

City of Long Beach Harbor Department Engineering Design Division



ELECTRICAL STANDARD PLANS

July 2016



Port of
LONG BEACH
The Green Port



Port of
LONG BEACH

The Green Port

July 2016

Preface

The Electrical Standard Plans contained in this manual have been prepared for the guidance of engineers, contractors and developers who have an interest in the preparation of plans and the construction of facilities and improvements under the jurisdiction of the Port of Long Beach.

The Port of Long Beach Electrical Standard Plans is to be used in conjunction with latest editions of the various public agency standard plans and industry standard plans. The order of precedence for these various standard plans is as follows:

1. Port of Long Beach Electrical Standard Plans
2. California Electric Code

Conformance with these standards will reduce design costs and the processing time needed to review and approve plans. The use of this manual in no way relieves the engineer from liability, nor does it alleviate, or replace the individual design adherence to the profession's "standard of care" in the design. Therefore, the design engineer assumes a professional engineer's responsibility for their use.

These standards may be modified by the Port of Long Beach from time to time, as required.

Sincerely,

A handwritten signature in blue ink, appearing to read "John Chun", with a stylized flourish at the end.

John Chun, P.E.

Director of Engineering Design

TABLE OF CONTENTS

	<i>Standard Plan No.</i>	<i>No. of Sheets</i>
Electrical Abbreviations	E-1	1
Electrical Symbols	E-2 to E-6	5
Duct Bank Section Detail in Outdoor Trenches	E-9	1
Duct Bank Below Railroad Track Cross Section	E-10	1
Electric Manhole Detail	E-11	1
2' X 3' Precast Pull Box Detail	E-16	1
Small Precast Concrete Pull Box	E-17	1
6" Diameter Guard Post Detail	E-20	1
8" Diameter Guard Post Detail	E-21	1
12" Diameter Guard Post Detail	E-22	1
Guard Posts and Cage at Light Pole	E-23	1
Concrete Pad Detail	E-24	1
Ground Rod and Well Detail	E-25	1
Fence Grounding Detail	E-26	1
120' Light Pole Detail	E-30	1
120' Light Pole Plan W/Powerlink Panel – Wiring	E-31	2
120' Light Pole Plan W/O Powerlink Panel – Wiring	E-32	2

TABLE OF CONTENTS

	<i>Standard Plan No.</i>	<i>No. of Sheets</i>
Luminaire Terminal Box – Wiring	E-33	1 of 2
Powerlink G3 Controller	E-33	2 of 2
Area Floodlight Pole	E-34	3
Street Light Pole Detail	E-36	1
Bridge Light Pole Detail	E-37	1
Street Lighting Service Control Cabinet Wiring Diagram	E-38	1
Electrical Service Control Cabinet	E-39	1
Pull Box and Street Light Conduit and Conductor Details	E-40	1
Fuse Holder Detail	E-41	1
Parking Lot Light Pole Detail	E-42	1
Bunker for 480V/240V 8-Gang Power Outlet	E-49	1
Bunker Mounted 4-Gang Reefer Outlet Assembly	E-50	1
1-Gang Rack Mounted Reefer Outlet Assembly	E-51	1
2-Gang Rack Mounted Reefer Outlet Assembly	E-52	1
Camera Pole and Camera Mounting Details	E-60	1
Fence Protection System Details	E-61	2
Chassis Camera Detail	E-63	1

TABLE OF CONTENTS

	<i>Standard Plan No.</i>	<i>No. of Sheets</i>
Intercom Pedestal Detail	E-64	1
Conduit Stub Detail – Section	E-70	1
Raceway & Conductor Schedule	E-80	1
Underground Pull Box Schedule	E-81	1
Light Pole Schedule	E-82	1
Light Fixture Schedule	E-83	1
Typical Titanium Oxide Rod Anode Connection Detail	E-84	1
Anode Bracket System Between Piles	E-85	1
Anode Bracket System at Steel Bulkhead	E-86	1 of 2
PVC Mounting Bracket	E-86	2 of 2
Shore To Ship Power, Pilot Loop Continuity Check Wiring Diagram	E-87	4
Shore To Ship Power Power Outlet Vault Enclosure	E-88	2
Shore Power Outlet Grounding Details	E-89	2
Typical Substation Light Pole	E-90	1
Substation Gate Standard	E-92	1
Sacrificial Anode Bracket System for Steel Pile and Sheet Pile	E-93	1

A	AMPERE	MCM	THOUSAND CIRCULAR MILS	W	WATT, WIRE
ABS	ACRYLONITRILE BUTADIENE STYRENE	MH	METAL HALIDE, MANHOLE	WH	WATTHOUR
AC	ALTERNATING CURRENT	MIN	MINIMUM	WP	WEATHERPROOF
AFF	ABOVE FINISHED FLOOR	MTD	MOUNTED	XFMR	TRANSFORMER
AIC	AMPERE INTERRUPTING CAPACITY	NC	NORMALLY CLOSED	Z	IMPEDANCE
AUX	AUXILIARY	NEC	NATIONAL ELECTRICAL CODE	2P	TWO-POLE
AWG	AMERICAN WIRE GAUGE	NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION	3P	THREE-POLE
BLDG	BUILDING	NF	NON FUSED	3W	THREE-WIRE
BKBD	BACKBOARD	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION	4W	FOUR-WIRE
BRKR	BREAKER				
C	CONDUIT	NIC	NOT IN CONTRACT		
C/B, CB	CIRCUIT BREAKER	NO	NORMALLY OPEN		
CKT	CIRCUIT	NO.	NUMBER		
CO	CONDUIT ONLY	NTS	NOT TO SCALE		
CONC	CONCRETE	OD	OUTSIDE DIAMETER		
CONN	CONNECT, CONNECTION, CONNECTED	OL, O/L	OVERLOAD		
CT	CURRENT TRANSFORMER	PB	PULL BOX		
CU	COPPER	PF	POWER FACTOR		
DC	DIRECT CURRENT	PH, Ø	PHASE		
DISC	DISCONNECT	PC	PHOTO CELL		
DWG	DRAWING	P.C.C.	PORTLAND CONCRETE CEMENT		
EA	EACH	PNL	PANEL		
EB	ENCASED BURIAL	POLB	PORT OF LONG BEACH		
ENCL	ENCLOSURE	PT	POTENTIAL TRANSFORMER		
EQUIP	EQUIPMENT	PVC	POLYVINYL CHLORIDE CONDUIT		
ESD	EMERGENCY SHUTDOWN	PWR	POWER		
EXT	EXTERIOR	RPM	REVOLUTIONS PER MINUTE		
F	FUSE, FAULT	RM	ROOM		
FLUO	FLUORESCENT	SHT	SHEET		
FT	FEET	SPDT	SINGLE-POLE, DOUBLE-THROW		
GFI, GFCI	GROUND FAULT CIRCUIT INTERRUPTER	SPEC	SPECIFICATION		
GND OR G	GROUND	SPD	SHORE POWER OUTLET		
HID	HIGH INTENSITY DISCHARGE	SPST	SINGLE-POLE, SINGLE-THROW		
HMWPE	HIGH MOLECULAR WEIGHT POLYETHYLENE	SW	SWITCH		
HOA	HAND-OFF-AUTOMATIC	SWBD	SWITCHBOARD		
HPS	HIGH PRESSURE SODIUM	SWGR	SWITCHGEAR		
HT	HEIGHT	SYM	SYMETRICAL		
HV	HIGH VOLTAGE	TB	TERMINAL BLOCK, OR TERMINAL BOX		
JB	JUNCTION BOX	TEL	TELEPHONE		
K	THOUSAND	TERM	TERMINAL		
Kcmil	THOUSAND CIRCULAR MILS	TYP	TYPICAL		
KVA	KILO VOLT-AMPERE	UON	UNLESS OTHERWISE NOTED		
KW	KILOWATT	UL	UNDERWRITERS LABORATORIES INC.		
CL	CONTINUOUS LOAD	UG	UNDERGROUND		
LCP	LOCAL CONTROL PANEL	UGPS	UNDERGROUND PULL SECTION		
LTG	LIGHTING	V	VOLTAGE		
LV	LOW VOLTAGE	VA	VOLT-AMPERES		
MAX	MAXIMUM	VD	VOLTAGE DROP		



