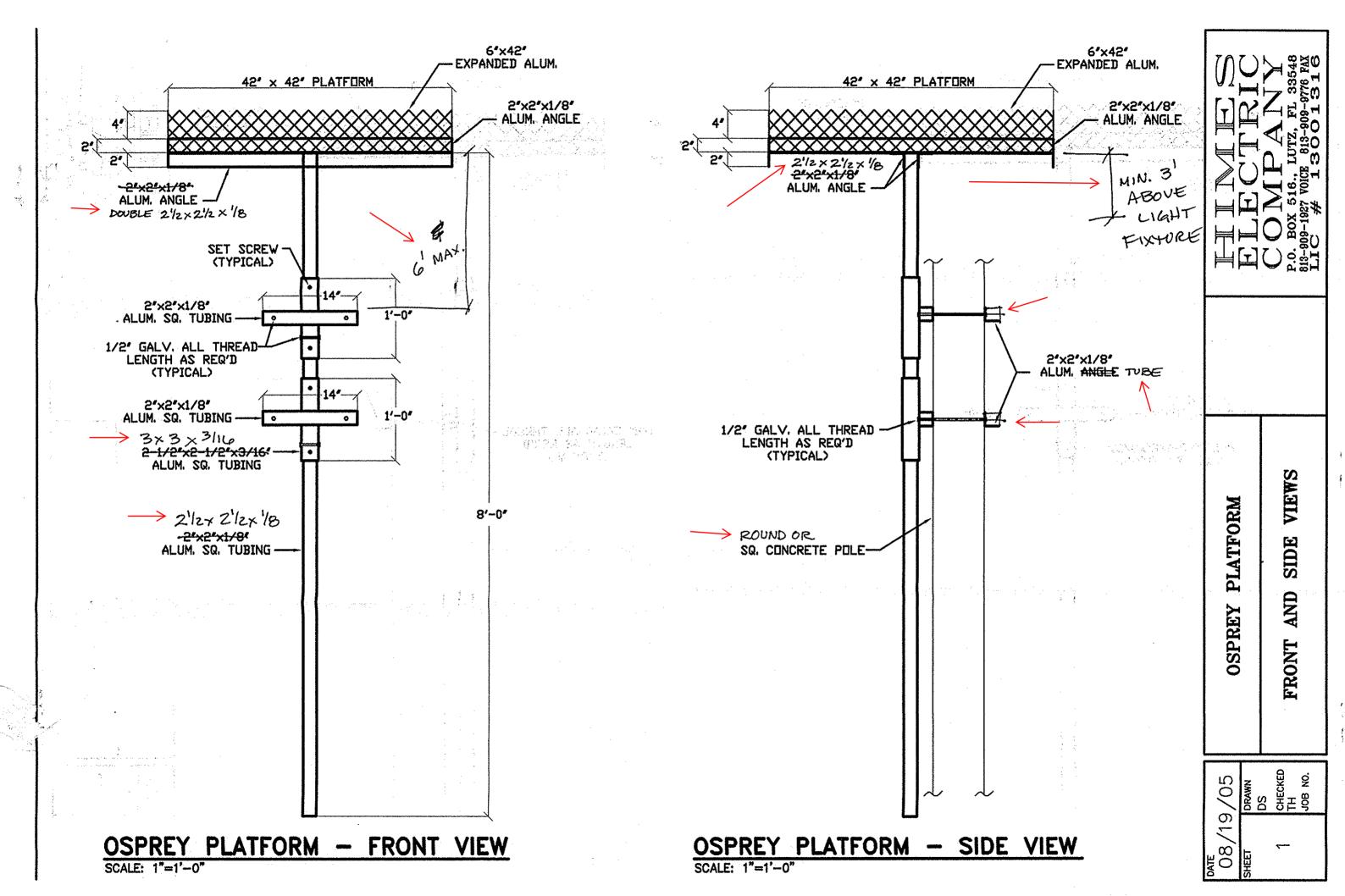


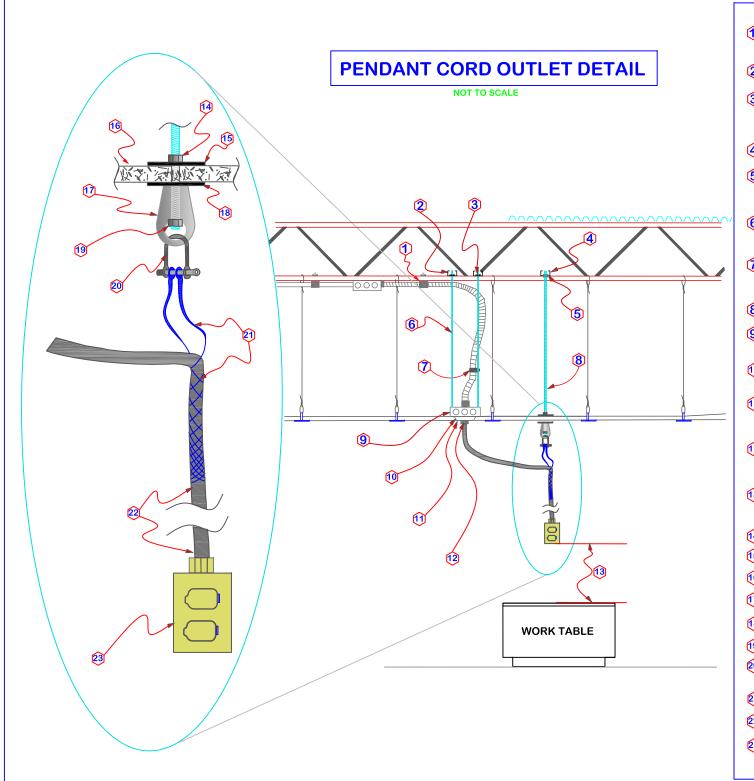
OSPREY PLATFORM - ISOMETRIC VIEW
SCALE: 1"=1'-0"

	OSPREY PLATFORM	
۵ .	ISOMETRIC AND TOP VIEWS	COMPANY P.0. BOX 516., LUTZ, FL 33548 813-909-1927 VOICE 813-909-9776 FAX LIC # 13001316

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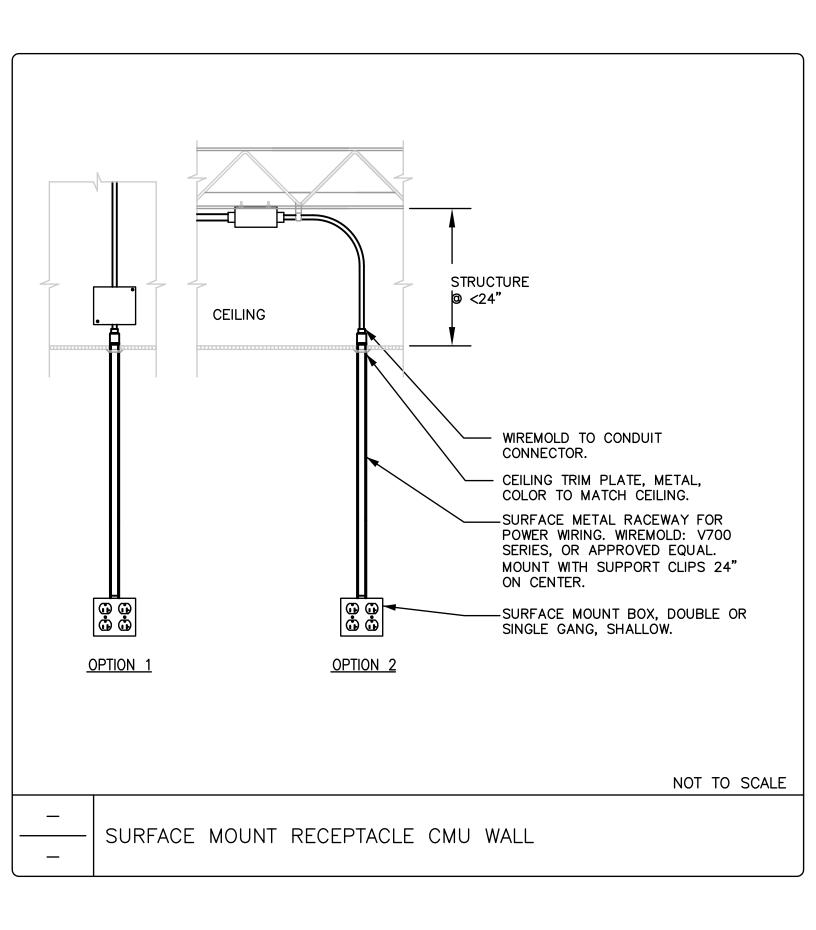
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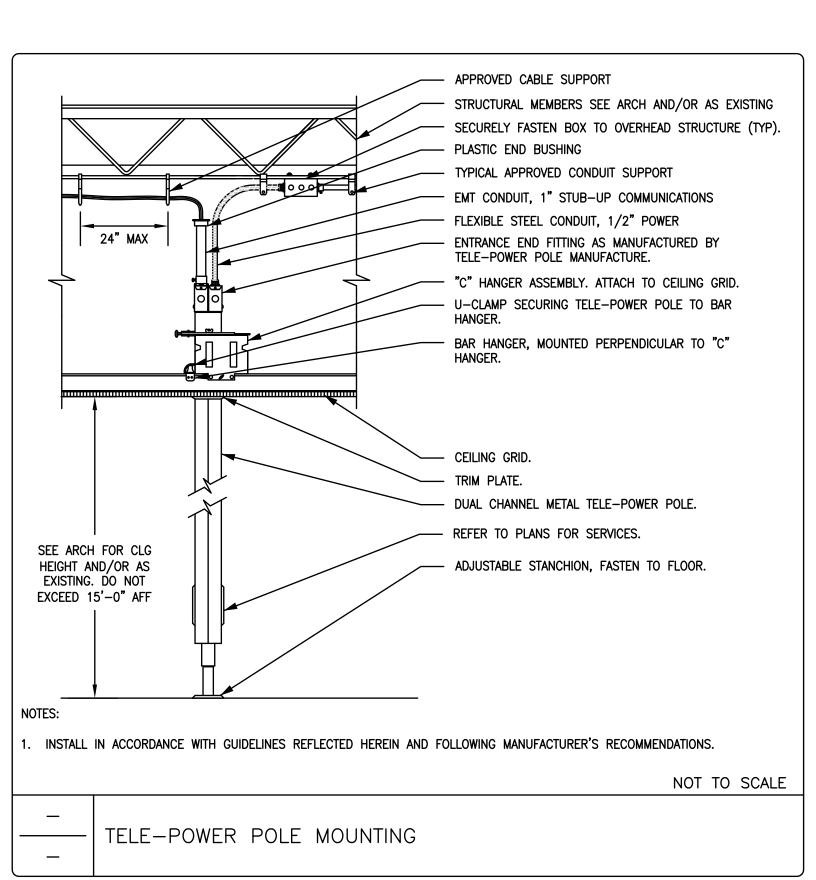


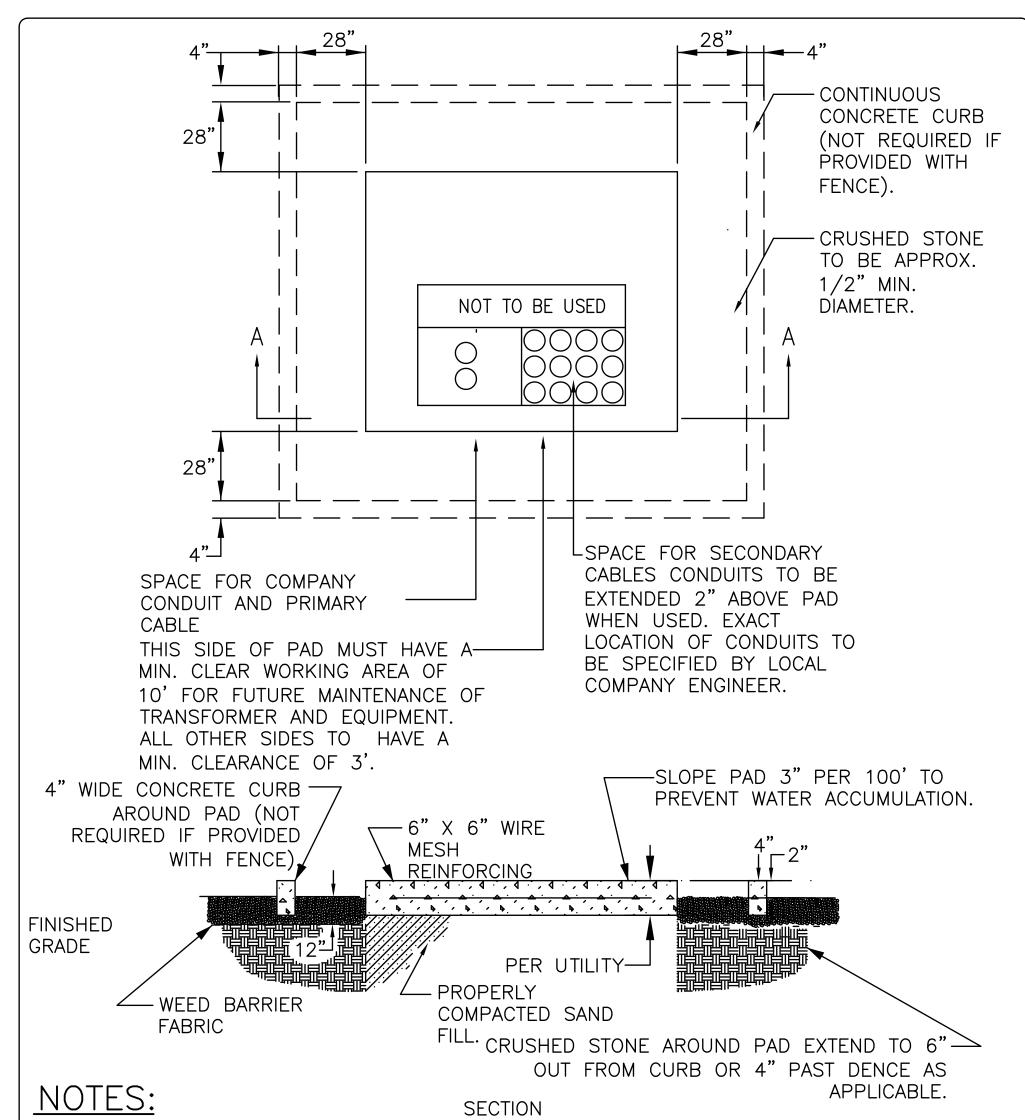


- NOTES
- 1 ½" FMC SUPPORT ON EACH END WITHIN 12" OF BOX
- $\frac{3}{4}$ " UNISTRUT
- (3) $\frac{1}{4}$ "-20 NYLON LOCK NUTS AND $\frac{1}{4}$ "X 1" FLAT WASHER TYPICAL
- 4 1½" UNISTRUT
- (5) 1/2 "-13 NUTS AND 1/2 "X 1" FLAT WASHER TYPICAL
- (6) (2) \(\frac{1}{4}\) -20 ALL THREAD, FLAT WASHERS, NUTS AS REQUIRED
- 7 ½ " FMC SUPPORT ON EACH END WITHIN 12" OF BOX
- $\frac{1}{2}$ "-13 ALL THREAD
- 9 4" X 2 1 DEEP BOX PART #
- 10 3/4" DEEP ROUND MUD RING PART # 38423
- 1 3½" ROUND COVER PLATE WITH 78 " KO PART # 36289
- 12 #12 AWG STRAIN RELIEF CONNECTOR PART # 38226
- 12" FROM BOTTEM OF OUTLET TO TOP OF TABLE

- **6** ACOUSTICAL TILE
- 1 13 EYE NUT
- 18 ½"X 1"½ FLAT WASHER
- $9\frac{1}{2}$ "-13 NYLON LOCK NUT
- 20 5/16 18 SHACKLE PART # 48885
- (1) .850-1.00" KELLEMS GRIP
- 2 12AWG 3/C SOOW CORD
- ERICSON 6130 BOX ERICSON 6135 COVERPLATE ERICSON 6131 DUPLEX RECEPT



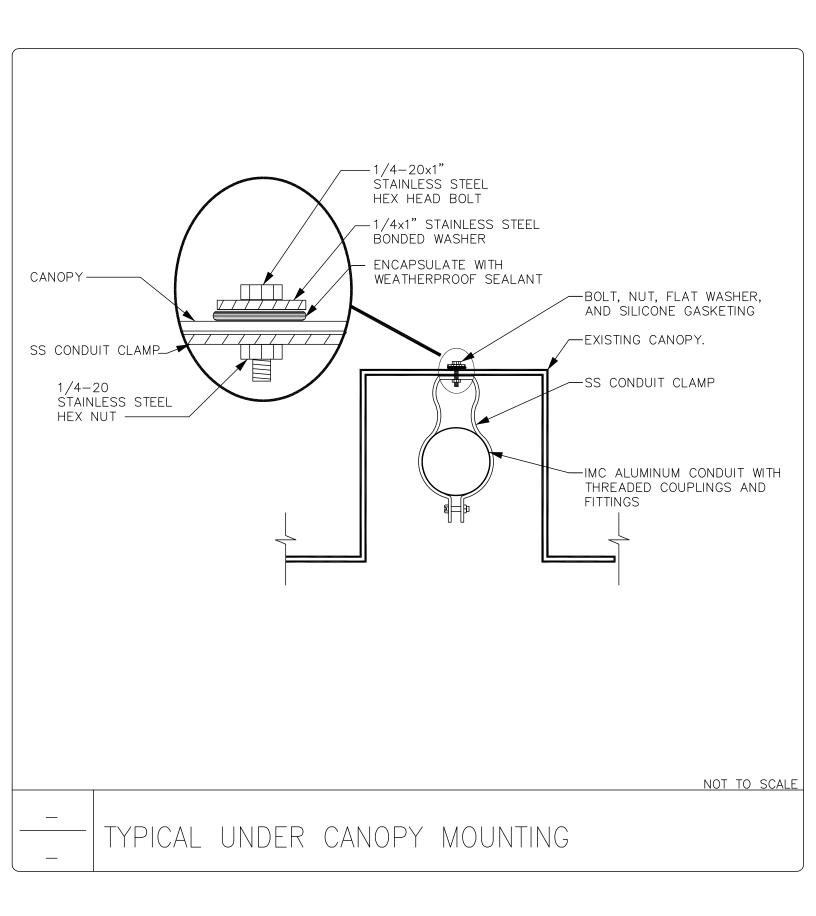


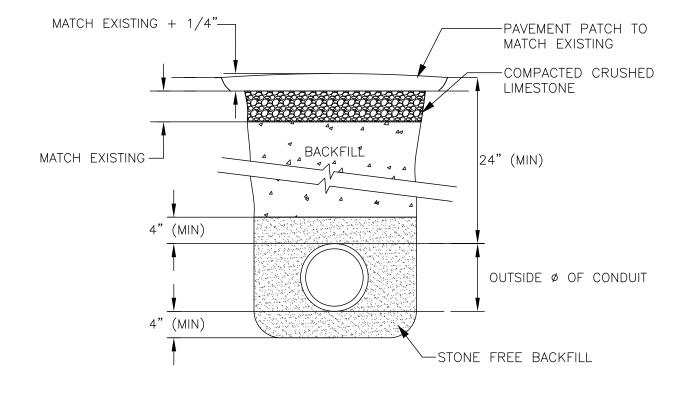


- 1. THE GROUND SHALL BE LEVELED AND THOR $\delta \overline{u}$ the compacted before the pad is installed.
- 2. THERE SHALL BE NO ABOVE GROUND OBSTRUCTIONS WITHIN 10 FEET OF THE FRONT OF THE TRANSFORMER OR WITHIN 3' OF THE SIDES AND BACK.
- 3. THE PAD IS SHOWN AS A REFERENCE AND IS INSTALLED AFTER THE CABLE AND CONDUIT IS INSTALLED.
- 4. CUT ALL CONDUITS OFF FLUSH WITH TOP OF PAD AND CAP CONDUIT.
- 5. PROVIDE CRUSHED STONE ONLY WITHIN FENCE. THERE SHALL BE NO GRASS. PROVIDE BARRIER BENEATH STONE TO PREVENT GRASS GROWTH.
- 6. CONSULT UTILITY COMPANY FOR PAD DIMENSIONS.
- 7. PROVIDE 6' DOUBLE SWING GATE IF FENCE IS PROVIDED. PROVIDE CLEARANCES REQUIRED BY UTILITY