Port of
LONG BEACH
The Green Port

ELECTRICAL ABBREVIATIONS

STANDARD PLAN

E-1

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 1



METER



AMMETER



VOLTMETER



AUTOMATIC TRANSFER SWITCH, RATING AS INDICATED



KEY INTERLOCK



GROUND



GROUND WELL WITH 3/4" x 10' GROUND ROD



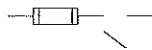
CIRCUIT BREAKER



SHUNT TRIP



FUSE



FUSED DISCONNECT



MOTOR, HORSEPOWER RATING AS INDICATED



TRANSFORMER



CURRENT TRANSFORMER, RATIO AND NUMBER OF CT'S AS INDICATED



GROUND FAULT INTERRUPTER

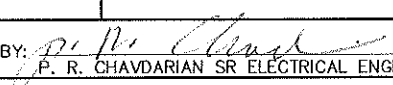


Port of
LONG BEACH
The Green Port

ELECTRICAL SYMBOLS

STANDARD PLAN

E-2

APPROVED BY: 
P. R. CHAVDARIAN SR ELECTRICAL ENGINEER

P.E. NO.: E-8410 DATE: 01-31-16

1 OF 5

	BELOW GRADE CONCRETE ENCASED DUCTBANK
	BELOW GRADE CONDUIT
	CONDUIT RUN CONCEALED IN ABOVE GRADE STRUCTURE
	CONDUIT RUN EXPOSED
	EXISTING CONDUIT
	CROSS LINES INDICATE NUMBER OF CONDUCTORS IN CONDUIT, SIZE AS INDICATED (#12 MIN). LONG LINE INDICATES NEUTRAL, SHORT LINE INDICATES PHASE CONDUCTOR, DIAGONAL LINE INDICATES CODE-SIZED GROUND.
	BRANCH CIRCUIT HOME RUN TO PANELBOARD; LETTER AND NUMBER NOTATION IDENTIFIES PANEL AND CIRCUIT NUMBER(S)
	CONDUIT STUBBED AND CAPPED
	CONDUIT TURNED UP (OR TOWARDS)
	CONDUIT TURNED DOWN (OR AWAY)
	FLEXIBLE CONDUIT
MH2	UNDERGROUND POWER MANHOLE, SEE SCHEDULE FOR DESIGNATION
P4	UNDERGROUND POWER PULLBOX, SEE SCHEDULE FOR DESIGNATION
C4	UNDERGROUND COMMUNICATIONS PULLBOX, SEE SCHEDULE FOR DESIGNATION
	NEW FEEDER CALLOUT
	EXISTING FEEDER CALLOUT
	FLUSH MOUNTED PANELBOARD, REFER TO SINGLE LINE FOR VOLTAGE AND PHASING
	SURFACE MOUNTED PANELBOARD, REFER TO SINGLE LINE FOR VOLTAGE AND PHASING
	SWITCHBOARD OR DISTRIBUTION PANELBOARD
	SAFETY SWITCH - 3 PHASES UON, F - FUSED
	TRANSFORMER, SIZE, VOLTAGE AND PHASING PER SINGLE LINE



Port of
LONG BEACH
The Green Port

ELECTRICAL SYMBOLS

STANDARD PLAN

E-3

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR ELECTRICAL ENGINEER

P.E. NO.:

E-8410

DATE:

01-31-16

2 OF 5

	MOTOR STARTER, SIZE AS INDICATED
	COMBINATION MOTOR STARTER, SIZE AS INDICATED
	DISCONNECT SWITCH, SIZE AS INDICATED
	FUSED DISCONNECT SWITCH, SIZE AS INDICATED
	JUNCTION BOX - RECESSED OR SURFACE CEILING MOUNTED
	JUNCTION BOX - FLUSH FLOOR MOUNTED
	JUNCTION BOX - WALL MOUNTED
	SINGLE RECEPTACLE, WALL MOUNTED, NEMA 5-20R, GROUNDING TYPE, +15" UON
	DUPLEX RECEPTACLE, WALL MOUNTED, NEMA 5-15R, GROUNDING TYPE; SUBSCRIPT LETTERS INDICATE: GFI=GROUND FAULT INTERRUPTER IG=ISOLATED GROUND, +15" UON
	DUPLEX RECEPTACLE, WALL MOUNTED, NEMA 5-20R, WITH ISOLATED GROUND, +15" UON
	QUAD-RECEPTACLE (DOUBLE DUPLEX), WALL MOUNTED, NEMA 5-15R, GROUNDING TYPE, +15" UON
	DUPLEX RECEPTACLE, IN FLUSH FLOOR BOX
	QUAD-RECEPTACLE (DOUBLE DUPLEX), IN FLUSH FLOOR BOX
	CLOCK HANGER RECEPTACLE, +84" AFF
	SPECIAL RECEPTACLE AS NOTED ON PLANS
	DATA OUTLET, WALL MOUNTED, +15" (UON) WITH 3/4"C.O. STUBBED UP INTO ACCESSIBLE CEILING SPACE
	TELEPHONE OUTLET, WALL MOUNTED, +15" (UON) WITH 3/4"C.O. STUBBED INTO ACCESSIBLE CEILING SPACE. ADJACENT "P" INDICATES PAY PHONE @ +48" WHERE ABOVE COUNTER & +54" ON WALL.
	DATA OUTLET IN FLUSH FLOOR BOX
	TELEPHONE OUTLET IN FLUSH FLOOR BOX



Port of
LONG BEACH
The Green Port

ELECTRICAL SYMBOLS

STANDARD PLAN

E-4

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

3 OF 5



LIGHTING FIXTURE IDENTIFICATION SYMBOL



EXIT LIGHT, CEILING MOUNTED, ARROW INDICATES DIRECTION OF EGRESS



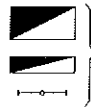
EXIT LIGHT, WALL MOUNTED, ARROW INDICATES DIRECTION OF EGRESS



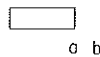
PHOTOELECTRIC SWITCH



DUAL HEAD EMERGENCY LIGHT FIXTURE



FLUORESCENT FIXTURE WITH EMERGENCY BALLAST/BATTERY BACK-UP. ADJACENT "NL" INDICATES NIGHT LIGHT



FLUORESCENT FIXTURE WITH DUAL LEVEL SWITCHING SWITCH S_a CONTROLS OUTBOARD LAMPS AND SWITCH S_b CONTROLS INBOARD LAMP(S)



RECESSED DOWNLIGHT



SURFACE MOUNTED FIXTURE



RECESSED STEPLIGHT



2'X4' RECESSED MTD FLUORESCENT FIXTURE



1'X4' SURFACE MTD FLUOR FIXTURE



4' INDUSTRIAL FLUOR. FIXTURE WITH WIRE GUARD



SURFACE MOUNTED FIXTURE, HID



POLE MOUNTED CUTOFF TYPE III LUMINAIRE



POLE MOUNTED TWIN CUTOFF LUMINAIRES



Port of
LONG BEACH
The Green Port

ELECTRICAL SYMBOLS

STANDARD PLAN

E-5

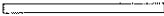
APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

4 OF 5

S	SINGLE POLE SWITCH, + 46" UON
S ₃	THREE-WAY SWITCH, + 46" UON
S ₄	FOUR-WAY SWITCH, + 46" UON
S _{ak}	SWITCH THAT CONTROLS FIXTURES MARKED WITH SUBSCRIPT INDICATED
S _k	KEY OPERATED SWITCH, + 46" UON
S _P	SWITCH WITH PILOT LAMP, + 46" UON
S _{BP}	BY-PASS SWITCH, + 46" UON
S _D	DIMMER SWITCH, + 46" UON
	TIME SWITCH
S _M	1Ø MOTOR RATED SWITCH WITH THERMAL OVERLOADS
S _{WP}	WEATHERPROOF SWITCH
	OCCUPANCY SENSOR/SWITCH, WALL MOUNTED, + 46" UON
	OCCUPANCY SENSOR, ONE-WAY, CEILING MOUNTED
	OCCUPANCY SENSOR, TWO-WAY, CEILING MOUNTED.
	THERMOSTAT OUTLET, VERIFY MOUNTING HEIGHT WITH MECHANICAL
	FIRE ALARM CONTROL PANEL
	TELEPHONE/COMMUNICATION BACKBOARD, 4' x 8' x 3/4" THICK PLYWOOD



Port of
LONG BEACH
The Green Port

ELECTRICAL SYMBOLS

STANDARD PLAN

E-6

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR ELECTRICAL ENGINEER

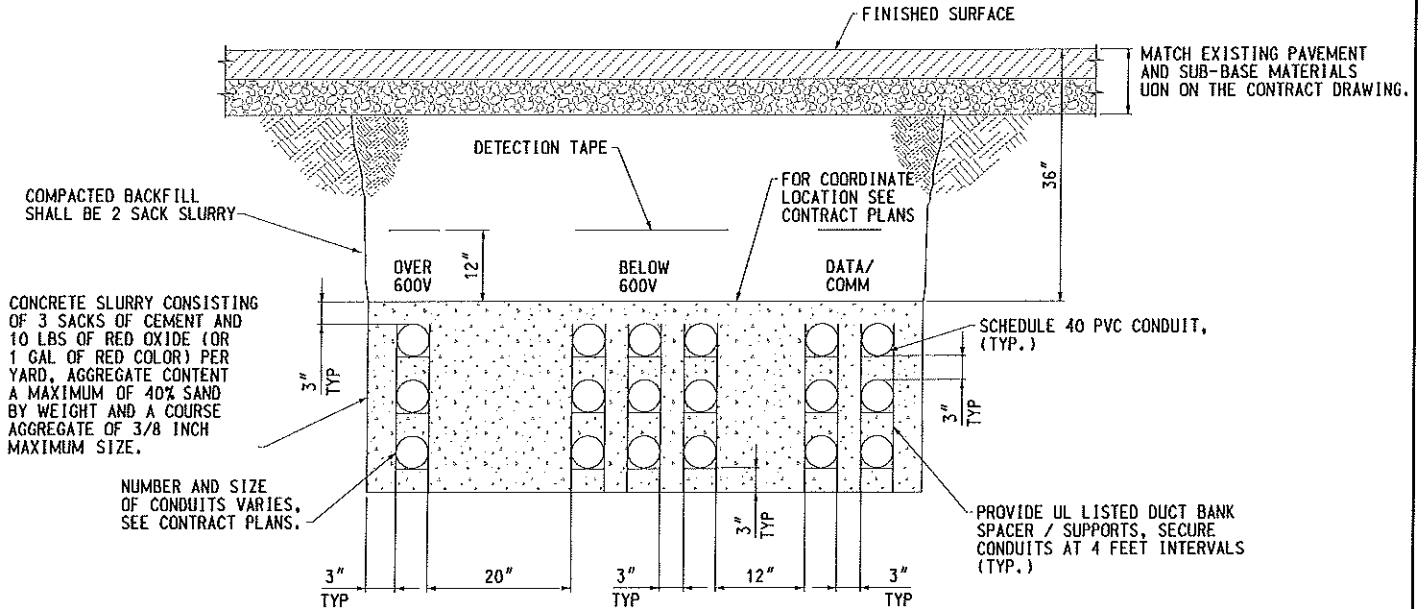
P.E. NO.:

E-8410

DATE:

01-31-16

5 OF 5



NOTES:

1. ARRANGE CONDUITS AND DUCT BANK DEPTH FOR SHORT LENGTHS AS REQUIRED TO AVOID UNDERGROUND OBSTRUCTIONS.
2. SLOPE DUCT BANKS DOWN TOWARDS MANHOLES AND PULL BOXES.
3. IF REPLACING EXISTING EB CONDUIT, USE SCHEDULE 40 PVC FOR NEW INSTALLATION.