TRANSFORMER PAD DETAIL - TYPICAL

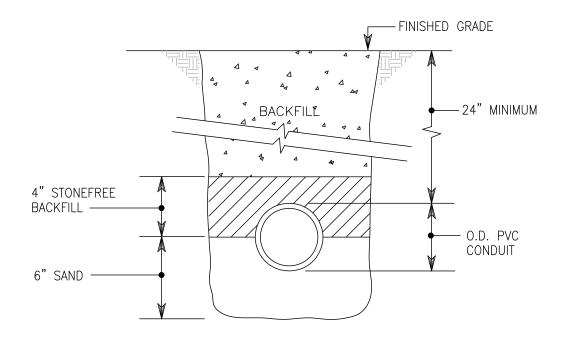
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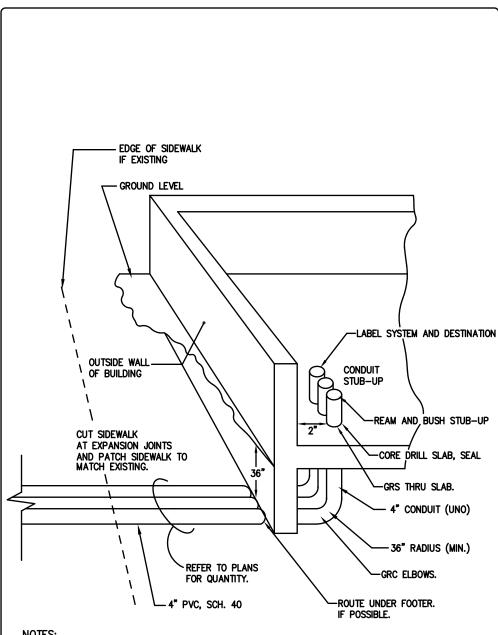
UNDERGROUND CONDUIT WITH PAVEMENT PATCH



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UNDERGROUND CONDUIT

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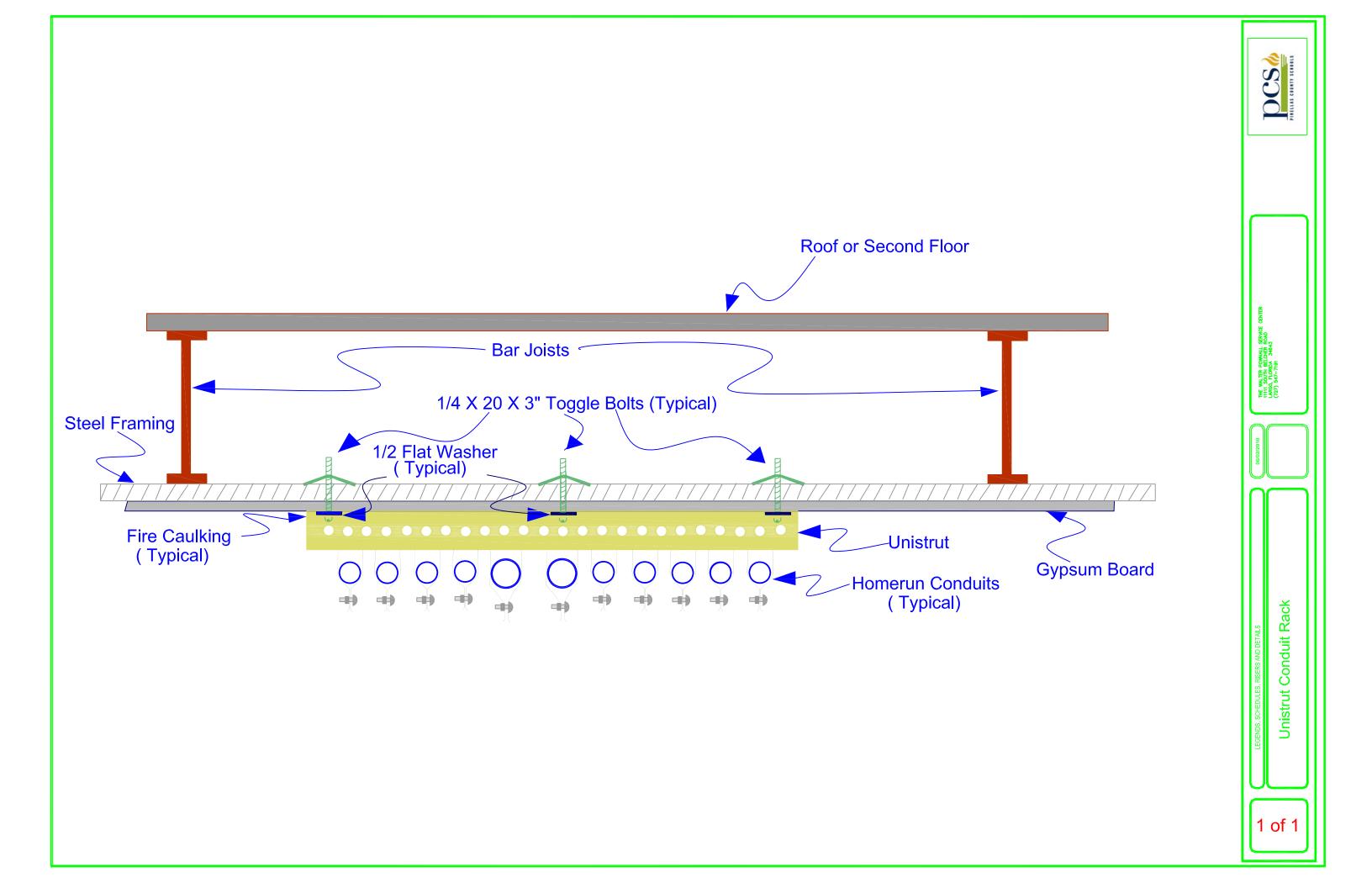


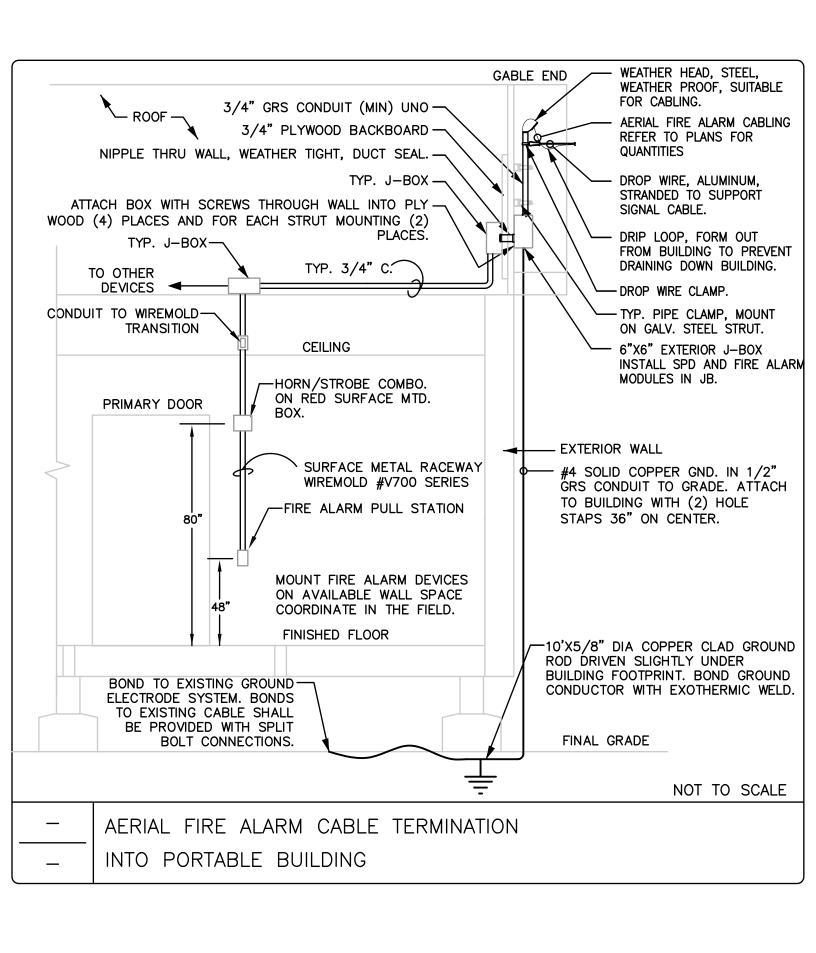
- 1. PLACING DEPTH 36" MINIMUM.
- 2. SLOPE CONDUIT AWAY FROM BLDG., 1/8" PER FOOT TO MANHOLE.
- 3. CONDUIT ENDS TO BE CAPPED AT TIME OF PLACING (BOTH ENDS).
- 4. REFER TO PLANS FOR QUANTITIES, ROUTING, AND POINT OF PENETRATION.
- 5. SEAL SLAB PENETRATIONS WITH SILICONE SEALANT
- 6. EXERCISE CARE TO AVOID DAMAGE TO FINISHED FLOOR.

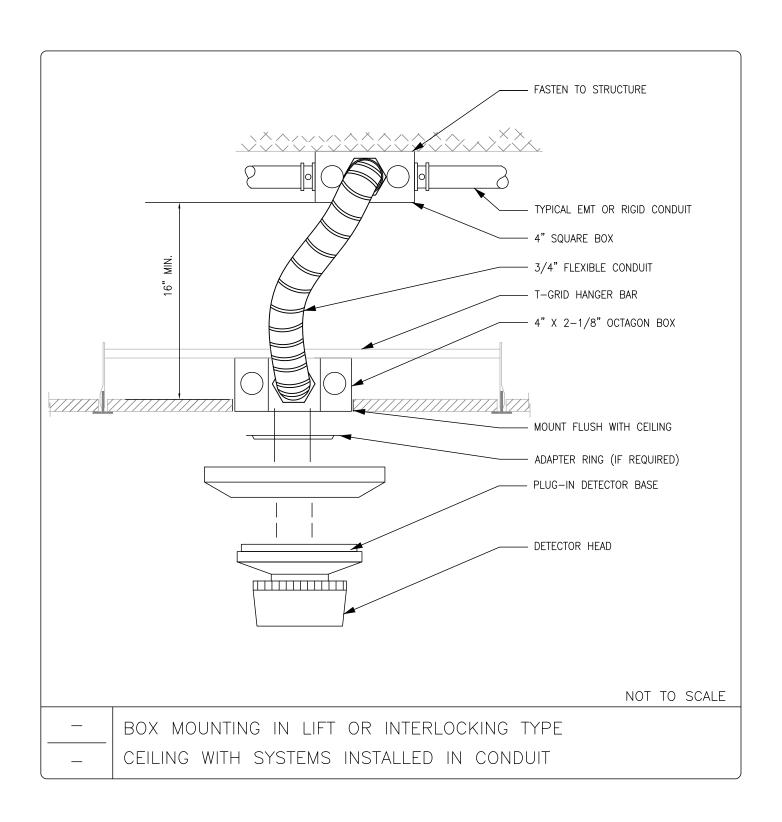
NOT TO SCALE

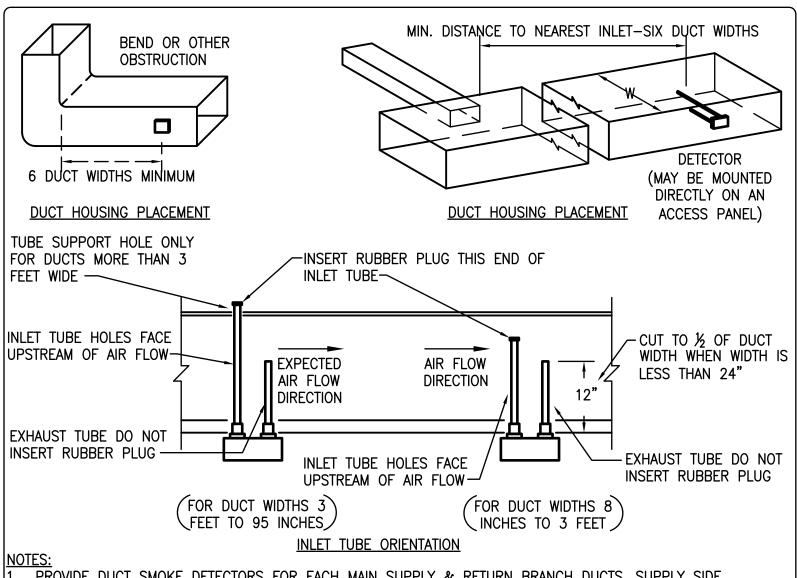
UNDERGROUND ENTRANCE

(COMMUNICATIONS ONLY) - TYPICAL



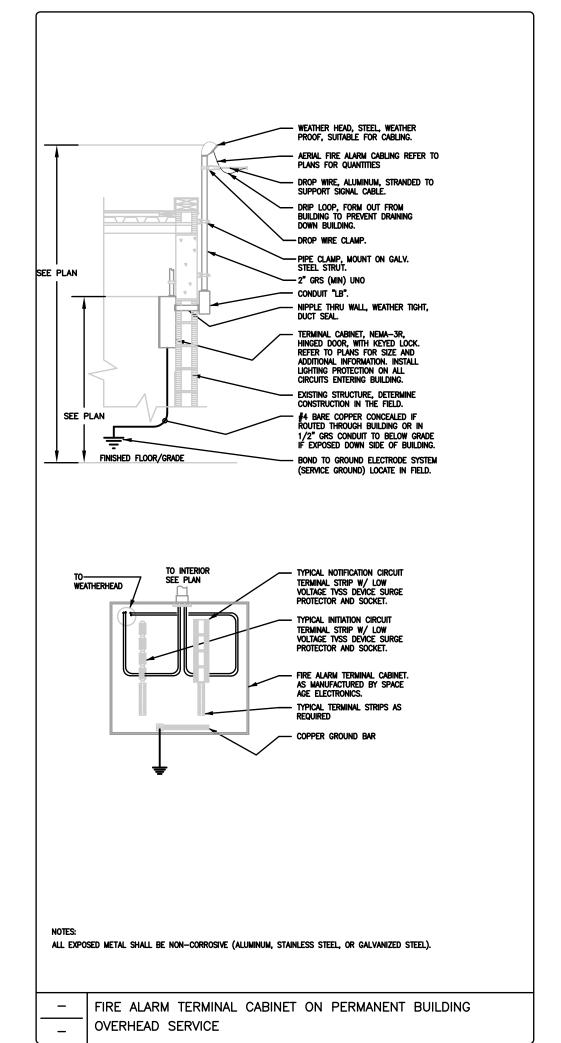


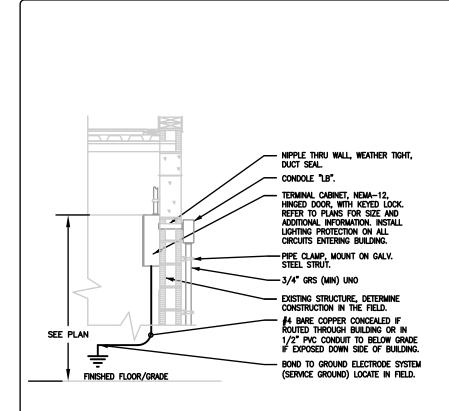


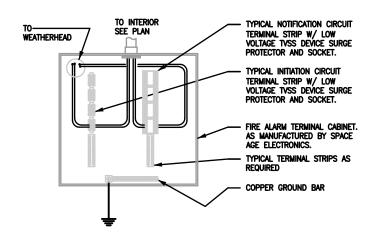


- 1. PROVIDE DUCT SMOKE DETECTORS FOR EACH MAIN SUPPLY & RETURN BRANCH DUCTS. SUPPLY SIDE DETECTORS SHALL BE LOCATED ON DOWNSTREAM SIDE OF FILTERS. ALL DETECTOR LOCATIONS SHALL BE MINIMUM SIX DUCT WIDTHS AWAY FROM ANY INLET, TURN, OR ANY OTHER TURBULENCE CAUSING OBSTRUCTION.
- 2. CONTRACTOR SHALL PROVIDE AND INSTALL A REMOTE INDICATOR FOR EACH CONCEALED DUCT SMOKE DETECTOR. INDICATOR SHALL BE MOUNTED IN A CLEARLY VISIBLE LOCATION, AND SHALL BE READILY ACCESSIBLE FOR MAINTENANCE AND TESTING. PROVIDE CONDUIT OR WIREMOLD AS REQUIRED (SEE FIRE ALARM NOTES). VERIFY LOCATION IN FIELD.