Port of
LONG BEACH
The Green Port

DUCT BANK SECTION DETAIL IN OUTDOOR TRENCHES

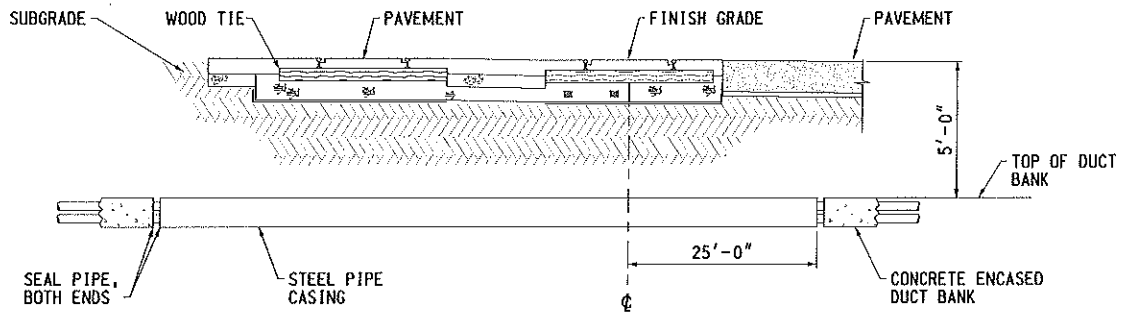
STANDARD PLAN

E-9

APPROVED BY: *P. R. Chavdarian*
P. R. CHAVDARIAN SR ELECTRICAL ENGINEER

P.E. NO.: E-8410 DATE: 01-31-16

1 OF 1



SEE RAILROAD STANDARD CASING
REQUIREMENTS (NON-FLAMMABLE)
FOR ADDITIONAL INFORMATION



Port of
LONG BEACH
The Green Port

DUCT BANK BELOW RAILROAD TRACK CROSS SECTION

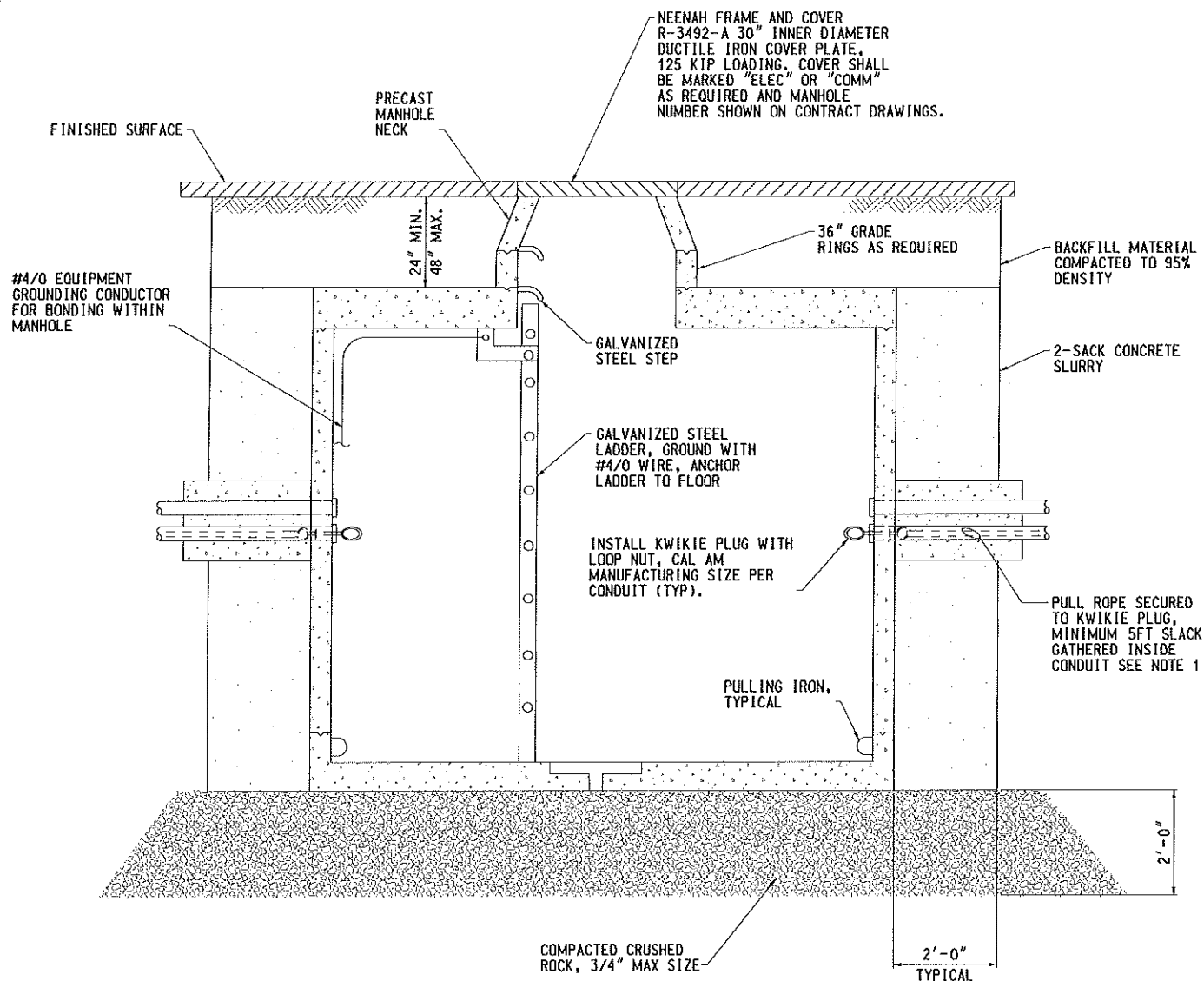
STANDARD PLAN

E-10

APPROVED BY: *P. R. Chavdarian*
P. R. CHAVDARIAN SR ELECTRICAL ENGINEER

P.E. NO.: E-8410 DATE: 01-31-16

1 OF 1



NOTE:

1. INSTALL KWIKIE PLUG AND PULL ROPE IN ALL SPARE CONDUITS. ATTACH BAKELITE TAG TO EACH PLUG WITH LOCATION OF OTHER END OF CONDUIT USING 3/16" MIN. LETTERING.



Port of
LONG BEACH
The Green Port

ELECTRIC MANHOLE DETAIL

STANDARD PLAN

E-11

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

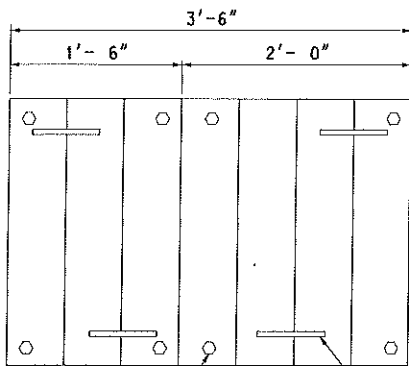
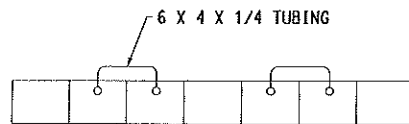
P.E. NO.:

E-8410

DATE:

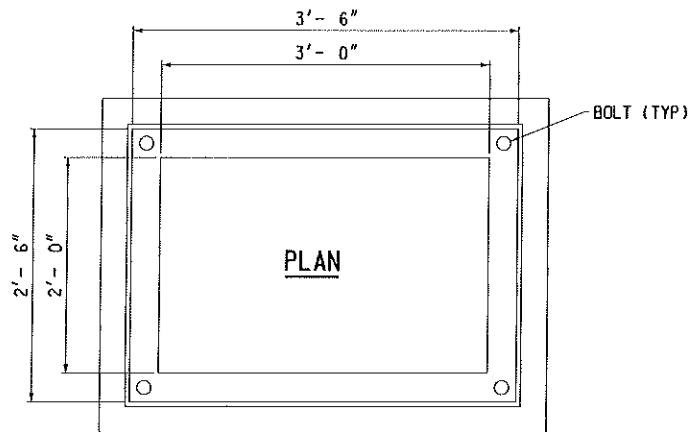
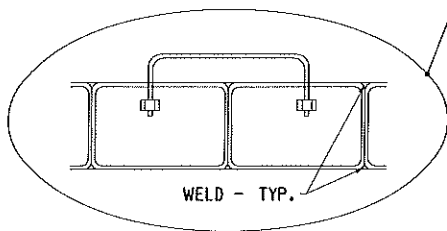
01-31-16

1 OF 1



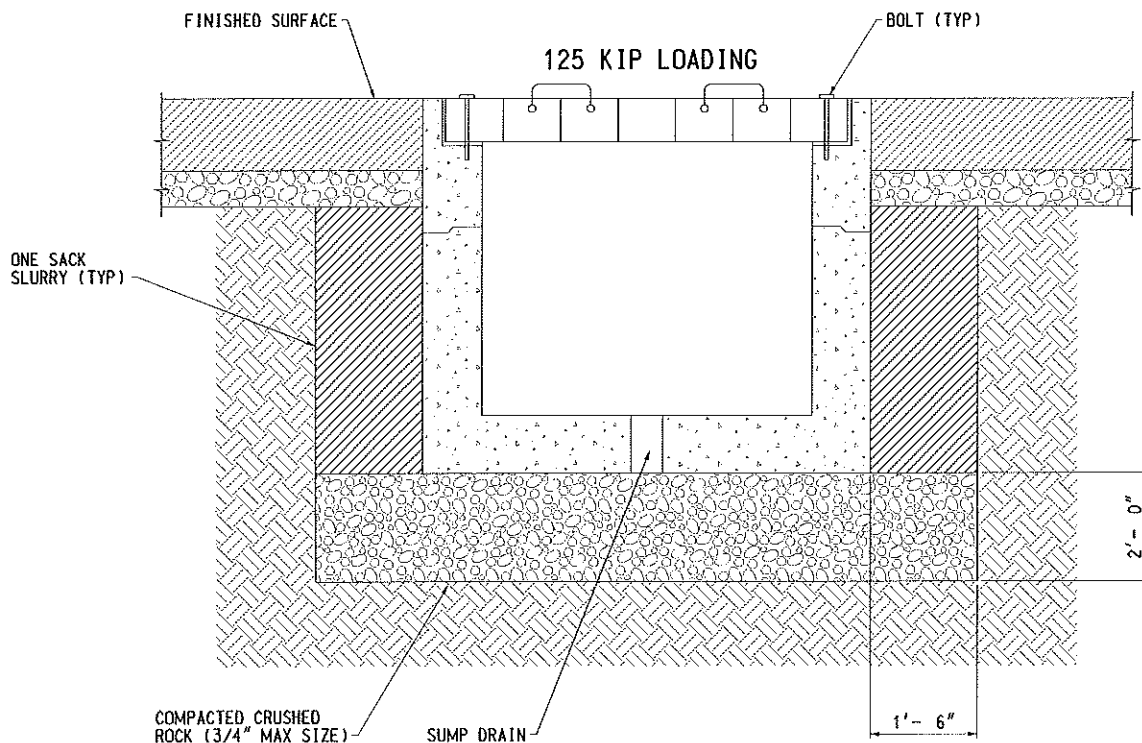
BOLT DOWN
COVER (TYP)

TWO-PIECE COVER



NOTES:

1. DIMENSIONS SHOWN ARE FOR A 24" X 36" PULL BOX AND REPRESENT THE TYPE OF CONSTRUCTION REQUIRED FOR ALL PULL BOXES & COVERS.
2. ONE SACK SAND SLURRY SHALL BE PLACED AROUND ALL PRECAST CONCRETE BOXES (ELECTRICAL, COMMUNICATION, ETC.) AS SHOWN. THIS STANDARD SHALL APPLY TO ALL BOXES 2' X 3' MEASURED HORIZONTALLY OR LARGER.
3. COVER SHALL BE MARKED 'ELEC' OR 'COMM', AS APPROPRIATE, AND PULL BOX NUMBER AS SHOWN ON CONTRACT DRAWING.