- FIRE ALARM DUCT SMOKE DETECTOR DETAILS



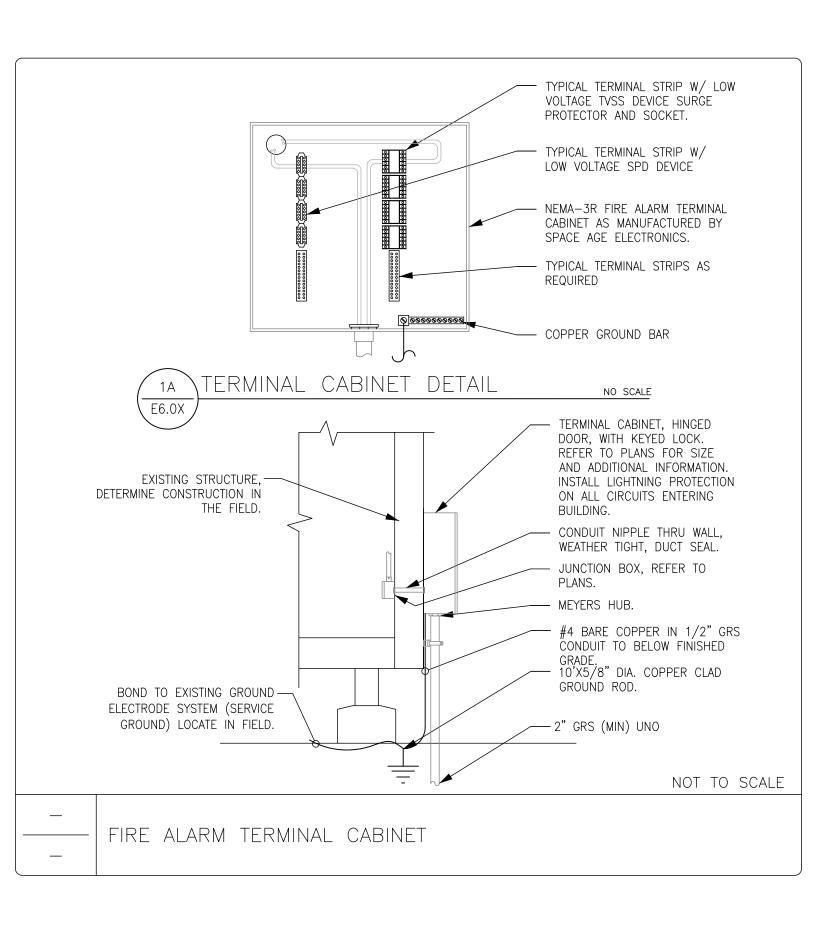


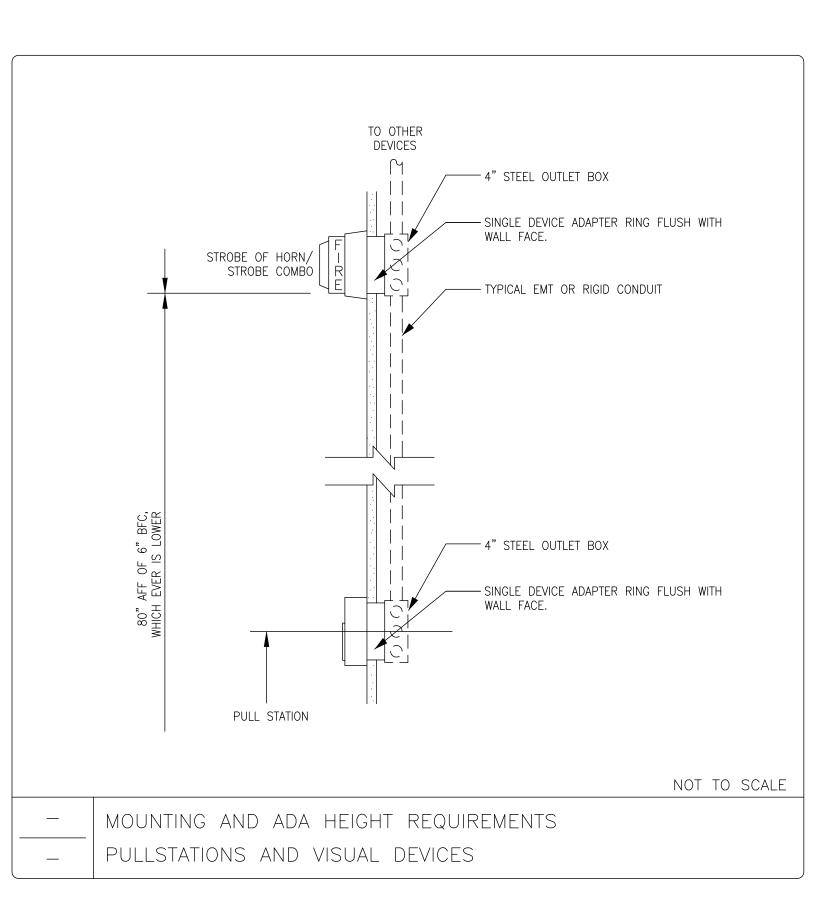


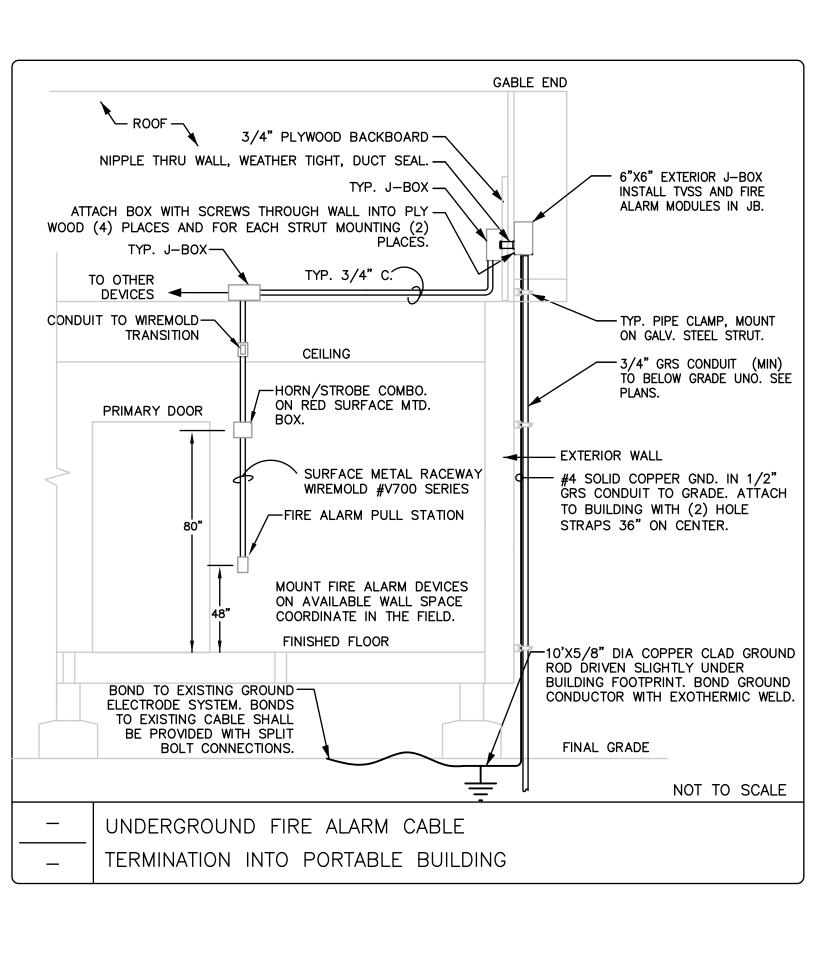
NOTES: ALL EXPOSED METAL SHALL BE NON-CORROSIVE (ALUMINUM, STAINLESS STEEL, OR GALVANIZED STEEL).

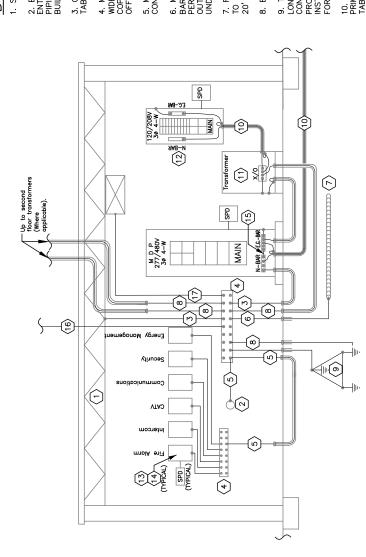
NOT TO SCALE

- FIRE ALARM TERMINAL CABINET ON PERMANENT BUILDING UNDERGROUND









DETAIL NOTES:

- 1. STRUCTURAL BUILDING STEEL
- 2. BOND MAIN METAL PLUMBING PIPING WITHIN 5' OF FINTENIG BULLDING, IF UNDERFORGOUND PLUMBING PHONE IS PVC, GROUND METAL PLUMBING WITHIN BUILDING AT CLOSEST ACCESSABLE POINT.
- 3. GROUNDING ELECTRODE CONDUCTOR SIZED PER TABLE 250.66.
- 4. MAIN GROUNDING ELECTRODE GROUND BAR 4" WDE X 18" LONG MINIMUM X 1/4" THICK SOLID COPPER TERMINAL BUS MOUNTED ON INSULATORS OFF WALL.
- 5. MINIMUM #4 COPPER GROUNDING ELECTRODE CONDUCTOR.
- 6. MAIN GROUNDING ELECTRODE CONDUCTOR 20' BARE COPPER IN EARTH, BURIED 24" DEEP, SIZED PER TABLE 250.66. INSURE CONDUCTOR IS BURIED OUTSIDE OF BUILDING PAD AND NOT INSTALLED UNDER SLAB OR FOOTER.
- 7. FOOTER STEEL IN GROUND. GROUND CONNECTIONS TO BE EXOTHERMIC WELDS TO A MIN. 1/2" THICK BY 20" LONG REBAR.
- 8. BASED ON SECONDARY FEEDER CONDUCTORS.
- 9. THREE COPPER GROUND RODS, 5/8" BY 20'
 LONG, SPACED A MINIMUM OF 10' APART. GROUND
 CONNECTIONS SHALL BE EXOTHERMIC WELDS.
 PROVIDE 6" DVC SLEEVE WITH THREADED CAP
 INSTALLED FLUSH WITH FINISHED GRADE FOR ACCESS
 FOR SERVICE AND/OR INSPECTION.
- 10. EQUIPMENT GROUNDING CONDUCTOR ROUTED WITH PRIMARY AND SECONDARY FEEDERS SIZED PER TABLE 250.122. CONNECT TO GROUND BUS AT PANELBOARD.

11. ALL TRANSFORMER SECONDARY NEUTRAL CONDUCTORS) SHALL BE BONDED AT THE TRANSFORMERS. DO NOT BOND SECONDARY LOW VOLTAGE PANELBOARD NEUTRALS.

12. NEUTRAL (GROUNDED CONDUCTOR) SHALL NOT BE BONDED AT SECONDARY PANELBOARDS (FLOAT IF APPLICABLE).

13. ALL ENCLOSURES/CONTROL CABINETS FOR SYSTEMS PER DETAIL SHALL BE BONDED WITH A MINUMUM #4 COPPER GROUNDING CONDUCTOR TO MAIN GROUNDING ELECTRODE BUSSBAR.

14. INSTALL A GROUND BAR KIT CAPABLE OF TERMINATING ALL EQUIPMENT GROUNDING CONDUCTORS ENTERING THE ENCLOSURE.

15. NEUTRAL (GROUNDED CONDUCTOR) TO BE BONDED ONLY AT SERVICE MAIN. ALL OTHER BUDIDING MAIN NEUTRALS ARE NOT TO BE BONDED (FLOATING).

16. TO SECOND FLOOR AND ABOVE ELECTRICAL ROOM MAIN COPPER GROUND BUSS IF APPLICABLE. USE REMOTE BUILDING GROUNDING DETAIL FOR ALL SECOND FLOOR AND ABOVE BONDING/GROUNDING PER NEC 250.66 OR 250.122 AS APPLICABLE.

17. METAL HVAC DUCTWORK SHALL BE BONDED AS PER 250.104 (B) WITHIN THE MECHANICAL ROOM IN WHICH THEY ORIGINATE WITH A MINIMUM #6 AWG COPPER.

NOT TO SCALE

BUILDING GROUNDING DETAIL

1

GENERAL NOTES

- . All grounding electrode conductors/grounding conductors installed underground/in-slab shall be in PVC conduit.
- Reference NEC 250.52 (B) and 250.104(B) for bonding metal gas piping. Gas piping to be grounded with a grounding conductor sized per NEC Table 250.122 or a minimum of #6
- 3. Reference NEC 250.104(B) for bonding all interior metal piping and air ducts. Ground all same interior piping/ducts.
- Reference NEC 250.52(A)(4) for a ground ring encircling the building or structure, if installed. Grounding conductor shall not be less than 2.5' below the earths surface, consisting of at least 20' of bare copper, not smaller than #2 AWG.
- i. Reference NEC 250.106 and NFPA 780 for lightning protection systems, if installed. Lightning protection system ground terminal shall be bonded to the building or structure ground
- 6. All floor-mounted swithcboards, panelboards and transformers are to be installed on 4" concrete housekeeping pads.
- 7. All TVSS devices shall be provided and installed per division 16600 and per manufacturers standards. For clarity only bonding, grounding and neutral conductors/connections are
- 8. If a main electrical service is supplied by 120/208V 3ø 4-W, disregard all power ditribution step-down transformers.
- 9. All copper grounding electrodes conductors shall be identified every 4' with green tape if insulated and exposed.
- Reference NEC 250.58 Common Grounding Electrode Where separate services supply a building, they shall be provided with a common grounding electrode.
- 11. All National Electrical Code Article numbers are based on the

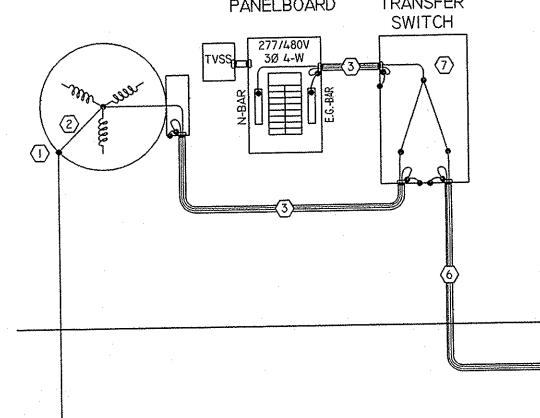
EMERGENCY GENERATOR

KEYED NOTES

- Terminal bus for grounding electrode to generator set. Generator set/system grounded conductor (neutral) to be bonded to grounding electrode conductor/system only at generator set.
- 2 Bonding jumper sized per table 250.30(A)(1).
- $\sqrt{3}$ Provide equipment grounding conductor sized per 250.122.
- 4 Install conduit underground from generator set to main grounding electrode.
- Frounding electrode conductor sized per table 250.66, shall be routed back to and terminated at main building grounding Equipment grounding conductor shall be installed per 250.122 and terminated at ground buss.
- $\overline{(7)}$ Grounded conductor (neutral) shall be installed and terminated at neutral buss. NOTE: Neutral shall not be bonded at "ATS"

GENERATOR

AUTOMATIC **EMERGENCY** TRANSFER PANELBOARD



MAIN ELECTRICAL SERVICE

KEYED NOTES

- (1) Structural Building Steel.
- Bond main metal plumbing piping within 5' of entering building.

 If underground plumbing piping is PVC, ground metal plumbing within building at closest accessable point.
- (3) Grounding electrode conductor sized per table 250.66.
- 4 Ground Bus 4" wide x 18" long minimum x 1/4" thick solid copper terminal bus mounted on insulators off wall.
- (5) Minimum #4 copper grounding electrode conductor.
- $\sqrt{6}$ Main grounding electrode conductor 20' bare copper in earth, buried 24" deep, sized per table 250.66. Insure conductor is buried outside of building pad and not installed under slab or
- $\overline{7}$ Footer steel in ground. Ground connections to be exothermic welds to a min. 1/2" thick by 20' long rebar.
- Solution Grounding electrode conductor sized per table 250.66 based on secondary feeder conductors.
- $\sqrt{9}$ Three copper ground rods, 5/8" by 20' long, spaced a minimum of 10' apart. Ground connections shall be exothermic welds. Provide 6" PVC sleeve with threaded cap installed flush with finished grade for access for service and/or inspection.
- Equipment grounding conductor routed with primary and secondary feeders sized per table 250.122. Connect to ground bus at panelboard.
- $\langle 11 \rangle$ All transformer secondary neutral conductors (grounded conductors) shall be bonded at the transformers. Do not bond secondary low voltage panelboard neutrals.

KEYED NOTES (CONT.)

- Neutral (Grounded Conductor) shall not be bonded at secondary panelboards (Float if applicable).
- All enclosures/control cabinets for systems per detail shall be grounded with a minumum #4 copper grounding conductor to main grounding electrode bussbar.
- (14) Install a ground bar kit capable of terminating all equipment grounding conductors entering the enclosure.
- Lightning protection system air terminal(s). (See General Note
- $|\langle 16 \rangle$ If provided, lightning protection system ground terminals shall be bonded to main building grounding electrical system/buss.
- (17) Ground ring. (See General Note #4)
- (18) Made electrodes installed as necessary per manufacturers requirements. Ground connections shall be exothermic welds. Provide 6" PVC sleeve with threaded cap installed flush with finished grade for access for service and/or inspection.
- Neutral (Grounded Conductor) to be bonded only at Service Main. All other building main neutrals are NOT to be bonded
- $|\sqrt{20}\rangle$ To second floor and above electrical room main copper ground buss if applicable. Use remote building grounding detail for all second floor and above bonding/grounding per NEC 250.66 or
- 21) Metal HVAC ductwork shall be bonded as per 250.104 (B) within the mechanical room in which they originate with a minimum #6 AWG copper.

- UP TO SECOND FLOOR TRANSFORMERS (WHERE APPLICABLE). 120/208V 3Ø 4-W MDP 277/480V 3Ø 4-W 4 MAIN

REMOTE BUILDINGS & UPPER FLOOR

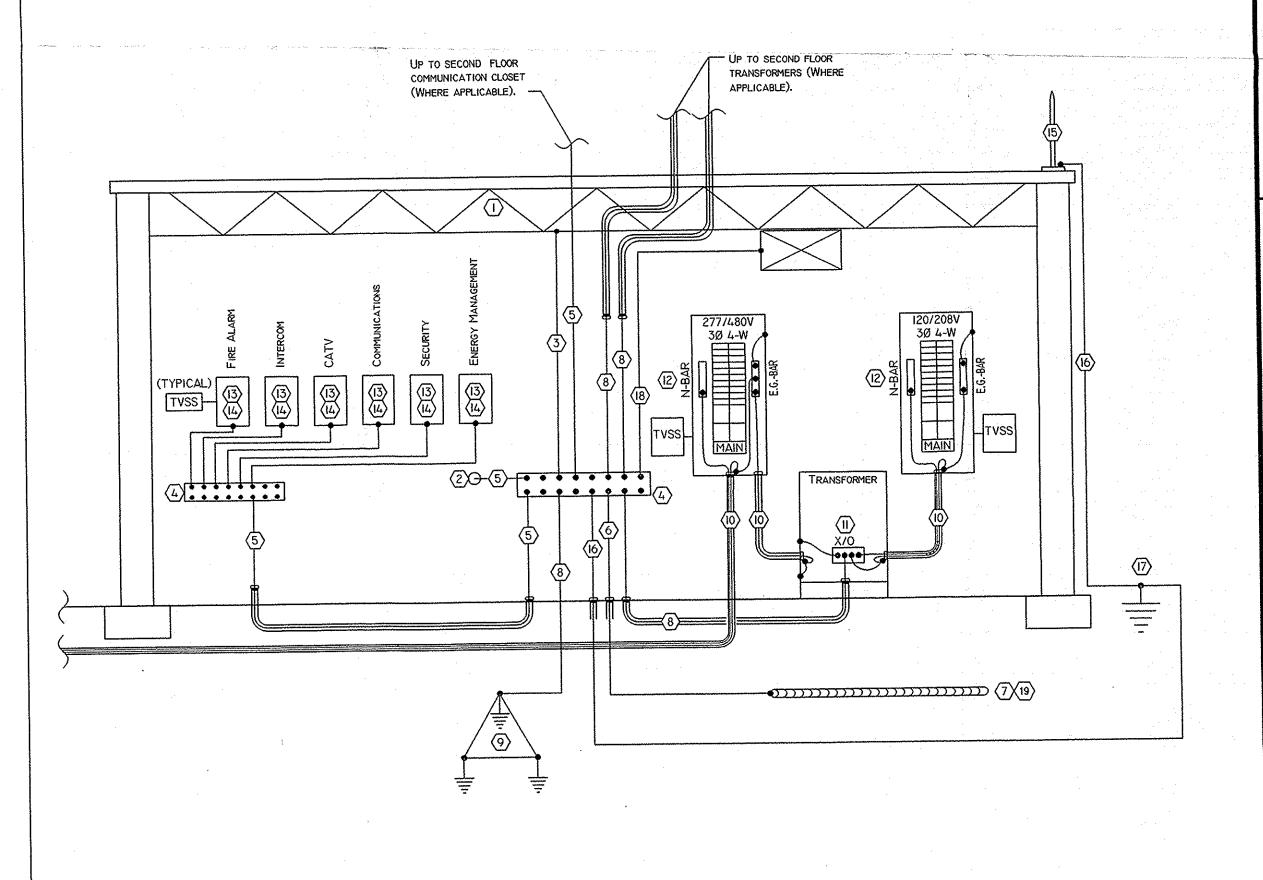
KEYED NOTES

- 1 Structural Building Steel.
- Bond main metal plumbing piping within 5' of entering building.
 If underground plumbing piping is PVC, ground metal plumbing within building at closest accessible point.
- 3 Grounding electrode conductor sized per table 250.66.
- Ground Bus 4" wide x 18" long minimum x 1/4" thick solid copper terminal buss mounted on insulators off wall.
- (5) Minimum #4 copper grounding electrode conductor.
- 6 Main grounding electrode conductor 20' bare copper in earth, buried 24" deep, sized per table 250.66.
- 7 Footer steel in ground. Ground connections shall be exothermic (15) Lightning protection system air terminal(s). welds to a min. 1/2" thick by 20' long rebar.
- (8) Grounding electrode conductor sized per table 250.66 based or
- secondary feeder conductors. (9) Three copperciad ground rod 5/8" x 20' long spaced a minimum of 10' apart. Ground connections to be exothermic welds. Provide 6" PVC sleeve with threaded cap installed flush

with finished grade for access for service and/or inspection.

Equipment grounding conductor routed with primary and secondary feeders and sized per table 250.122. Connect to ground buss at panelboard.

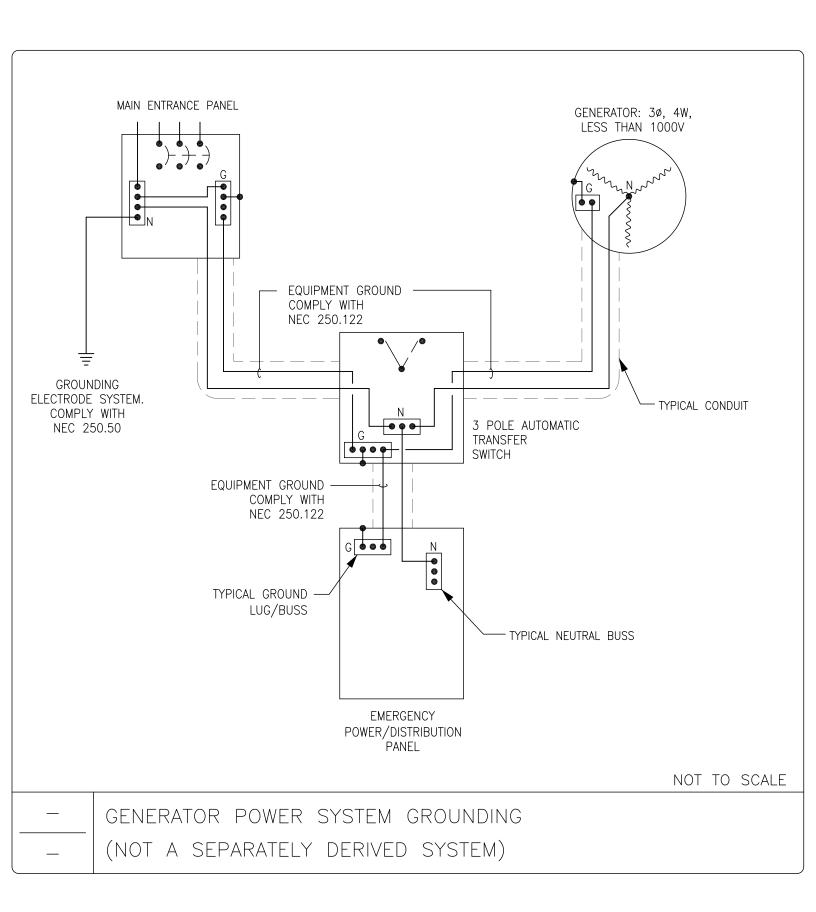
- $\langle \overline{11} \rangle$ All transformer secondary neutral conductors (grounded conductor) to be bonded at the transformers. do not bond secondary low voltage panelboard and neutral.
- Neutral (Grounded Conductor) shall not be bonded at secondary panelboards (Float if applicable).
- All enclosures/control cabinets for systems per detail shall be grounded with a #4 copper grounding conductor to main
- $\langle 14 \rangle$ Install a ground buss capable of terminating all equipment grounding conductors exiting the enclosure. (Provide the same for second floor communication room where applicable.)
- If provided, lightning protection system ground terminals shall be bonded to main building grounding electrode system/buss.
- Made electrodes installed as necessary per manufacturers requirements. Cround assert requirements. Ground connections shall be exothermic welds. Provide 6" PVC sleeve with threaded cap installed flush with finished grade for access for service and/or inspection.
- Metal HVAC ductwork shall be bonded as per 250.104 (8) within the mechanical room in which they originate with a minimum #6 AWG copper.
- (19) This applies only to remote electrical rooms.

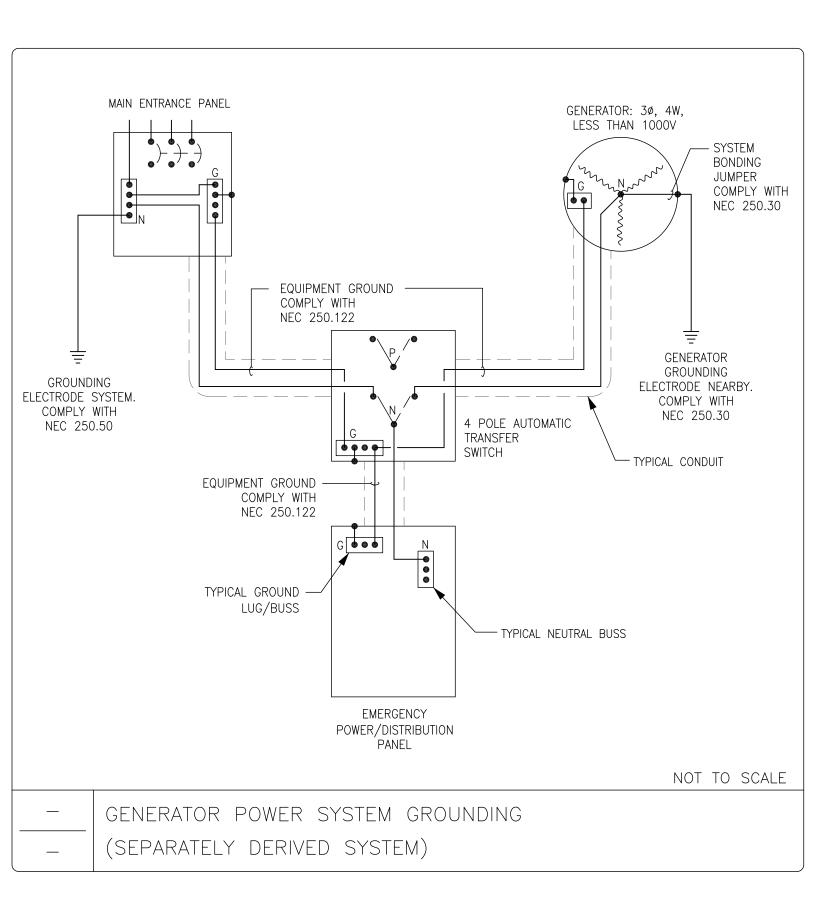


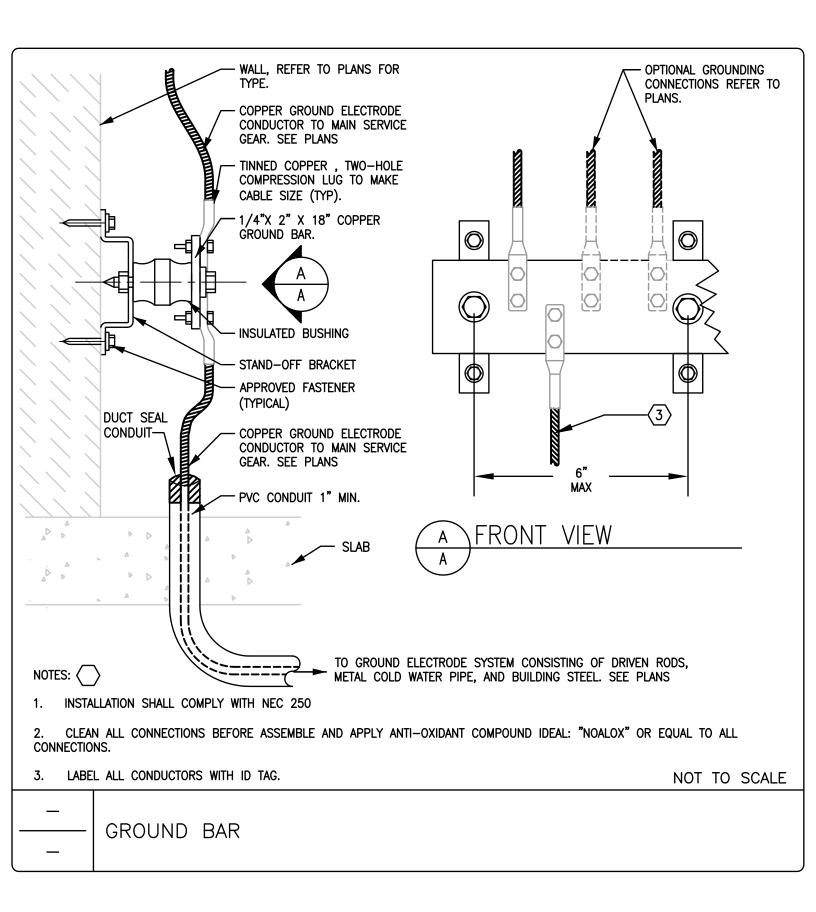
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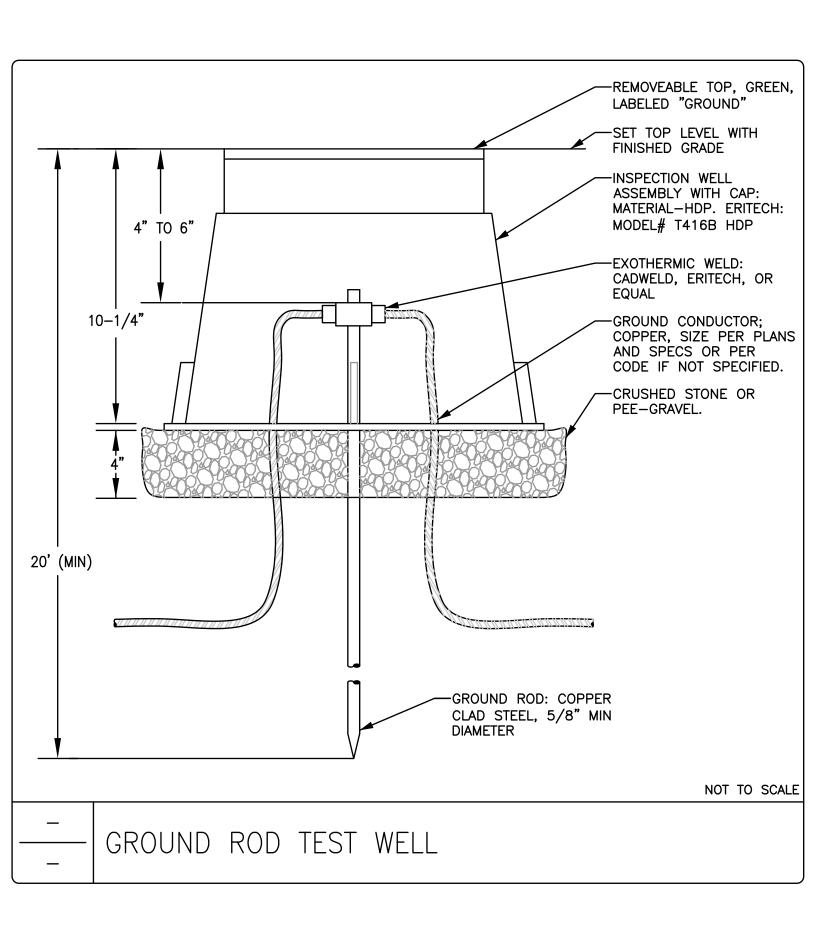
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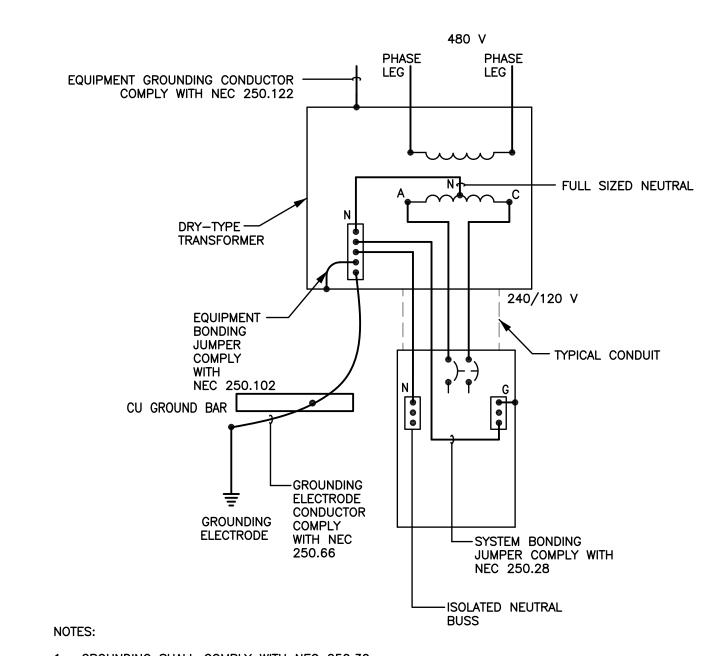
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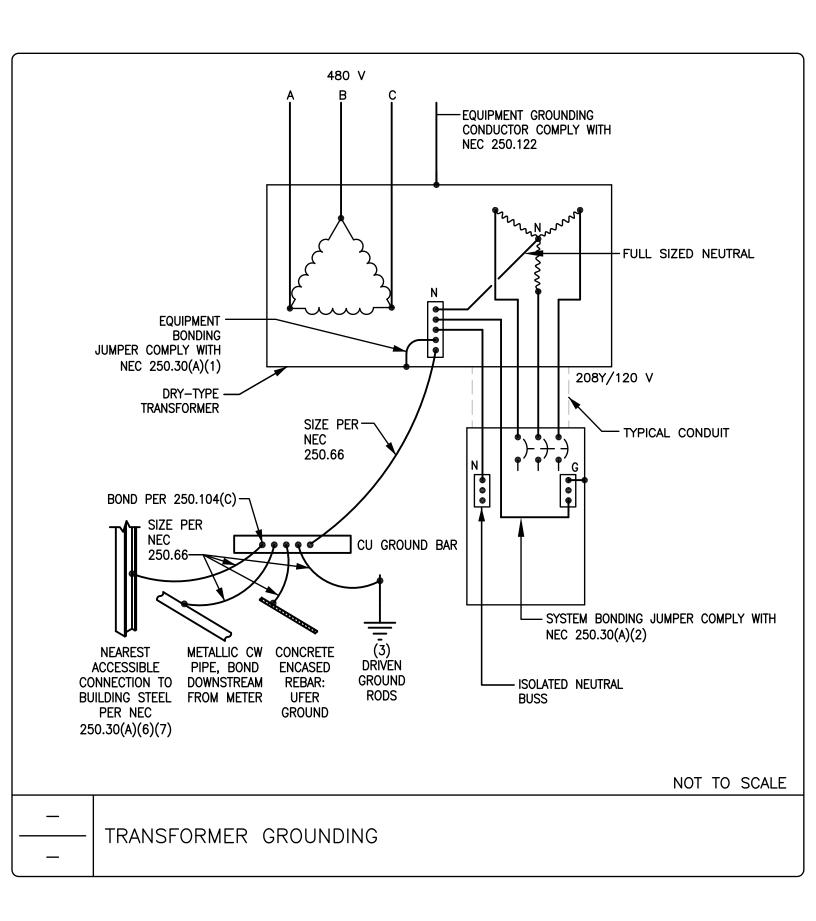


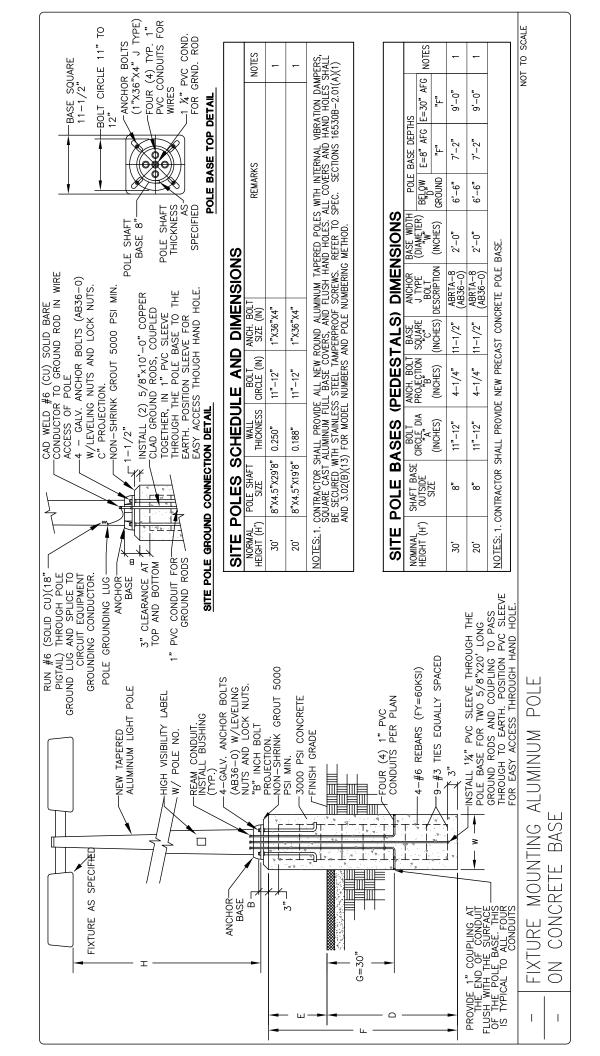
1. GROUNDING SHALL COMPLY WITH NEC 250.30

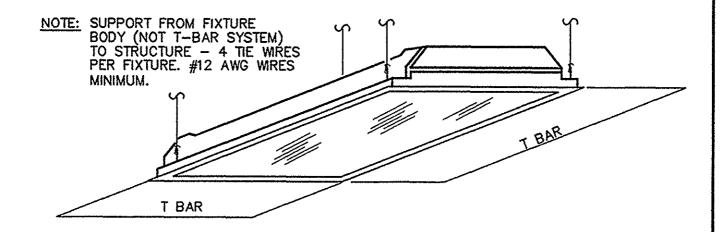
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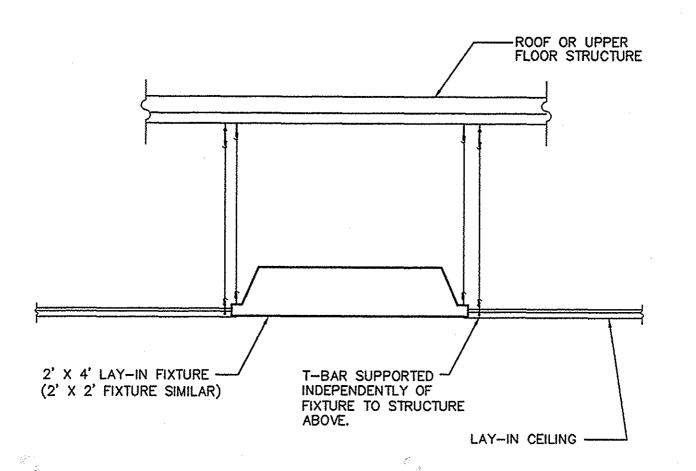
SINGLE PHASE TRANSFORMER GROUNDING