SECTION



Port of
LONG BEACH
The Green Port

2' X 3' PRECAST PULL BOX DETAIL

STANDARD PLAN

E-16

APPROVED BY:

P. R. Chaudharian
P. R. CHAUDHARIAN SR. ELECTRICAL ENGINEER

P.E. NO.:

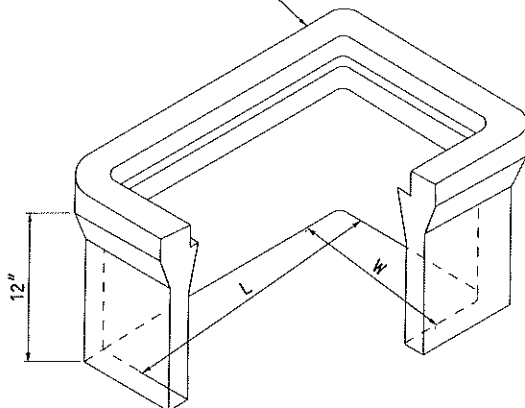
E-8410

DATE:

01-31-16

1 OF 1

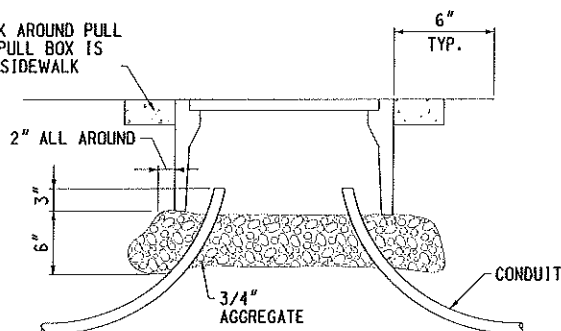
9.5" x 16" PRECAST CONCRETE
PULL BOX, SET BOX ON 6"
BASE OF 3/4" CRUSHED ROCK



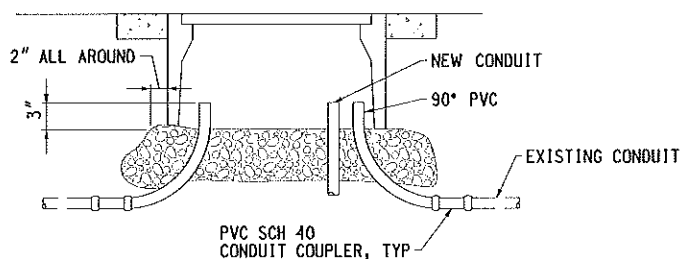
PULL BOXES MANUFACTURED BY JENSEN PRECAST			
NON-TRAFFIC RATED			
SIZE	BOX PART NO.	COVER PART NO.	MAX. # CONDUITS
10"x17"	HN1017-B	HN1017-L09	3
13"x24"	HN1324-B	HN1324-L09	4
17"x30"	HN1730-B	HN1730-L09	6
TRAFFIC RATED SHALL BE INSTALLED PER CALTRANS ES-8			
10"x17"	HT1017-B	HT1017-L03	3
13"x24"	HT1324-B	HT1324-L03	4
17"x30"	HT1730-B	HT1730-L03	6

PULL BOX DETAILS

P.C.C. APRON, 3" THICK AROUND PULL
BOX. DELETE APRON IF PULL BOX IS
CONSTRUCTED WITHIN A SIDEWALK



TYPICAL PULL BOX INSTALLATION



TYPICAL CONDUIT INTERCEPT

NOTES:

1. SIZE OF COUPLER AND NEW CONDUIT SHALL BE SAME SIZE AS EXISTING CONDUIT.
2. PULL BOX SHALL BE PRE-CAST CONCRETE NON-BOLTDOWN TYPE UON.
3. IF AREA IS SUBJECT TO CONTAINER TRAFFIC, USE 2'x3' MINIMUM SIZE PULL BOX WITH 125 KIP COVER (E-16).
4. SEE CALTRANS ES-8B FOR INSTALLATION OF TRAFFIC RATED PULL BOXES.



Port of
LONG BEACH
The Green Port

SMALL PRECAST CONCRETE PULL BOX

STANDARD PLAN

E-17

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

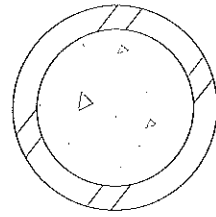
P.E. NO.:

E-8410

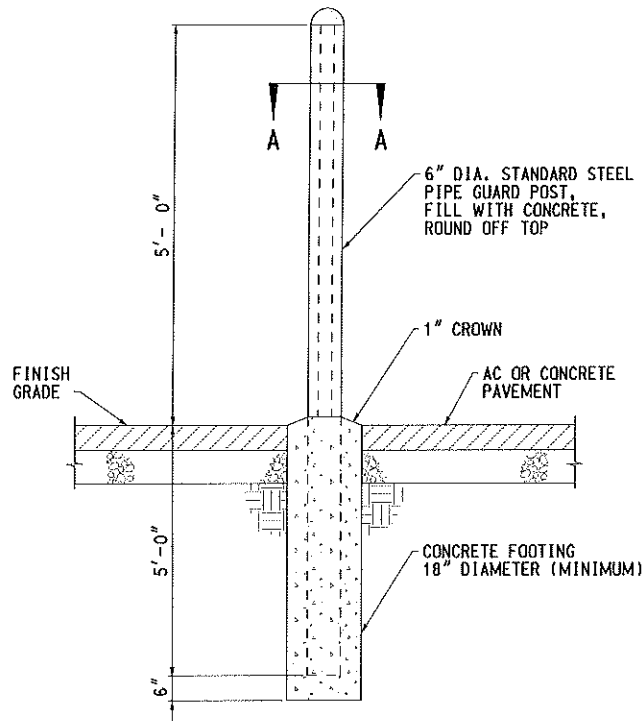
DATE:

01-31-16

1 OF 1



SECTION A-A



NOTES:

1. STEEL PIPE = ASTM A53
2. CONCRETE f'_c = 4000 PSI (MINIMUM) W/C=0.40 MAX.
3. MAXIMUM LOAD PER ASCE 7-10, SECTION 4.5.3 (6K @ 2.25')
4. COHESIONLESS SOIL, FIXED HEAD CONDITION, UNIFORM SOIL PROFILE
5. WATER TABLE DEPTH 7'-0" BELOW FG, WATER DENSITY=62.4 PCF
6. 1'-0" DEPTH FROM FG IGNORED FOR PASSIVE PRESSURE.
7. SOIL DENSITY=110 PCF MIN., SOIL FRICTION ANGLE=30° MIN.



Port of
LONG BEACH
The Green Port

6" DIAMETER GUARD POST DETAIL

STANDARD PLAN

E-20

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

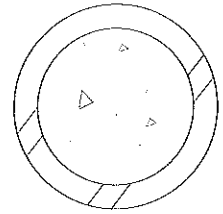
P.E. NO.:

E-8410

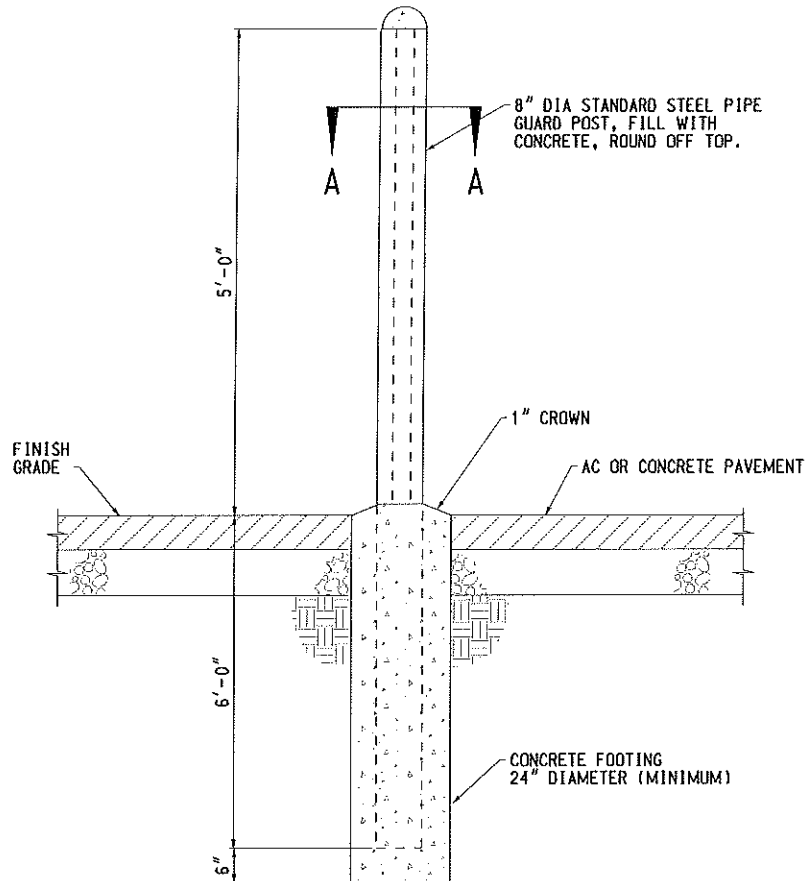
DATE:

01-31-16

1 OF 1



SECTION A-A



NOTES:

1. STEEL PIPE = ASTM A53
2. CONCRETE f'_c = 4000 PSI (MINIMUM) W/C=0.40 MAX.
3. MAXIMUM LOAD 12 KIPS HORIZONTAL @ 2'-6" ABOVE FG.
4. COHESIONLESS SOIL, FIXED HEAD CONDITION, UNIFORM SOIL PROFILE
5. WATER TABLE DEPTH 7'-0" BELOW FG, WATER DENSITY=62.4 PCF
6. 1'-0" DEPTH FROM FG IGNORED FOR PASSIVE PRESSURE.
7. SOIL DENSITY=110 PCF MIN., SOIL FRICTION ANGLE =30° MIN.



Port of
LONG BEACH
The Green Port

8" DIAMETER GUARD POST DETAIL

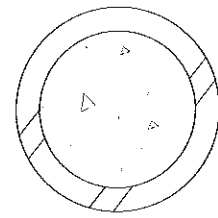
STANDARD PLAN

E-21

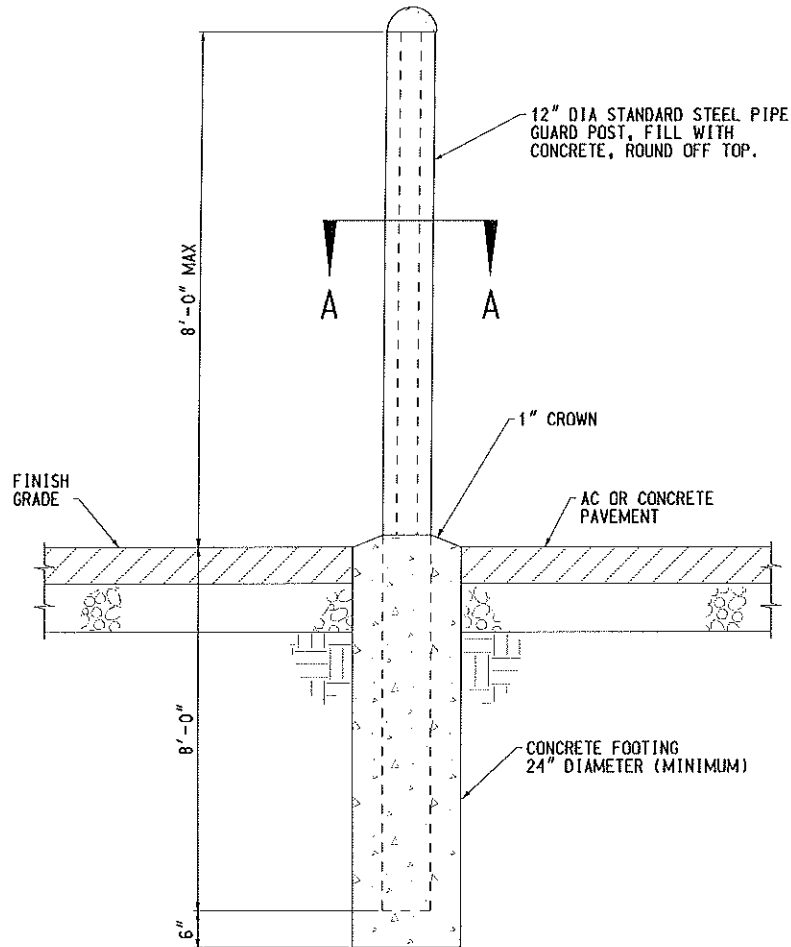
APPROVED BY: *P. R. Chavdarian*
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410 DATE: 01-31-16

1 OF 1



SECTION A-A



NOTES:

1. STEEL PIPE = ASTM A53
2. CONCRETE f'_c = 4000 PSI (MINIMUM) W/C=0.40 MAX.
3. MAXIMUM LOAD 24 KIPS HORIZONTAL @ 3'-0" ABOVE FG.
4. COHESIONLESS SOIL, FIXED HEAD CONDITION, UNIFORM SOIL PROFILE
5. WATER TABLE DEPTH 7'-0" BELOW FG, WATER DENSITY=62.4 PCF
6. 1'-0" DEPTH FROM FG IGNORED FOR PASSIVE PRESSURE.
7. SOIL DENSITY=110 PCF MIN, SOIL FRICTION ANGLE=30° MIN



Port of
LONG BEACH
The Green Port

12" DIAMETER GUARD POST DETAIL

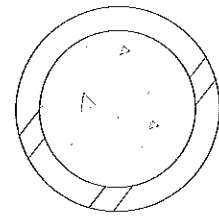
STANDARD PLAN

E-22

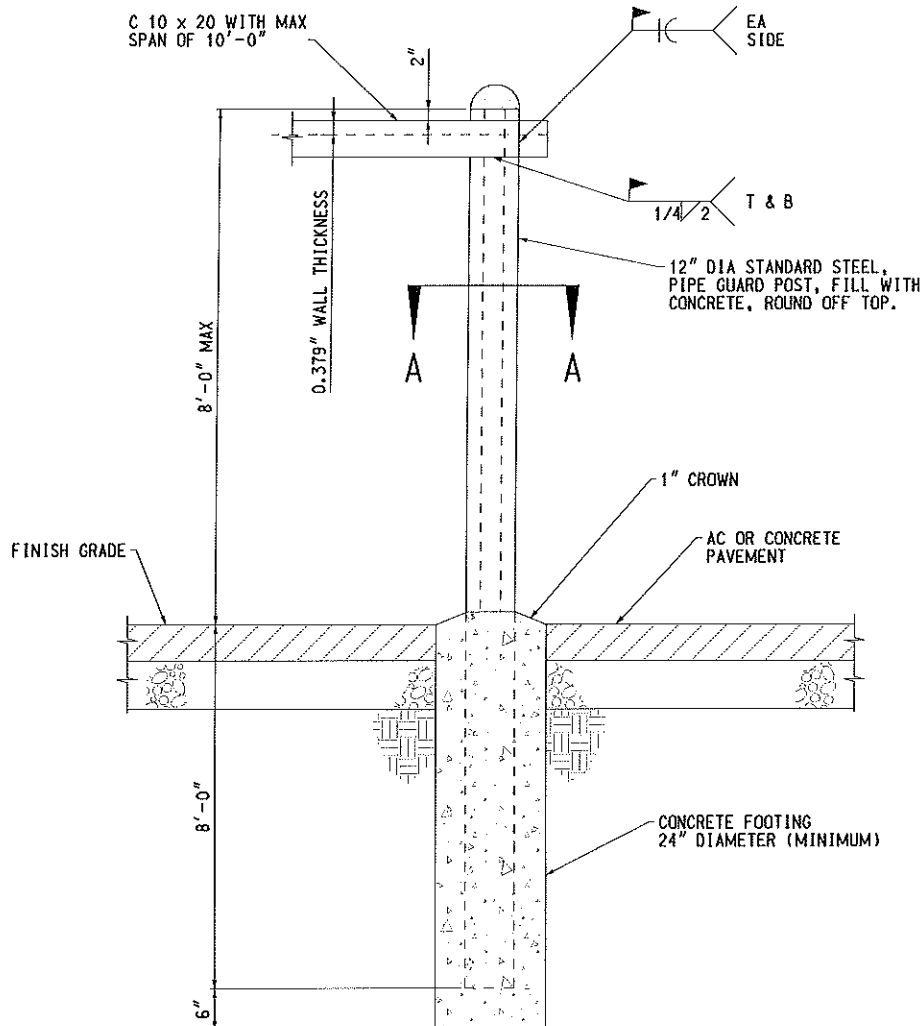
APPROVED BY: *P. R. Chavdarian* P.E. NO.: E-8410 DATE: 01-31-16