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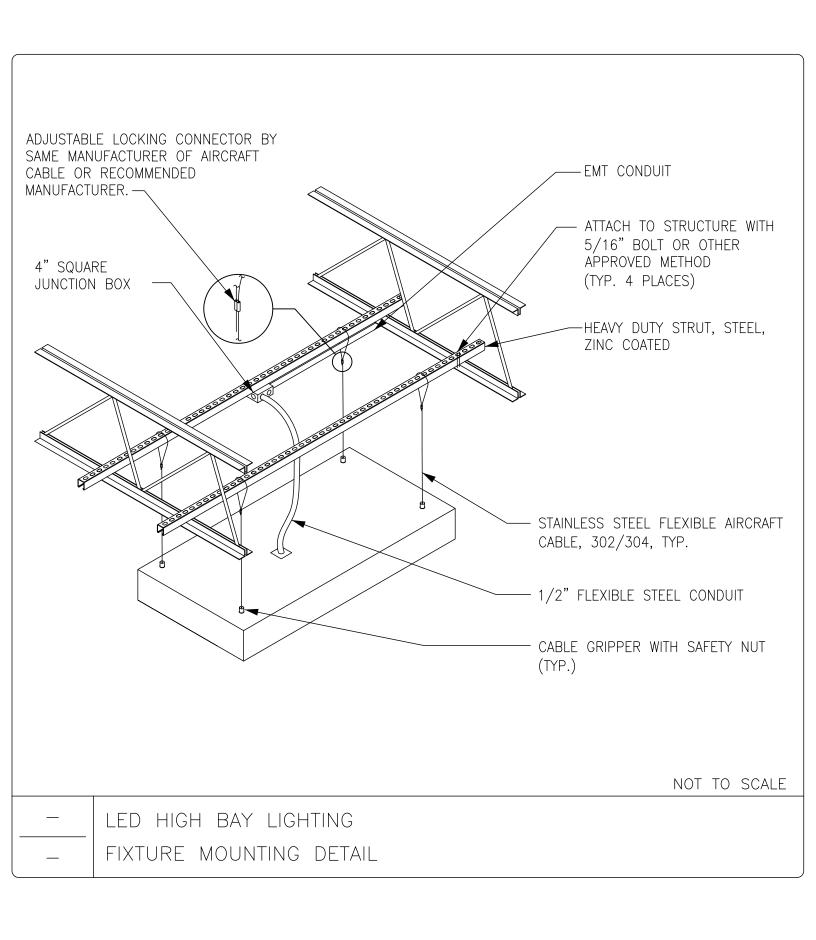


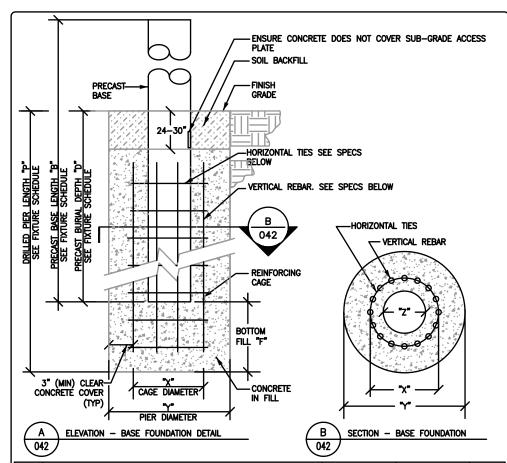
NOTE: HANG FIXTURE FROM STRUCTURE WITH 4 HANGERS PER FIXTURE. SUPPORT HANGERS SHALL NOT EXCEED 45° ANGLE TO SUPPORT MEANS. CONTRACTOR MAY INSTALL HANGERS ON COLD ROLLED STEEL WHICH HAS BEEN SECURELY ATTACHED TO BUILDING STRUCTURE.

2' X 4' RECESSED LAY-IN FIXTURE DETAIL

NO SCALE

filename: E018B





POLE TYPE	DIMENSIONS								VERTICAL REBAR		HORIZONTAL REBAR	
	P=	D=	F=	B=	X=	Y=	Z=	SIZE	QTY	SIZE	SPACE	NOTES
A1	27'-0"	18'-0"	9'-0"	26'-1"	41"	48"	20.70°	# 7	16	#4	12" OC	1,2
A2	26'-0"	18'-0"	8'-0"	26'-1"	41"	48*	20.70"	#7	16	#4	12" OC	1,2
B1	31'-0"	21'-0"	10'-0"	27'-10"	41"	48*	23.75"	#8	20	#4	12" OC	1,2
B2	31'-0"	21'-0"	10'-0"	27'-10"	41"	48*	23.75"	#8	20	#4	12" OC	1,2
C1	26'-0"	18'-0"	8'-0"	26'-1"	41"	48*	20.70°	# 7	16	#4	12" OC	1,2
C2	26'-0"	18'-0"	8'-0"	26'-1"	41"	48*	20.70"	#7	16	#4	12" OC	1,2
D1	27'-0"	18'-0"	9'-0"	26'-1"	41"	48*	20.70°	# 7	16	#4	12" OC	1,2
D2	27'-0"	18'-0"	9'-0"	26'-1"	41"	48*	20.70"	#7	16	#4	12" OC	1,2

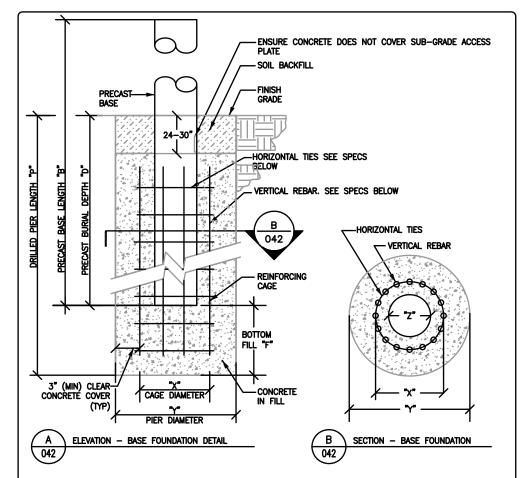
- NOTES:
- REFER TO MUSCO INSTALLATION INSTRUCTIONS FOR ADDITIONAL REQUIREMENTS.
 REFER TO FIXTURE SCHEDULE FOR POLE SPECIFICATIONS AND PLAN FOR LOCATIONS.

GENERAL NOTES:

- 1. POUR CONCRETE IN FILL IN TWO STEPS: 1) WITH THE REINFORCING CAGE IN PLACE POUR CONCRETE BOTTOM FILL FROM BOTTOM OF HOLE TO BOTTOM OF PRECAST BASE LEVEL (DIMENSION "F"), ALLOW TO CURE SUFFICIENT TO SUPPORT PRECAST BASE (MIN OF (4) HOURS). 2) POUR REMAINING CONCRETE WITH PRECAST BASE SET IN PLACE.
- 2. CONCRETE BACKFILL SHALL BE AIR-ENTRAINED (IN ACCORDANCE WITH ASTM C-260) AND HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 4000 PSI. SLUMP LIMITS ARE 4" MINIMUM AND 6" MAXIMUM. THE JOB SITE SLUMP MAT BE INCREASED BY USE OF WATER REDUCING AGENT MEETING ASTM C494-92. CONCRETE DRILLED PIERS MUST ATTAIN A 28 DAY STRENGTH PRIOR TO POLE INSTALLATION AND FIXTURE MOUNTING.
- 3. MAXIMUM FREE DROP OF CONCRETE SHALL NOT EXCEED 6'-O". CONCRETE SHALL BE POURED BY TREMIE PIPE OR PUMPING TECHNIQUES. COMPACT THE TOP 12'-0" OF CONCRETE WITH A CONCRETE VIBRATOR.
- 4. CONCRETE SHALL COMPLY WITH THE FOLLOWING ASTM STANDARDS: MIXTURE WITH ASTM C-94 PORTLAND CEMENT WITH ASTM C-150 TYPE 1-A AGGREGATES WITH ASTM C-33, AND BE IN CONFORMANCE WITH ACI 318-05.
- 5. CONCRETE REINFORCEMENT SHALL COMPLY AS FOLLOWS: HORIZONTAL BARS ASTM A615 GRADE 60; VERTICAL TIES ASTM 615, GRADE 40. COMPLY WITH ACI 315 AND 318.
- 6. THE TOP SECTION OF FILL SHALL BE CLASS 4 OR BETTER SOIL. COMPACT TO 95% FOR COHESIVE SOIL AND 98% FOR A COHESIONLESS SOIL AS PER STANDARD PROCTOR TESTING (ASTM D698).
- 7. PIER HOLES MUST BE FREE OF WATER, LOOSE SOIL AND DEBRIS PRIOR TO CONCRETE PLACEMENT. TEMPORARY CASINGS OR DRILLERS SLURRY MAY BE USED TO STABILIZE THE EXCAVATION DURING INSTALLATION. CASINGS MUST BE REMOVED DURING CONCRETE BACKFILL PLACEMENT.
- 8. CONTRACTOR SHALL BE KNOWLEDGEABLE OF SOIL CONDITIONS. THE CONTRACTOR SHALL PROVIDE GROUND WATER PUMPING AND EXCAVATION STABILIZATION OR BRACING DURING PRECAST BASE INSTALLATION AND PLACEMENT OF CONCRETE BACKFILL. CONTRACTOR SHALL CONTACT THE GEOTECHNICAL TESTING FIRM AS REQUIRED TO FULLY UNDERSTAND EXISTING SOIL CONDITIONS.

NOT TO SCALE

MUSCO PRECAST BASE FOUNDATION INSTALLATION



POLE TYPE	DIMENSIONS								VERTICAL REBAR		HORIZONTAL REBAR	
	P=	D=	F=	B=	X=	Y=	Z=	SIZE	QTY	SIZE	SPACE	NOTES
F1	27'-0"	18'-0"	9'-0"	26'-1"	41"	48"	20.70"	# 7	16	#4	12" OC	1,2
F2	26'-0"	18'-0"	8'-0"	26'-1"	41"	48"	20.70°	# 7	16	#4	12" OC	1,2
F3	31'-0"	21'-0"	10'-0"	27'-10"	41"	48"	23.75"	#8	20	#4	12" OC	1,2
F4	31'-0"	21'-0"	10'-0"	27'-10"	41"	48"	23.75"	#8	20	#4	12" OC	1,2

OTES: 1. REFER TO MUSCO INSTALLATION INSTRUCTIONS FOR ADDITIONAL REQUIREMENTS.

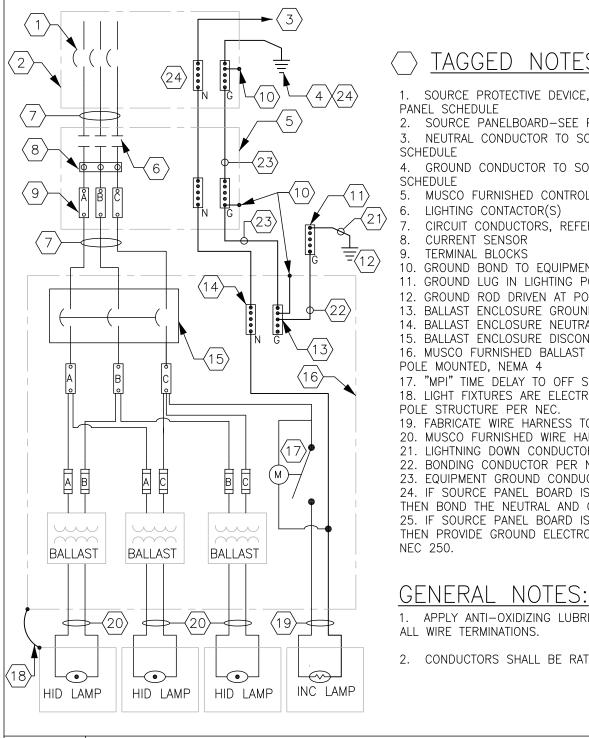
2. REFER TO FIXTURE SCHEDULE FOR POLE SPECIFICATIONS AND PLAN FOR LOCATIONS.

GENERAL NOTES:

- 1. POUR CONCRETE IN FILL IN TWO STEPS: 1) WITH THE REINFORCING CAGE IN PLACE POUR CONCRETE BOTTOM FILL FROM BOTTOM OF HOLE TO BOTTOM OF PRECAST BASE LEVEL (DIMENSION "F"), ALLOW TO CURE SUFFICIENT TO SUPPORT PRECAST BASE (MIN OF (4) HOURS). 2) POUR REMAINING CONCRETE WITH PRECAST BASE SET IN PLACE.
- 2. CONCRETE BACKFILL SHALL BE AIR-ENTRAINED (IN ACCORDANCE WITH ASTM C-260) AND HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 4000 PSI. SLUMP LIMITS ARE 4" MINIMUM AND 6" MAXIMUM. THE JOB SITE SLUMP MAT BE INCREASED BY USE OF WATER REDUCING AGENT MEETING ASTM C494-92. CONCRETE DRILLED PIERS MUST ATTAIN A 28 DAY STRENGTH PRIOR TO POLE INSTALLATION AND FIXTURE MOUNTING.
- 3. MAXIMUM FREE DROP OF CONCRETE SHALL NOT EXCEED 6'-0". CONCRETE SHALL BE POURED BY TREMIE PIPE OR PUMPING TECHNIQUES. COMPACT THE TOP 12'-0" OF CONCRETE WITH A CONCRETE VIBRATOR.
- 4. CONCRETE SHALL COMPLY WITH THE FOLLOWING ASTM STANDARDS: MIXTURE WITH ASTM C-94 PORTLAND CEMENT WITH ASTM C-150 TYPE 1-A AGGREGATES WITH ASTM C-33, AND BE IN CONFORMANCE WITH ACI 318-05.
- 5. CONCRETE REINFORCEMENT SHALL COMPLY AS FOLLOWS: HORIZONTAL BARS ASTM A615 GRADE 60; VERTICAL TIES ASTM 615, GRADE 40. COMPLY WITH ACI 315 AND 318.
- 6. THE TOP SECTION OF FILL SHALL BE CLASS 4 OR BETTER SOIL. COMPACT TO 95% FOR COHESIVE SOIL AND 98% FOR A COHESIONLESS SOIL AS PER STANDARD PROCTOR TESTING (ASTM D698).
- 7. PIER HOLES MUST BE FREE OF WATER, LOOSE SOIL AND DEBRIS PRIOR TO CONCRETE PLACEMENT. TEMPORARY CASINGS OR DRILLERS SLURRY MAY BE USED TO STABILIZE THE EXCAVATION DURING INSTALLATION. CASINGS MUST BE REMOVED DURING CONCRETE BACKFILL PLACEMENT.
- 8. CONTRACTOR SHALL BE KNOWLEDGEABLE OF SOIL CONDITIONS. THE CONTRACTOR SHALL PROVIDE GROUND WATER PUMPING AND EXCAVATION STABILIZATION OR BRACING DURING PRECAST BASE INSTALLATION AND PLACEMENT OF CONCRETE BACKFILL. CONTRACTOR SHALL CONTACT THE GEOTECHNICAL TESTING FIRM AS REQUIRED TO FULLY UNDERSTAND EXISTING SOIL CONDITIONS.

NOT TO SCALE

—— MUSCO PRECAST BASE FOUNDATION



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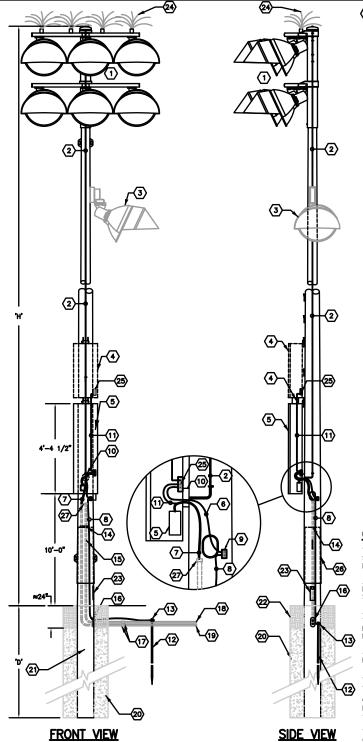
- SOURCE PROTECTIVE DEVICE, CIRCUIT BREAKER SHOWN-SEE
- SOURCE PANELBOARD-SEE PANEL SCHEDULE
- NEUTRAL CONDUCTOR TO SOURCE PANEL-SEE FEEDER/PANEL
- GROUND CONDUCTOR TO SOURCE PANEL-SEE FEEDER/PANEL
- MUSCO FURNISHED CONTROLS AND ENCLOSURE
- CIRCUIT CONDUCTORS, REFER TO PANEL/FEEDER SCHEDULES
- 10. GROUND BOND TO EQUIPMENT ENCLOSURE
- 11. GROUND LUG IN LIGHTING POLE, PER NFPA 780
- 12. GROUND ROD DRIVEN AT POLE, 5/8" DIA X 10' MIN
- 13. BALLAST ENCLOSURE GROUND BAR
- 14. BALLAST ENCLOSURE NEUTRAL BAR
- 15. BALLAST ENCLOSURE DISCONNECT SWITCH
- 16. MUSCO FURNISHED BALLAST ENCLOSURE WITH CONTROLS,
- 17. "MPI" TIME DELAY TO OFF SWITCH
- 18. LIGHT FIXTURES ARE ELECTRICALLY BONDED THROUGH THE POLE STRUCTURE PER NEC.
- 19. FABRICATE WIRE HARNESS TO MPI FIXTURE
- 20. MUSCO FURNISHED WIRE HARNESS
- 21. LIGHTNING DOWN CONDUCTOR PER NFPA 780
- 22. BONDING CONDUCTOR PER NFPA 780
- 23. EQUIPMENT GROUND CONDUCTOR
- 24. IF SOURCE PANEL BOARD IS THE SERVICE ENTRANCE PANEL THEN BOND THE NEUTRAL AND GROUND BUSS PER NEC 250 25. IF SOURCE PANEL BOARD IS THE SERVICE ENTRANCE PANEL THEN PROVIDE GROUND ELECTRODE SYSTEM AND GROUND PER

- 1. APPLY ANTI-OXIDIZING LUBRICANT "NO-OX" OR EQUAL TO
- 2. CONDUCTORS SHALL BE RATED 90°C.

NOT TO SCALE

MUSCO SCHEMATIC WIRING DIAGRAM

WITH MPI FIXTURE



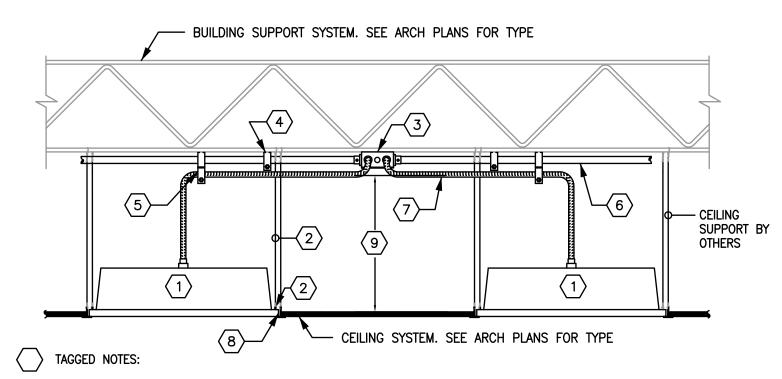
- 1. POLE TOP LUMINARE ASSEMBLY FURNISHED BY MUSCO AND INSTALLED BY CONTRACTOR. REFER TO FIXTURE SCHEDULE FOR FIXTURE QUANTITY, TYPE, AND MOUNTING HEIGHT.
- 2. WIRING HARNESS FURNISHED BY MUSCO AND INSTALLED BY CONTRACTOR, ROUTE UP TOFIXTURE HEADS THROUGH POLE CAVITY.
- 3. OPTIONAL SECURITY LIGHT; 1000 WATT MPI FIXTURE. REFER TO FIXTURE SCHEDULE FOR MOUNTING HEIGHT AND ADDITIONAL INSTRUCTIONS.
- 4. ADDITIONAL BALLAST ENCLOSURES SHALL BE STACKED AND NIPPLED TOGETHER WITH GRS NIPPLES. PROVIDE FEEDERS TO EACH ENCLOSURE AS REQUIRED.
- 5. REMOTE BALLAST ENCLOSURE WITH MAIN DISCONNECT SWITCH.
- 6. CU GROUND BONDING CONDUCTOR FROM POLE GROUND LIG TO BALLAST ENCLOSURE GROUND BAR. PROVIDE \$2 WHERE 'H' IS 75' OR LESS, \$2/0 WHERE 'H' IS GREATER THAN 75'.
- 7. BRANCH FEEDER WITH EQUIPMENT GROUND, PROVIDE NEUTRAL TO POLES EQUIPPED WITH A MPI FIXTURE, REFER TO PANEL AND/OR FEEDER SCHEDULE FOR CONDUCTOR SIZES.
- 8. CU LIGHTNING GROUND CONDUCTOR. BOND TO POLE GROUND LUG. PROVIDE \$2 WHERE 'H' IS 75' OR LESS, \$2/0 WHERE 'H' IS GREATER THAN 75'.
- 9. POLE GROUND LUG.
- 10. ROUTE WIRING TO BALLAST ENCLOSURES THROUGH ACCESS HUB. SEAL ACCESS HUB TO BALLAST ENCLOSURE PER MANUFACTURER'S RECOMMENDATIONS.
- 11. EQUIPMENT GROUND CONDUCTOR. REFER TO SCHEDULE FOR SIZE.
- 12. 10' X 5/8" DIA. CU CLAD DRIVEN GROUND ROD. TOP 24" AFG.
- 13. CONNECT GROUND CONDUCTOR TO GROUND ROD WITH EXOTHERMIC WELD.
- 14. EXTEND CONDUIT TO 6" ABOVE TOP OF PRECAST POLE. CLAMP AT TOP OF PRECAST BASE.
- 15. ROUTE PVC CONDUIT UP THROUGH PRECAST BASE CAVITY AFTER SETTING.
- 16. UNDERGROUND WIRE ACCESS HOLE. PROVIDE CONDUIT ACCESS PLATE WITH REQUIRED OPENINGS. KEEP CONCRETE BACK FILL BELOW LEVEL OF HOLE.
- 17. TRANSITION FROM GRS CONDUIT TO HDPE CONDUIT.
- 18. OPTIONAL COMMUNICATIONS CONDUIT FOR PA SYSTEM. REFER TO PLANS FOR POLES REQUIRING COMMUNICATIONS CONDUIT.
- 19. CONDUIT FOR ELECTRICAL SERVICE TO POLE. TRANSITION TO A MINIMUM DEPTH OF 24" AFG IMMEDIATELY AFTER EXITING POLE.
- 20. CONCRETE BACK FILL. REFER TO "PRECAST BASE FOUNDATION DETAIL MUSCO SPORTS LIGHTING"
- 21. PRESTRESSED, CENTRIFUGALLY SPUN PRECAST CONCRETE BASE FURNISHED BY MUSCO AND INSTALLED BY CONTRACTOR.
- 22. BACK FILL WITH STONE FREE EARTH. REFER TO GENERAL NOTE #7.
- 23. ABOVE GRADE ACCESS HOLE. PROVIDE GALVANIZED STEEL COVER.
- 24. PROVIDE BIRD DETERRENT SYSTEM. REFER TO "BIRD DETERRENT DETAIL" FOR ADDITIONAL INFORMATION.
- 25. BALLAST ENCLOSURE GROUND BAR.
- 26 SLIP FIT CONNECTION BETWEEN POLE AND CONCRETE BASE.
- 27. STUB-UP AT HANDHOLE. PROVIDE NIPPLE AND SUPPORT BUSHING PER NEC 330.19.

GENERAL NOTES:

- 1. GALVANIZED STEEL POLES, PRECAST CONCRETE BASES, LIGHTING FIXTURES, BALLAST, ENCLOSURES, CONTACTORS, ETC. SHALL BE DIRECT OWNER PURCHASED FROM MUSCO AND INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS BY THE ELECTRICAL CONTRACTOR.
- 2. DELIVERY OF THE SPORTS LIGHTING EQUIPMENT AND THE FINAL AMING OF FIXTURES SHALL BE PROVIDED BY MUSCO LIGHTING INC, THE CONTRACTOR SHALL UNLOAD THE EQUIPMENT, INSPECT FOR DAMAGE AT TIME OF DELIVERY, AND PROPERLY STORE THE EQUIPMENT IN A SECURE LOCATION,
- 3. THE CONTRACTOR SHALL INSTALL THE SPORTS LIGHTING SYSTEM IN ACCORDANCE WITH DRAWINGS, SPECIFICATIONS, AND THE MANUFACTURER'S INSTRUCTIONS. INSTALLATION SHALL INCLUDE BUT NOT BE LIMITED TO: ASSEMBLY OF POLES AND EQUIPMENT, AUGURING OF HOLES; PROVIDING REINFORCED CONCRETE BACK FILL, GROUNDING, FEEDERS, AND MISCELLANEOUS MATERIALS; PLACEMENT OF PRECAST BASES; AND ERECTION OF POLES AND LUMINARIES.
- 4. THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND/OR INSTALL ALL SERVICE, OVERCURRENT, CONTROL EQUIPMENT, FEEDERS, POLE GROUNDING, ETC.. AS REQUIRED TO POWER THE MUSCO BALL FIELD LIGHTING.
- 5. PROVIDE REQUIRED BONDING BETWEEN STEEL POLE AND BALLAST'S ENCLOSURE, GROUNDING LUGS, GROUND RODS, CROSS ARMS, FIXTURES, GROUNDING ELECTRODE CONDUCTOR, ETC...
- 6. CONCRETE BACK FILL SHALL BE AIR—ENTRAINED AND HAVE A MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS OF 4000 PSI. INSTALLATION LIMITED TO A MAXIMUM FREE DROP OF 6'-0" TREMIE OR PUMPING TECHNIQUES SHALL BE UTILIZED. THE TOP 12'-0" SHALL BE THOROUGHLY CONSOLIDATED BY MECHANICAL VIBRATION DURING PLACEMENT.
- 7. THE TOP TWO FEET OF THE ANNULUS OPENING SHALL BE BACK FILLED WITH SOIL WITH CLASS 4 OR BETTER, AND COMPACTED TO 95% FOR COHESIVE SOIL AND TO 98% FOR COHESIONLESS SOIL.
- 8. ELECTRICALLY BOND ALL METAL COMPONENTS OF SPORTS LIGHTING ASSEMBLY.

NOT TO SCALE

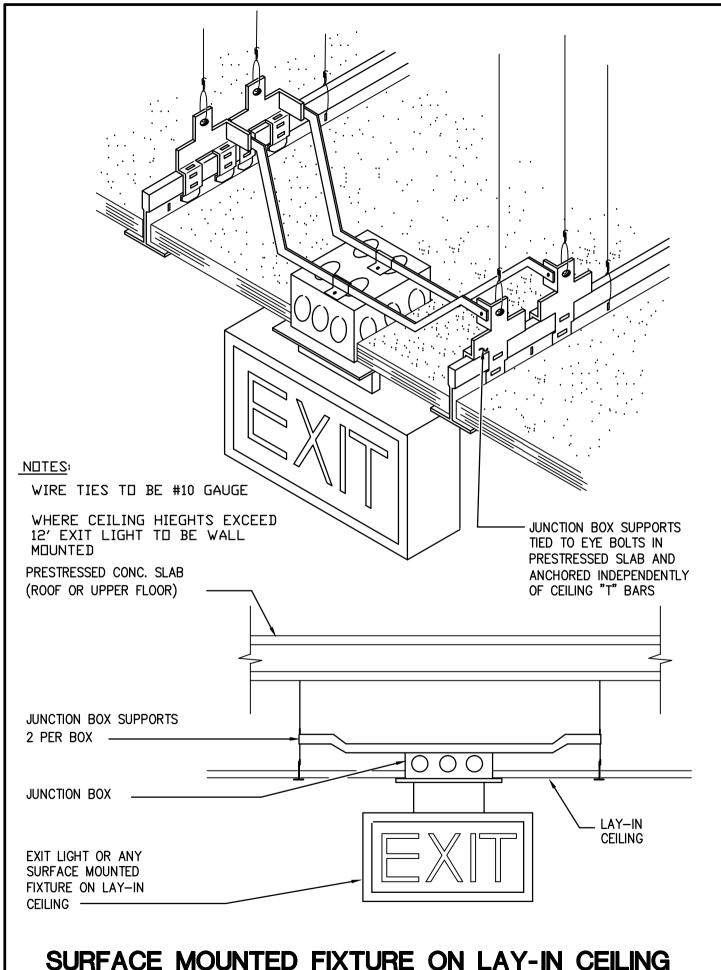
MUSCO SPORTS LIGHTING POLE



- 1. TYPICAL RECESSED LIGHT FIXTURE REFER TO PLANS AND SCHEDULE FOR TYPE.
- 2. FIXTURE SUPPORT; 12 GAGE MILD STEEL WIRE (UNIQUELY IDENTIFIED) AS REQUIRED BY AHJ. SUPPORT (4) PLACES MINIMUM DIAGONALLY. ANGLE OF SUPPORT SHALL NOT EXCEED 45 DEGREES FROM VERTICAL.
- 3. JUNCTION BOX SUPPORT SHOWN MAY EXCEED 45° FROM VERTICAL ANGLE, TO BUILDING STRUCTURE. MOUNT WITH APPROVED FASTENERS AT (2) POINTS MINIMUM. IDENTIFY CIRCUITS CONTAINED ON COVER.
- 4. SUPPORT CONDUIT WITH APPROVED CONDUIT HANGERS.
- 5. SUPPORT FIXTURE WHIP WITH APPROVED HANGERS MOUNTED TO BUILDING STRUCTURE.
- 6. UNLESS OTHERWISE NOTED EMT CONDUIT AND BRANCH CIRCUIT CONDUCTORS.
- 7. LIGHT FIXTURE WHIP MINIMUM 3/8" DIAMETER ALUMINUM FLEX WITH #14 COPPER CONDUCTORS. UNLESS OTHERWISE NOTED MAXIMUM LENGTH = 6'-0"
- 8. INSTALL FIXTURE FLAT IN OPENING WITHOUT GAPS BETWEEN FIXTURE IN FRAME. PROVIDE PLASTER/DRYWALL FRAME KITS IN GYP. BOARD CEILINGS.
- 9. MAINTAIN 36" (MIN) CLEARANCE BETWEEN CEILING AND CONDUIT. IF 36" CLEARANCE IS NOT AVAILABLE MAINTAIN MAXIMUM CLEARANCE POSSIBLE.

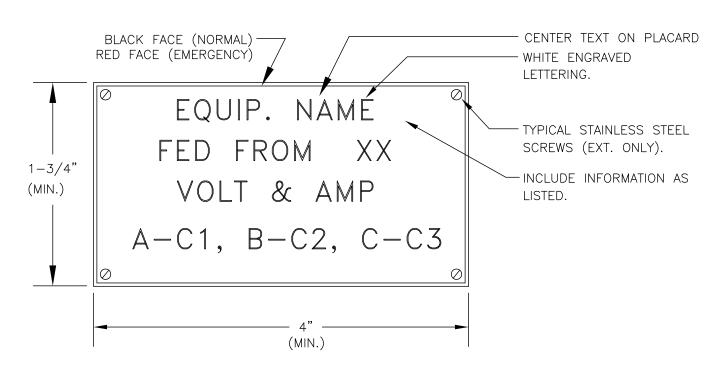
NOT TO SCALE

- RECESSED TROFFER FIXTURE MOUNTING



SURFACE MOUNTED FIXTURE ON LAY-IN CEILING

NO SCALE

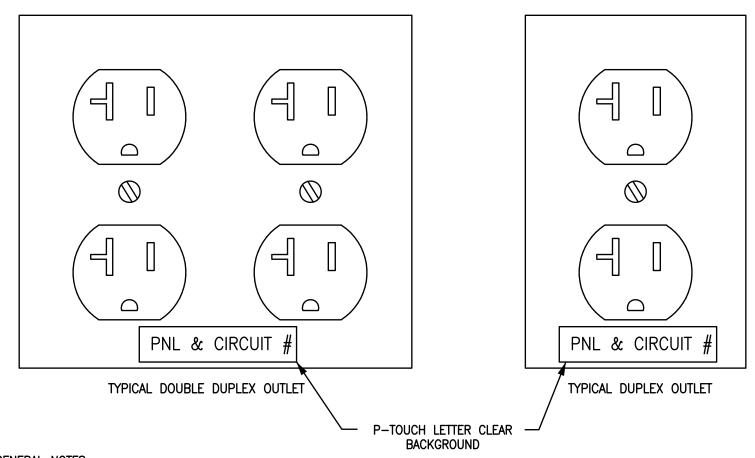


GENERAL NOTES:

- 1. PLACARD TO HAVE WHITE ENGRAVED LETTERING WITH NOTED FOREGROUND.
- 2. EDGES TO BE BEVELED WITH 1/64" TO 1/32" CHAMFER.
- 3. PLACARD TO BE APPLIED USING EPOXY ADHESIVE.
- 4. MINIMUM LETTERING SIZE TO BE 3/16".
- 5. PLACARD WIDTH SHALL BE INCREASED BY 1/4" INCREMENTS TO ACCOMMODATE SPECIFIED INFORMATION.
- 6. PROVIDE ON ALL PANELS, DISCONNECTS, STARTERS, ETC..
- 7. C1, C2, C3, REPRESENT CONDUCTOR COLORING. CONDUCTOR COLORING TO CONFORM WITH NEC AND EXISTING FACILITY COLOR DESIGNATIONS.

NOT TO SCALE

EQUIPMENT PLACARD

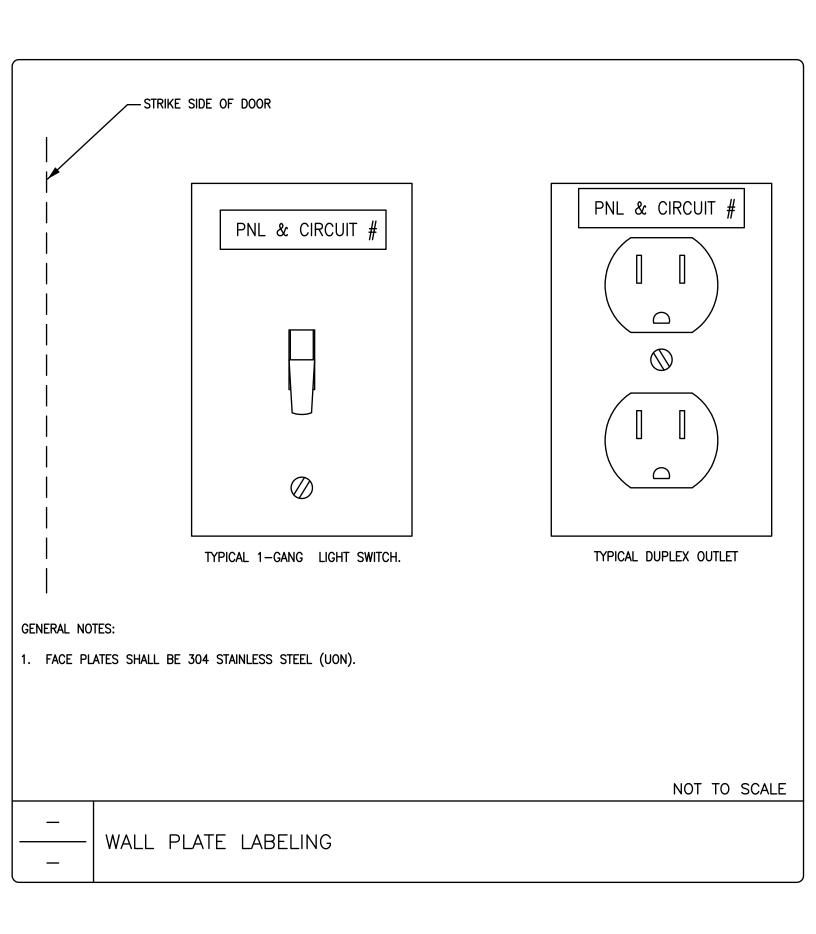


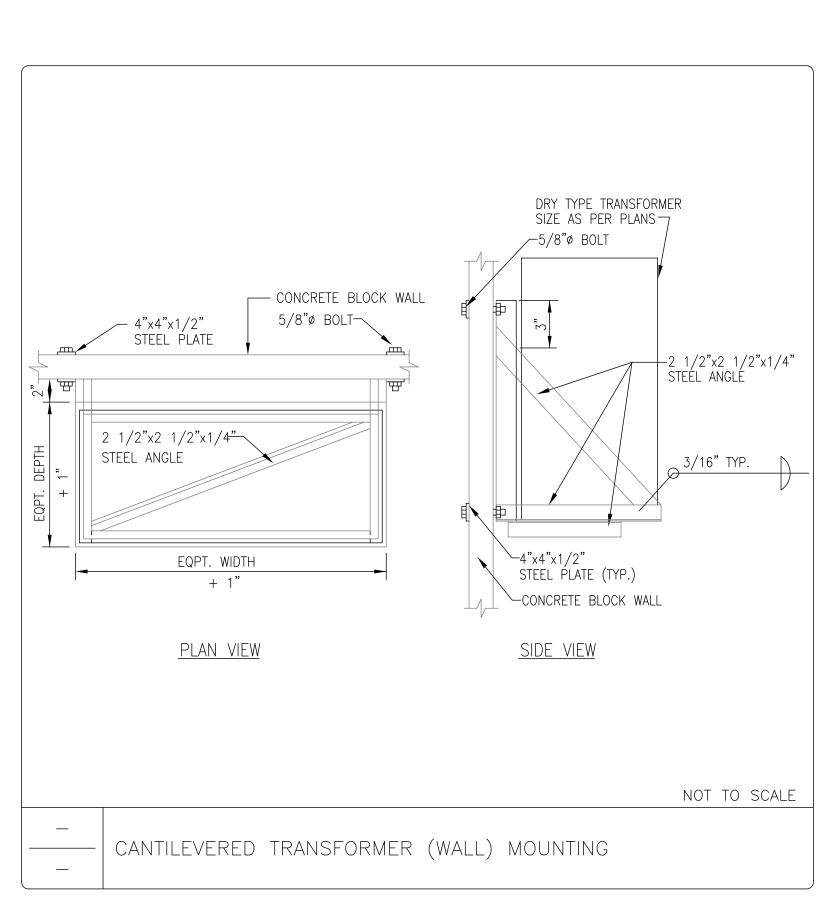
GENERAL NOTES:

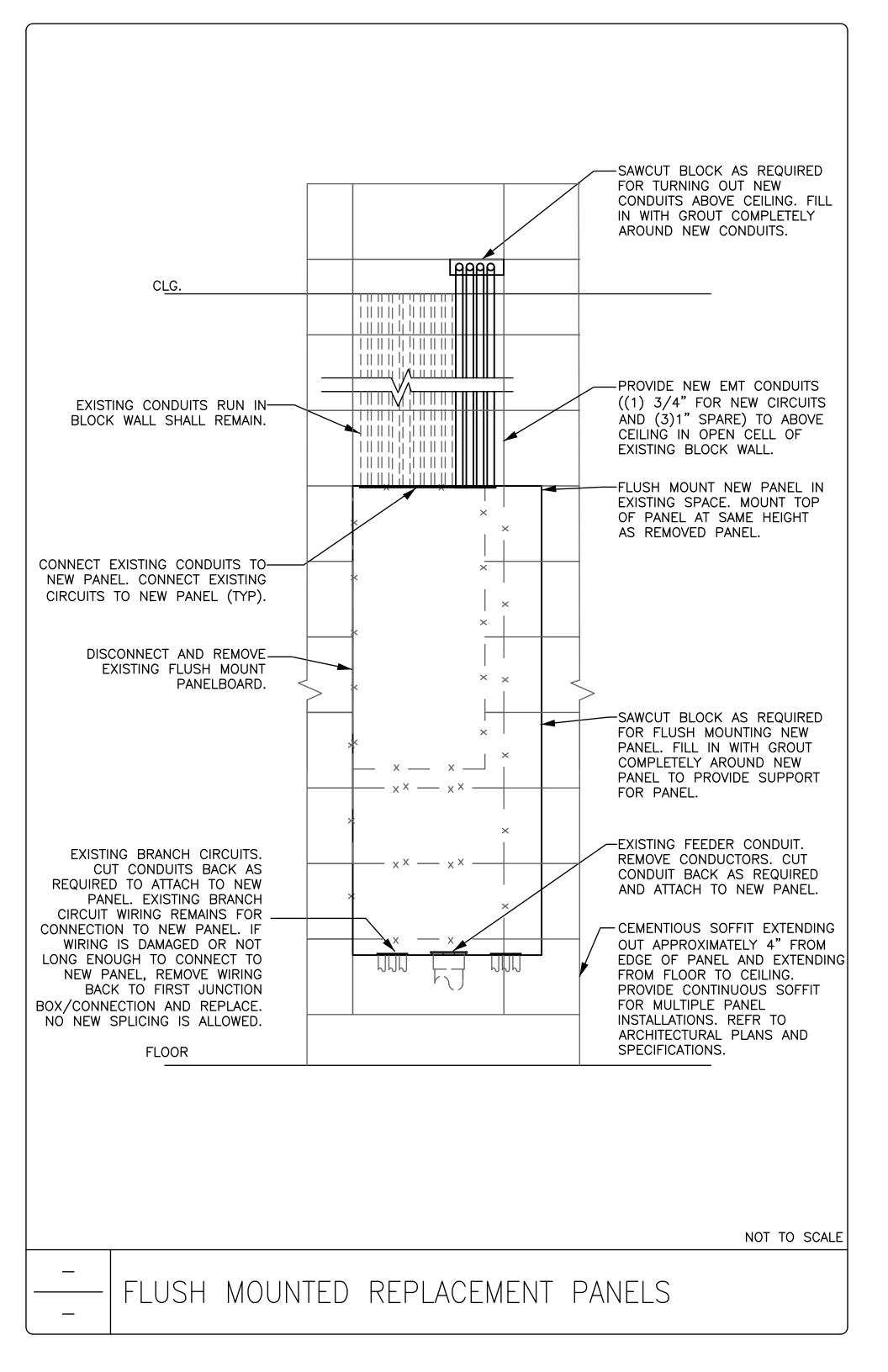
- 1. FACE PLATES SHALL BE 304 STAINLESS STEEL (UON).
- 2. COORDINATE DEVICE COLOR WITH ARCHITECT

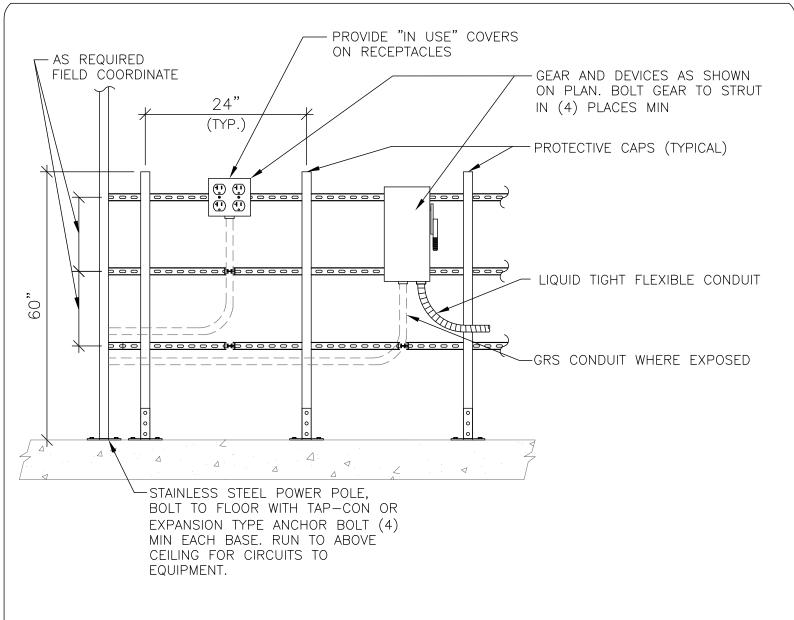
NOT TO SCALE

---- WALL PLATE LABELING









NOTES:

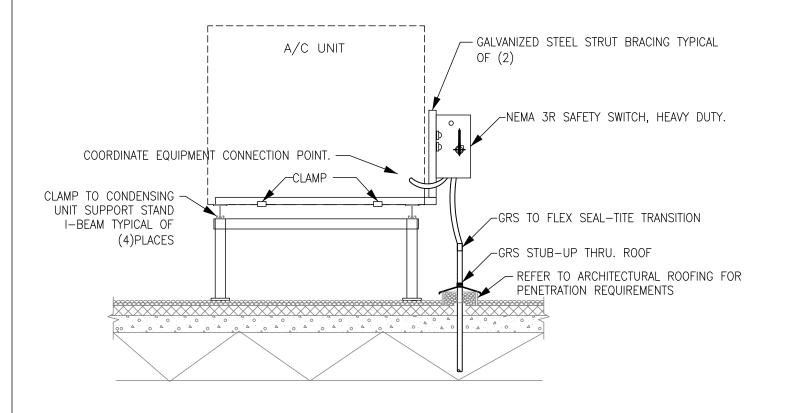
1. UNLESS OTHERWISE NOTED USE TO SUPPORT ELECTRICAL GEAR WEIGHING LESS THAN 50 LBS.

NOT TO SCALE

KITCHEN STANCHION



PANELBOARD		Date	
SOURCE:			
CIR	LOAD/CHARGE/CARGA	CIR	LOAD/CHARGE/CARGA
1 2			
3		4	
5		6	
7		8	
9		10	
11		12	
13		14	
15		16	
17		18	
19		20	
21		22	
23		24	
25		26	
27		28	
29		30	
31		32	
33		34	
35		36	
37		38	
39		40	
41		42	

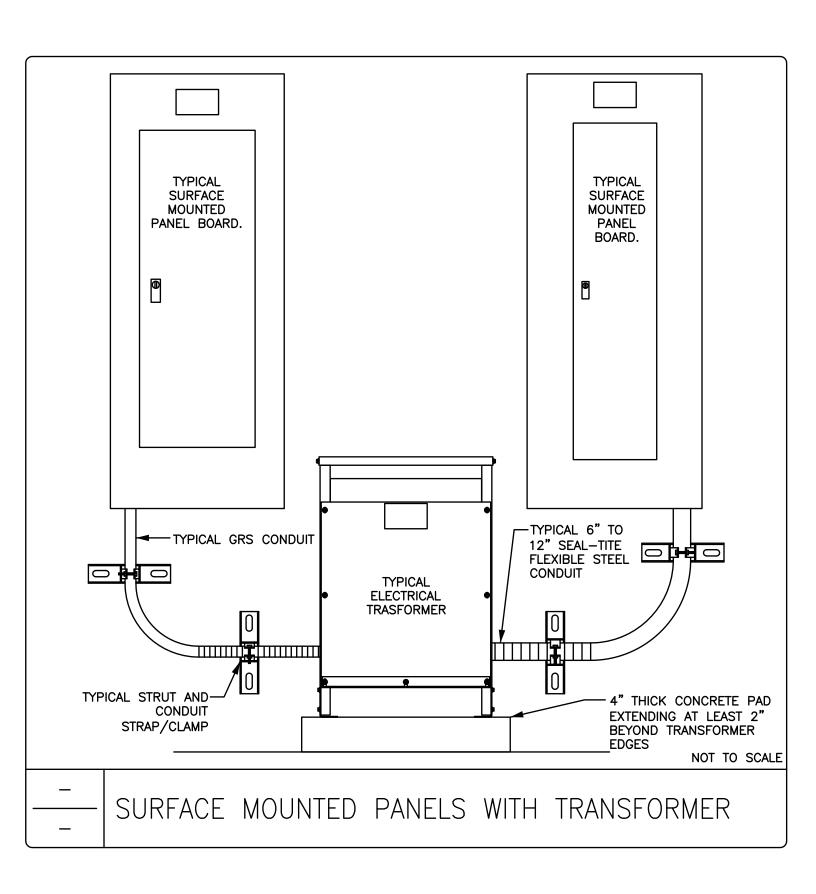


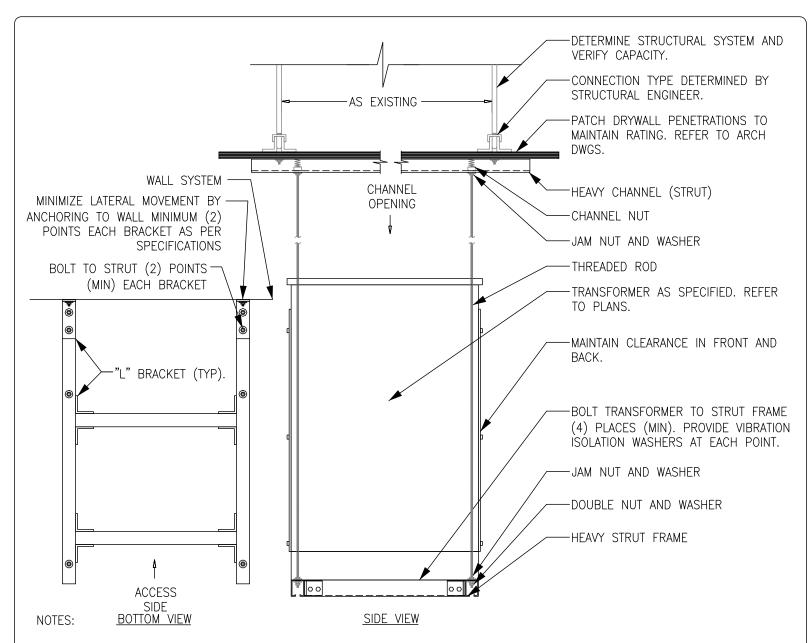
NOT TO SCALE

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SAFETY SWITCH MOUNTING - CONDENSING UNIT

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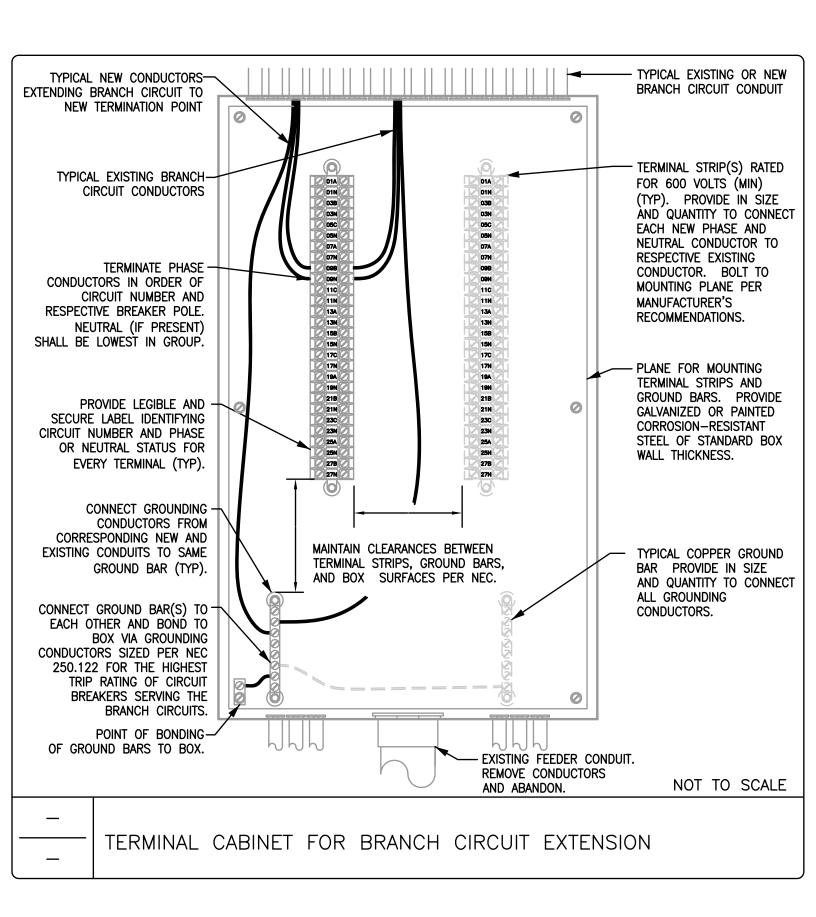


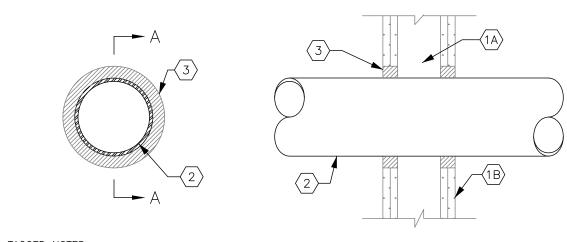


- 1. PROVIDE STRUCTURAL ENGINEERING SHOP DRAWINGS SHOWING MATERIAL SIZE, MATERIAL TYPE, DESIGN PARAMETERS, AND CONNECTION DETAILS. SHOP DRAWINGS SHALL BE SEALED BY A STRUCTURAL ENGINEER REGISTERED WITH THE STATE IN WHICH THE PROJECT RESIDES.
- 2. MAINTAIN CLEARANCES RECOMMENDED BY EQUIPMENT MANUFACTURER AND NEC.

NOT TO SCALE

SUSPENDED TRANSFORMER MOUNTING





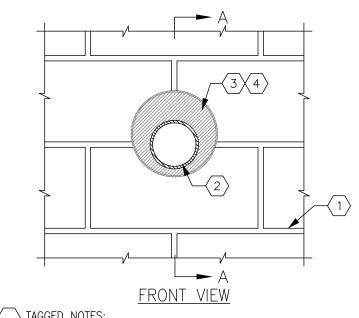
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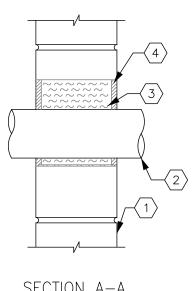
- SECTION A-A
- 1. WALL ASSEMBLY THE 1 OR 2 HR FIRE—RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
- A. STUDS -- WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4" LUMBER SPACED 16" OC. STEEL STUDS TO BE MINIMUM 2 1/2" WIDE AND SPACES MAXIMUM 24" OC. WHEN STEEL STUDS ARE USED AND THE DIAM. OF OPENING EXCEEDS THE WIDTH OF STUD CAVITY, THE OPENING SHALL BE FRAMED ON ALL SIDES USING LENGTHS OF STEEL STUD INSTALLED BETWEEN THE VERTICAL STUDS AND SCREW-ATTACHED TO THE STEEL STUDS AT EACH END. THE FRAMED OPENING IN THE WALL SHALL BE 4 TO 6" WIDER AND 4 TO 6" HIGHER THAN THE DIAM. OF THE PENETRATING ITEM SUCH THAT, WHEN THE PENETRATING ITEM IS INSTALLED IN THE OPENING, A 2 TO 3" CLEARANCE IS PRESENT BETWEEN THE PENETRATING ITEM AND THE FRAMING ON ALL FOUR SIDES.
- B. GYPSUM BOARD* -5/8" THICK, 4 FT WIDE WITH SQUARE OR TAPERED EDGES. MAXIMUM DIAM. OF OPENING IS 32-1/4" FOR STEEL STUD WALLS. MAXIMUM DIAM. OF OPENING IS 14-1/2" FOR WOOD STUD WALLS. THE F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE FIRE RATING OF THE WALL ASSEMBLY.
- 2. THROUGH—PENETRANTS ONE METALLIC CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE SHALL BE MINIMUM 0" TO MAXIMUM 2-1/4". CONDUIT OR TUBING MAY BE INSTALLED AT AN ANGLE NOT GREATER THAT 45 DEGREES FROM PERPENDICULAR. CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES MAY BE USED:
- A. CONDUIT -- NOM. 4" DIAM. (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR 6" DIAM. STEEL CONDUIT.
- 3. FILL, VOID OR CAVITY WITH UL LISTED SEALANT MINIMUM 5/8" THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH BOTH SURFACES OF WALL.

UL SYSTEM NO. W-L-1054 NOT TO SCALE

- TYP. UL FIRE PENETRATION WALL

F=1 OR 2 HR, T=0 HR





SECTION A-A

- TAGGED NOTES:
- 1. CONCRETE WALL ASSEMBLY (1 OR 2-HR. FIRE-RATING):
- LIGHTWEIGHT OR NORMAL WEIGHT CONCRETE WALL (MINIMUM 5" THICK).
- B. ANY U.L. CLASSIFIED CONCRETE BLOCK WALL.
- 2. PENETRATING ITEM TO BE ONE OF THE FOLLOWING:
- MAXIMUM 4" NOMINAL DIAMETER COPPER PIPE.
- MAXIMUM 4" NOMINAL DIAMETER STEEL CONDUIT.
- MAXIMUM 4" NOMINAL DIAMETER EMT.
- BACKER ROD, OR HILTI CF 128 FILLER FOAM TO BE USED AS A BACKER.
- 4. UL LISTED INTUMESCENT FIRESTOP SEALANT:
- MINIMUM 1/4" DEPTH WHEN EMT OR STEEL CONDUIT IS THE PENETRATING ITEM.
- MINIMUM 1/2" DEPTH WHEN COPPER PIPE IS THE PENETRATING ITEM.

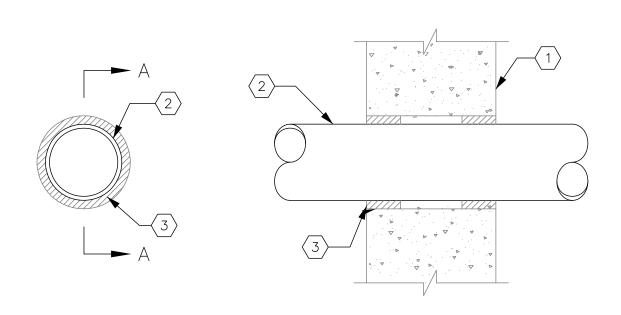
GENERAL NOTES:

- 1. MAXIMUM DIAMETER OF OPENING = 8".
- 2. ANNULAR SPACE = MINIMUM 3/4", MAXIMUM 3 1/2".
 3. FOR HOLLOW BLOCK WALLS, USE NO. 8 STEEL WIRE MESH TO AID IN THE INSTALLATION.

UL SYSTEM NO. WJ1020 NOT TO SCALE

TYP. UL FIRE PENETRATION

WALL F=2 HR,T=0 HR

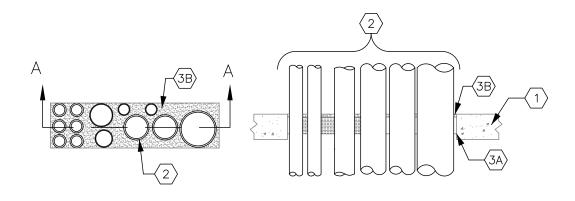


SECTION A-A

- TAGGED NOTES:
- 1. WALL ASSEMBLY MINIMUM 7 5/8" THICK WALL ASSEMBLY CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS. MINIMUM 4 HR. FIRE RATED WALL. MAXIMUM DIAMETER OF OPENING IS 13 5/8".
- 2. THROUGH PENETRANTS -- ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED CONCENTRICALLY WITHIN THE FIRESTOP SYSTEM. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE ANNULAR SPACE BETWEEN PIPE, CONDUIT OR TUBING AND THE PERIPHERY OF THE OPENING SHALL BE MINIMUM 3/8" TO 1/2" MAXIMUM. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:
- A. CONDUIT NOM. 4" DIAMETER (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR 6" DIAMETER STEEL CONDUIT.
- 3. FILL, VOID OR CAVITY WITH UL LISTED SEALANT MINIMUM 2" THICKNESS APPLIED WITHIN ANNULUS, FLUSH WITH BOTH SURFACES OF WALL.

UL SYSTEM NO. W-J-1042 NOT TO SCALE

- TYP, UL FIRE PENETRATION
- | WALL F=4 HR, T=0 HR



TAGGED NOTES:

1. FLOOR OR WALL ASSEMBLY — MIN 4—1/2" THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100—150 PCF) CONCRETE. FLOOR ASSEMBLY MAY ALSO BE CONSTRUCTED OF ANY MIN 6" THICK UL CLASSIFIED HOLLOW—CORE PRECAST CONCRETE UNITS*. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX AREA OF OPENING 240 SQ IN. WITH A MAX DIMENSION OF 30" MAX AREA OF OPENING IN FLOORS CONSTRUCTED OF HOLLOW—CORE CONCRETE IS 49 SQ IN. WITH A MAX DIMENSION OF 7"

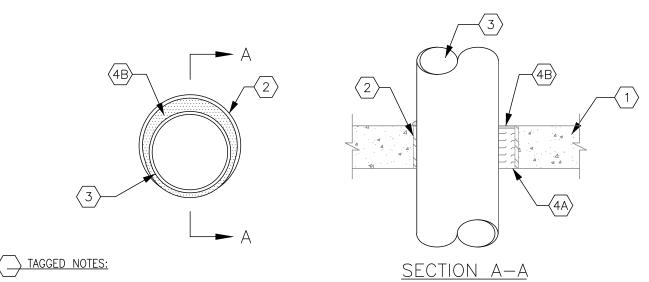
SECTION A-A

- 2. THROUGH PENETRANT ONE OR MORE METALLIC CONDUITS, TUBES OR FLEXIBLE METAL PIPES INSTALLED CONCENTRICALLY OR ECCENTRICALLY WITHIN OPENING. ANNULAR SPACE BETWEEN PENETRANTS AND PERIPHERY OF OPENING SHALL BE MIN OF 0 IN. (POINT CONTACT) TO MAX 2" SPACE BETWEEN PENETRANTS SHALL BE MIN OF 1/4" TO MAX 2" PENETRANTS TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF PENETRANTS MAY BE USED:
 - A. CONDUIT NOM 6" DIA. (OR SMALLER) STEEL CONDUIT OR NOM 4" DIA. (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING.
- 3. FIRESTOP SYSTEM THE DETAILS OF THE FIRESTOP SYSTEM SHALL BE AS FOLLOWS:
- A. PACKING MATERIAL MIN 3" THICKNESS OF MIN 4 PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL. IN FLOORS CONSTRUCTED OF HOLLOW-CORE CONCRETE, PACKING MATERIAL TO BE RECESSED FROM TOP AND BOTTOM SURFACES OF FLOOR AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.
- B. FILL, VOID OR CAVITY MATERIALS* UL LISTED CAULK OR SEALANT MIN 1/2" THICKNESS OF CAULK APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR OR WITH BOTH SURFACES OF WALL. IN FLOORS CONSTRUCTED OF HOLLOW-CORE CONCRETE, MIN 1/2" THICKNESS OF CAULK APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP AND BOTTOM SURFACES OF FLOOR. MIN 1/4" DIA. BEAD OF CAULK APPLIED TO THE PENETRANT/CONCRETE INTERFACE AT THE POINT CONTACT LOCATION ON THE TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL OR HOLLOW-CORE CONCRETE.

UL SYSTEM NO.: C-AJ-1492 NOT TO SCALE

TYP. UL FIRE PENETRATION WALL OR FLOOR

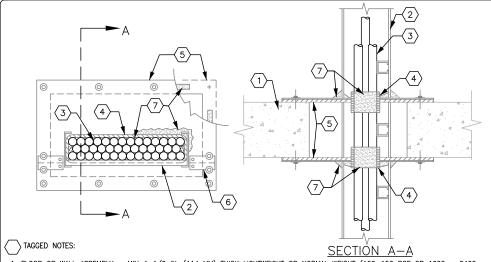
- | F=2 HR, T=0 HR



- 1. FLOOR OR WALL ASSEMBLY -- MINIMUM 4 1/2" THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS.
- 2. METALLIC SLEEVE -- (OPTIONAL) NOM. 10" DIAMETER (OR SMALLER) SCHEDULE 40 (OR HEAVIER) STEEL SLEEVE CAST OR GROUTED INTO FLOOR OR WALL ASSEMBLY, FLUSH WITH FLOOR OR WALL SURFACES OR EXTENDING A MAXIMUM. OF 3" ABOVE FLOOR OR BEYOND BOTH SURFACES OF WALL.
- 3. THROUGH-PENETRANT ONE CONDUIT TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. THE ANNULAR SPACE BETWEEN PENETRANT AND PERIPHERY OF OPENING SHALL BE MINIMUM O" (POINT CONTACT) TO MAXIMUM 1 7/8". PENETRANT MAY BE INSTALLED WITH CONTINUOUS POINT CONTACT. PENETRANT TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PENETRANTS MAY BE USED:
- A. CONDUIT -- NOM. 6" DIAMETER (OR SMALLER) STEEL CONDUIT.
- B. CONDUIT -- NOM. 4" DIAMETER (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING (EMT).
- 4. FIRESTOP -- THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
- A. PACKING MATERIAL MINIMUM 4" THICKNESS OF MINIMUM 4" PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM TOP SURFACE OF FLOOR OR SLEEVE OR FROM BOTH SURFACES OF WALL OR SLEEVE AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.
- B. FILL, VOID OR CAVITY WITH UL LISTED SEALANT MINIMUM 1/4" THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH TOP SURFACE OF FLOOR OR SLEEVE OR WITH BOTH SURFACES OF WALL OR SLEEVE. AT THE POINT OR CONTINUOUS CONTACT LOCATIONS BETWEEN PENETRANT AND CONCRETE OR SLEEVE, A MINIMUM 1/4" DIAMETER BEAD OF FILL MATERIAL SHALL BE APPLIED AT THE CONCRETE OR SLEEVE / PIPE PENETRANT INTERFACE ON THE TOP SURFACE OF FLOOR AND ON BOTH SURFACES OF WALL.

UL SYSTEM NO.: C-AJ-1226 NOT TO SCALE

TYP. UL FIRE PENETRATION WALL OR FLOOR F=3 HR, T=0 HR



1. FLOOR OR WALL ASSEMBLY - MIN 4-1/2 IN. (114 MM) THICK LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF OR 1600 - 2400 KG/M3) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX AREA OF OPENING 36 SQ FT (3.3 M2) WITH ONE DIMENSION OF OPENING BEING 36 IN. (914 MM) OR LESS.

SEE CONCRETE BLOCKS* (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.

- 2. CABLE TRAY MAX 36 IN. (914 MM) WIDE BY MAX 6 IN. (152 MM) DEEP STEEL OR ALUMINUM OPEN LADDER CABLE TRAY. CABLE TRAY TO CONSIST OF CHANNEL-SHAPED SIDE-RAILS WITH BOXED CHANNEL RUNGS SPACED 9 IN. (229 MM) OC. CABLE TRAY SIDE-RAILS TO BE FORMED OF MIN 0.056 IN. (1.4 MM) THICK (16 GA) GALV STEEL OR MIN 0.125 IN. (3.2 MM) THICK ALUMINUM. CABLE TRAY RUNGS TO BE FORMED OF MIN 0.029 IN. (.8 MM) THICK (22 GA) GALV STEEL OR MIN 0.080 IN. (2 MM) THICK ALUMINUM. WHEN MORE THAN ONE CABLE TRAY IS INSTALLED IN OPENING, MIN DISTANCE BETWEEN CABLE TRAYS IS 26 IN. (660 MM). MIN ANNULAR SPACE BETWEEN CABLE TRAY AND EDGE OF OPENING IS ZERO IN. (POINT CONTACT). WHEN ANNULAR SPACE BETWEEN CABLE TRAY AND EDGE OF OPENING OR BETWEEN MULTIPLE CABLE TRAYS EXCEEDS 6 IN., (152 MM), A SUPPORT CHANNEL (ITEM 8) SHALL BE INSTALLED BETWEEN THE CABLE TRAY AND THE EDGE OF THE OPENING TO SUPPORT THE EDGE OF THE INTUMESCENT SHEET (ITEM 5) PARALLEL WITH THE WIDTH DIMENSION OF THE CABLE TRAY. CABLE TRAYS RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ÁSSEMBLY.
- 3. CABLES AGGREGATE CROSS-SECTIONAL AREA OF CABLES IN CABLE TRAY NOT TO EXCEED 39 PERCENT OF THE CROSS-SECTIONAL AREA OF THE CABLE TRAY BASED ON A MAX 3 IN. (76 MM) CABLE LOADING DEPTH WITHIN THE CABLE TRAY. ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF CABLES MAY BE USED:
- A. MAX 1000 KCMIL SINGLE-CONDUCTOR POWER CABLES; CROSS-LINKED POLYETHYLENE INSULATION.
 B. MAX NO.2 AWG MULTICONDUCTOR POWER AND CONTROL CABLES; CROSS-LINKED POLYETHYLENE INSULATION, POLYVINYL CHLORIDE
- C. MAX 300 PAIR NO. 22 AWG (OR SMALLER) COPPER CONDUCTOR COMMUNICATION CABLE WITH POLYVINYL CHLORIDE INSULATION AND JACKET MATERIAL
- D. MULTIPLE FIBER OPTICAL COMMUNICATION CABLE JACKETED WITH POLYVINYL CHLORIDE AND HAVING A MAX OUTSIDE DIAM OF 5/8 IN. (16 MM).
 - E. MAX 22 AWG COAXIAL DATA CABLE WITH POLYETHYLENE INSULATION AND POLYVINYL CHLORIDE JACKET
- F. MAX 7C NO. 12 AWG (OR SMALLER) MULTI CONDUCTOR POWER AND CONTROL CABLES; XLPE INSULATION, XLPE OR POLYVINYL CHLORIDE (PVC) JACKET.
 - G. MAX NO. 18 AWG RG 6/U COAXIAL CABLE WITH PVC INSULATION AND JACKET.
 - H. MAX 4/C NO. 2/O AWG (OR SMALLER) COPPER OR ALUMINUM CONDUCTOR CABLES WITH XLPE OR PVC INSULATION AND JACKET.
- 4. FILL, VOID OR CAVITY MATERIALS* INTUMESCENT SHEET RIGID ALUMINUM FOIL-FACED SHEET WITH GALV STEEL SHEET BACKER. SHEETS CUT TO TIGHTLY FOLLOW THE CONTOURS OF THE CABLE TRAY AND THE CABLES. SHEETS CUT TO LAP A MIN OF 2 IN. (51 MM) ON THE FLOOR OR WALL SUFFACE ON ALL SIDES OF THE OPENING. SHEET IS REQUIRED TO BE INSTALLED ON BOTH SIDES OF THE FLOOR OR WALL ASSEMBLY TO ATTAIN THE 3 HR F RATING, AS AN OPTION FOR STEEL CABLE TRAY IN FLOORS, THE SHEET MAY BE INSTALLED ON ONLY THE TOP SURFACE OF THE FLOOR TO ATTAIN A MAX 2 HR F RATING.

WHEN SHEET IS INSTALLED ON ONLY THE TOP SURFACE OF THE FLOOR, THE CAULK (ITEM 6) FILL MATERIALS ARE ALSO REQUIRED TO BE INSTALLED ON ONLY THE TOP SURFACE OF THE FLOOR. SHEET TO BE INSTALLED WITH THE GALV STEEL SHEET BACKER EXPOSED (ALUMINUM FOIL FACING AGAINST FLOOR OR WALL SURFACE) AND SECURED TO FLOOR OR WALL SURFACE WITH MIN 3/16 IN. (5 MM) ĎIAM BY 1-1/4 IN. (32 MM) LONG STEEL ANCHOR SCREWŚ, OR EQUIVALENT, IN CONJUNCTION WITH MIN 1-1/4 IN. (32 MM) ĎIAM ŠTEEL FENDER WASHERS. MAX SPACING OF FASTENERS NOT TO EXCEED 6 IN. (152 MM) WITH ADDITIONAL FASTENERS LOCATED ON EACH SIDE OF BUTTED SEAMS OR SLITS MADE TO PERMIT INSTALLATION OR MM) OC 010 CC THE SHEET AROUND THE CABLE TRAY.

- 5. STEEL COVER STRIP MIN 2 IN. (51 MM) WIDE STRIP OF MIN 0.020 IN. (.51 MM) THICK GALV STEEL CENTERED OVER ENTIRE LENGTH OF EACH BUTTED SEAM OR SLIT MADE IN THE INTUMESCENT SHEET (ITEM 4). PRIOR TO INSTALLATION OF THE STEEL STRIP, THE SEAM OR SLIT IN THE INTUMESCENT SHEET SHALL BE COVERED WITH A NOM 1/4 IN. (6 MM) DIAM BEAD OF CAULK (ITEM 6). STEEL COVER STRIP SECURED TO GALV STEEL SHEET BACKER OF INTUMESCENT SHEET WITH STEEL SHEET METAL SCREWS OR STEEL RIVETS SPACED MAX 3 IN. (76 MM) OC ON EACH SIDE OF SEAM OR SLIT.
- 6. FILLYOID OR CAVITY MATERIALS* GRAPHITE SEAL, CAULK, SEALANT OR PUTTY ONE LAYER OF 1/2 IN. X 1/16 IN. (13 MM BY 1.6 MM) ADHESIVE BACKED GRAPHITE INTUMESCENT SEAL POSITIONED UNDER INTUMESCENT SHEET AROUND ENTIRE PERIMETER OF THROUGH OPENING OR MIN 1/4 IN. (6 MM) DIAM CONTINUOUS BEAD OF CAULK OR PUTTY APPLIED TO EDGE OF INTUMESCENT SHEET AT ITS
 INTERFACE WITH SURFACE OF FLOOR OR WALL AROUND ENTIRE PERIMETER OF THROUGH OPENING. GENEROUS APPLICATION OF CAULK OR
 PUTTY TO BE APPLIED TO FILL ALL INTERSTICES BETWEEN CABLES. GENEROUS APPLICATION OF CAULK OR PUTTY TO BE APPLIED AROUND
 THE BASE OF THE CABLE TRAY SIDE—RAILS AND CONTOUR OF CABLES AT THEIR EGRESS FROM THE INTUMESCENT SHEET ON BOTH SIDES OF THE FLOOR OR WALL ASSEMBLY.
- 7. SUPPORT CHANNEL (NOT SHOWN) WHEN AREA OF THROUGH OPENING EXCEEDS 1440 SQ IN. (9290 CM2), AN INTERMEDIATE SUPPORT CHANNEL SHALL BE INSTALLED FLUSH WITH TOP SURFACE OF FLOOR OR BOTH SURFACES OF WALL. SUPPORT CHANNELS TO BE MIN 1-5/8 BY 1-5/8 IN. (41 BY 41 MM) AND FORMED OF MIN 0.093 IN. (2.4 MM) THICK (NO. 12 GAUGE) PAINTED OR GALV STEEL. ENDS OF STEEL CHANNEL BOLTED OR WELDED TO STEEL ANGLES ANCHORED TO INSIDE WALLS OF THROUGH OPENING, WHEN WIDTH OF CABLE TRAY EXCEED 24 IN. (610 MM) AND/OR WHEN MORE THAN ONE CABLE TRAY IS INSTALLED IN THE OPENING, ADDITIONAL SUPPORT CHANNELS ARE TO BE INSTALLED SUCH THAT INTUMESCENT SHEET IS SUPPORTED WITHIN 6 IN. (152 MM) OF EACH SIDE OF THE CABLE TRAY(S). WHEN STEEL SUPPORT CHANNELS ARE CENTERED BENEATH BUTTED SEAMS OF INTUMESCENT SHEETS, NO STEEL COVER STRIP (ITEM 5) IS REQUIRED OVER BUTTED SEAM. INTUMESCENT SHEET SECURED TO STEEL SUPPORT CHANNELS WITH STEEL SHEET METAL SCREWS IN CONJUNCTION WITH MIN 1-1/4 IN. (32 MM) DIAM STEEL FENDER WASHERS.

WHEN SUPPORT CHANNEL IS USED BENEATH BUTTED SEAM OF INTUMESCENT SHEETS. FASTENERS SPACED MAX 3 IN. (76 MM) OC ON EACH SIDE OF BUTTED SEAM. WHEN SUPPORT CHANNEL IS LOCATED AWAY FROM INTUMESCENT SHEET SEAM, FASTENERS SPACED MAX 6 IN. (152 MM) OC. PRIOR TO INSTALLATION OF THE INTUMESCENT SHEET(S), A NOM 1/4 IN. (6 MM) DIAM CONTINUOUS BEAD OF CAULK (ITEM 6) SHALL BE APPLIED AS GASKET OVER THE STEEL SUPPORT CHANNEL.

*BEARING THE UL CLASSIFICATION MARK

UL SYSTEM NO. C-AJ-4003 NOT TO SCALE

TYP. UL FIRE PENETRATION - CABLE TRAY FLOOR OR WALL - F=2 AND F=3 HR, T=0 HR