P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

1 OF 1



SECTION A-A



12" DIAMETER GUARD POST DETAIL

NOTES:

1. STEEL PIPE = ASTM A53
2. CONCRETE f'_c = 4000 PSI (MINIMUM) W/C=0.40 MAX.
3. MAXIMUM LOAD 24 KIPS HORIZONTAL @ 3'-0" ABOVE FG.
4. COHESIONLESS SOIL, FIXED HEAD CONDITION, UNIFORM SOIL PROFILE
5. WATER TABLE DEPTH 7'-0" BELOW FG, WATER DENSITY=62.4 PCF
6. 1'-0" DEPTH FROM FG IGNORED FOR PASSIVE PRESSURE.
7. SOIL DENSITY=110 PCF MIN, SOIL FRICTION ANGLE =30° MIN
8. STEEL CHANNEL = ASTM A36



Port of
LONG BEACH
The Green Port

GUARD POSTS AND CAGE AT LIGHT POLE

STANDARD PLAN

E-23

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

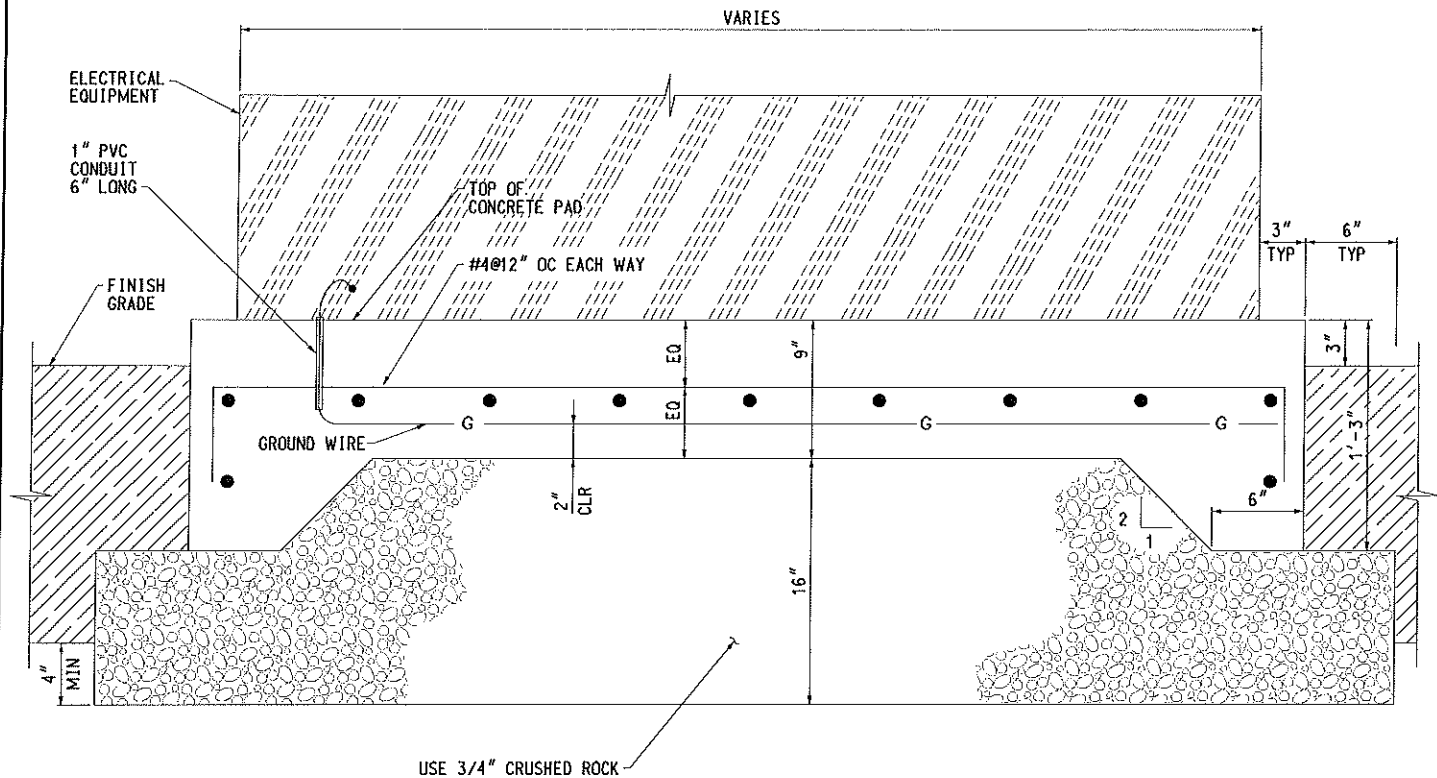
P.E. NO.:

E-8410

DATE:

01-31-16

1 OF 1



NOTES:

1. PROVIDE AND INSTALL 1-#3/0 MIN. BARE COPPER UFER GROUND WIRE 2" ABOVE BOTTOM OF PAD. BOND TO ELECTRICAL EQUIPMENT.
2. CONCRETE SHALL BE CLASS 560-C-3250 WITH A MAXIMUM SLUMP OF 5", UON ON THE CONTACT PLANS.
3. WELDED WIRE FABRIC SHALL BE DEFORMED WIRE ASTM A496 OR 494, GRADE 60.
4. REINFORCING STEEL SHALL BE DEFORMED REBARS ASTM A615 OR ASTM A706, GRADE 60. PLACING OF REINFORCEMENT AND SPLICING LENGTH SHALL CONFORM TO ACI CODE, LATEST EDITION.
5. ANCHORAGE REQUIREMENTS TO BE VERIFIED BY STRUCTURAL ENGINEER.



Port of
LONG BEACH
The Green Port

CONCRETE PAD DETAIL

STANDARD PLAN

E-24

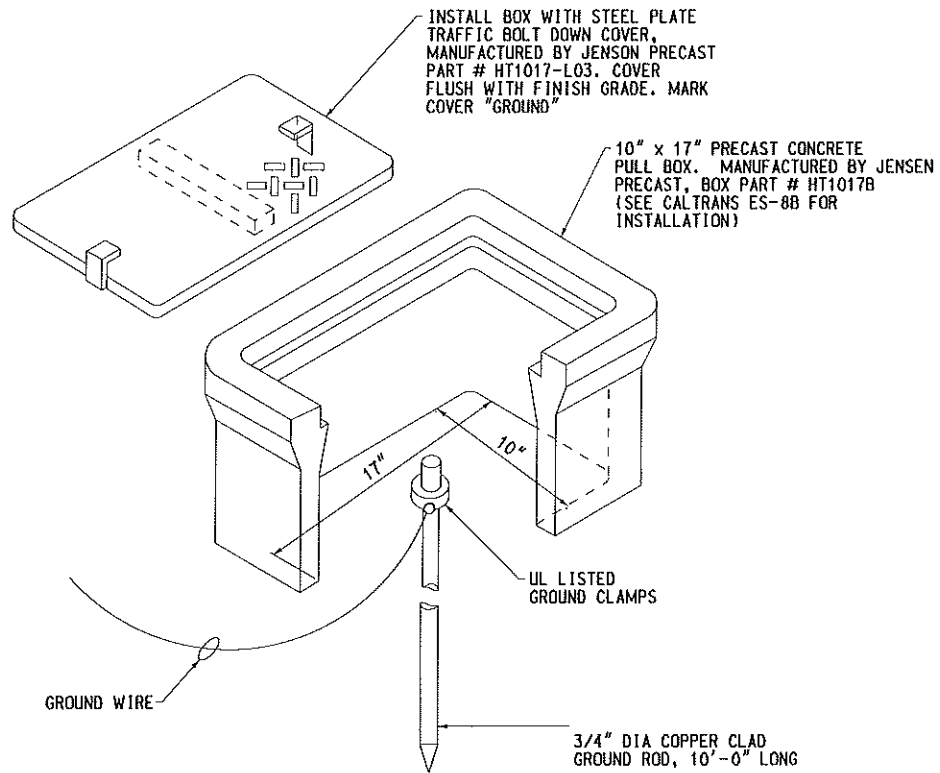
APPROVED BY:

P. R. Chaudhary
P. R. CHAUDHARY SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 1



GROUND ROD & WELL DETAIL



Port of
LONG BEACH
The Green Port

GROUND ROD AND WELL DETAIL

STANDARD PLAN

E-25

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

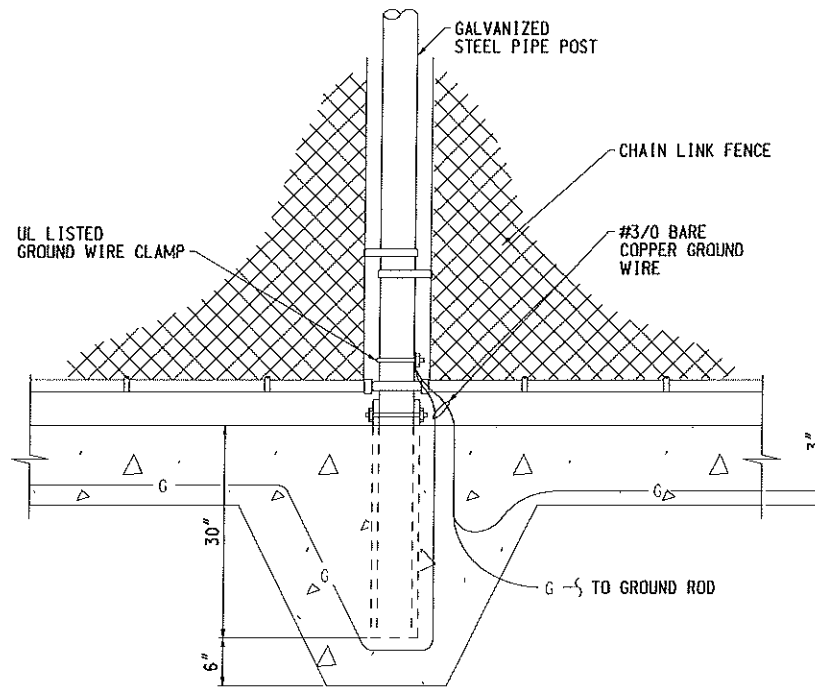
P.E. NO.:

E-8410

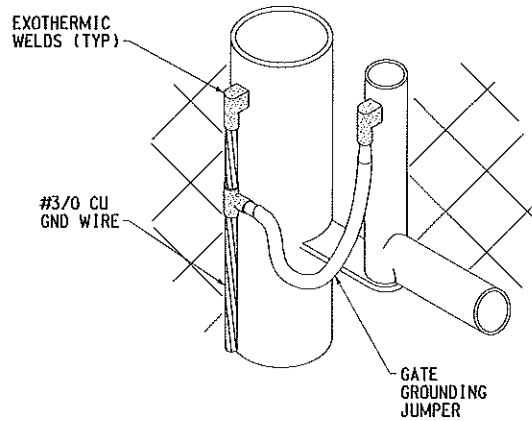
DATE:

01-31-16

1 OF 1



FENCE SUPPORT & GROUNDING DETAIL



NOTE:

1. REAPPLY PVC COATING OVER WELDING.

FENCE GATE GROUNDING



Port of
LONG BEACH
The Green Port

FENCE GROUNDING DETAIL

STANDARD PLAN

E-26

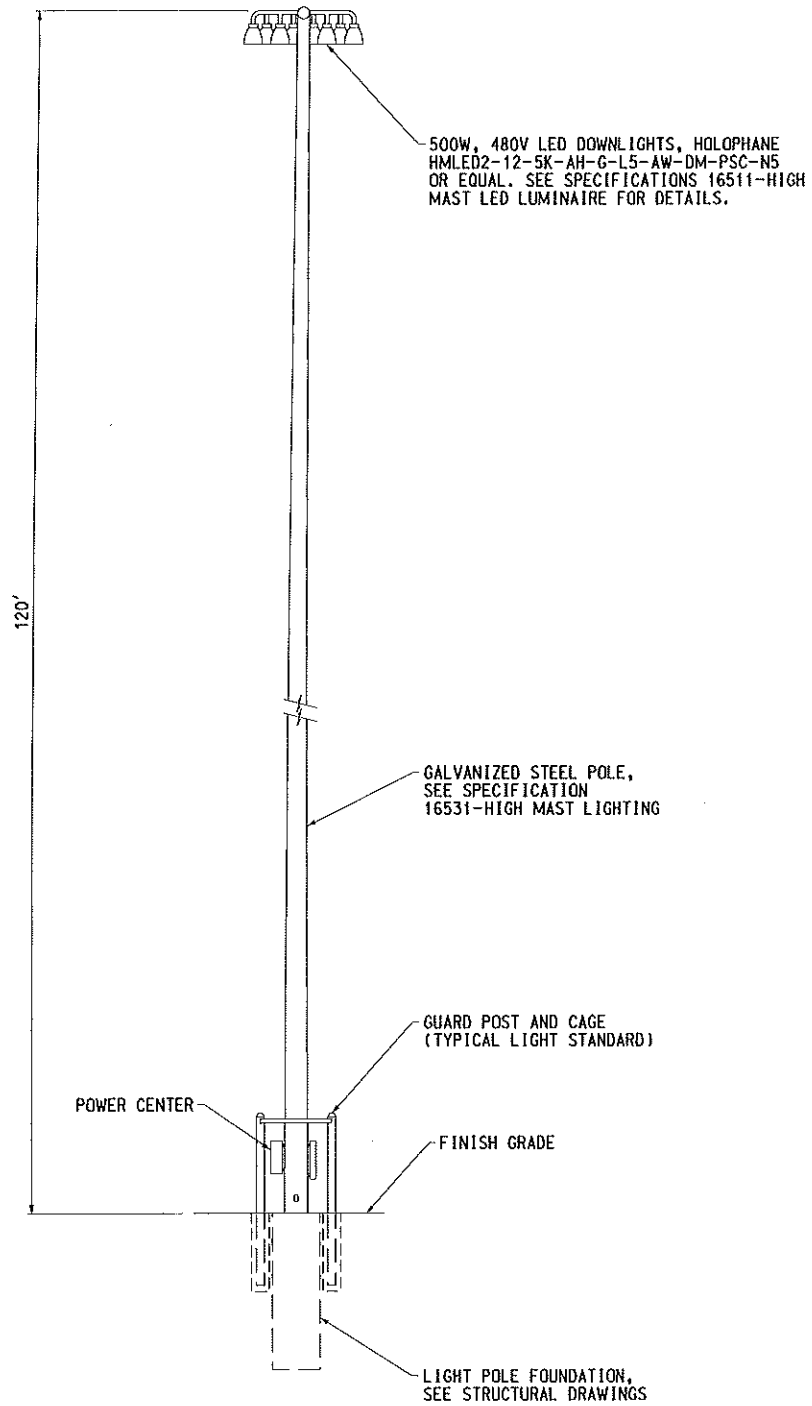
APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 1



LIGHT POLE ELEVATION
NOT TO SCALE



Port of
LONG BEACH
The Green Port

120' LIGHT POLE DETAIL

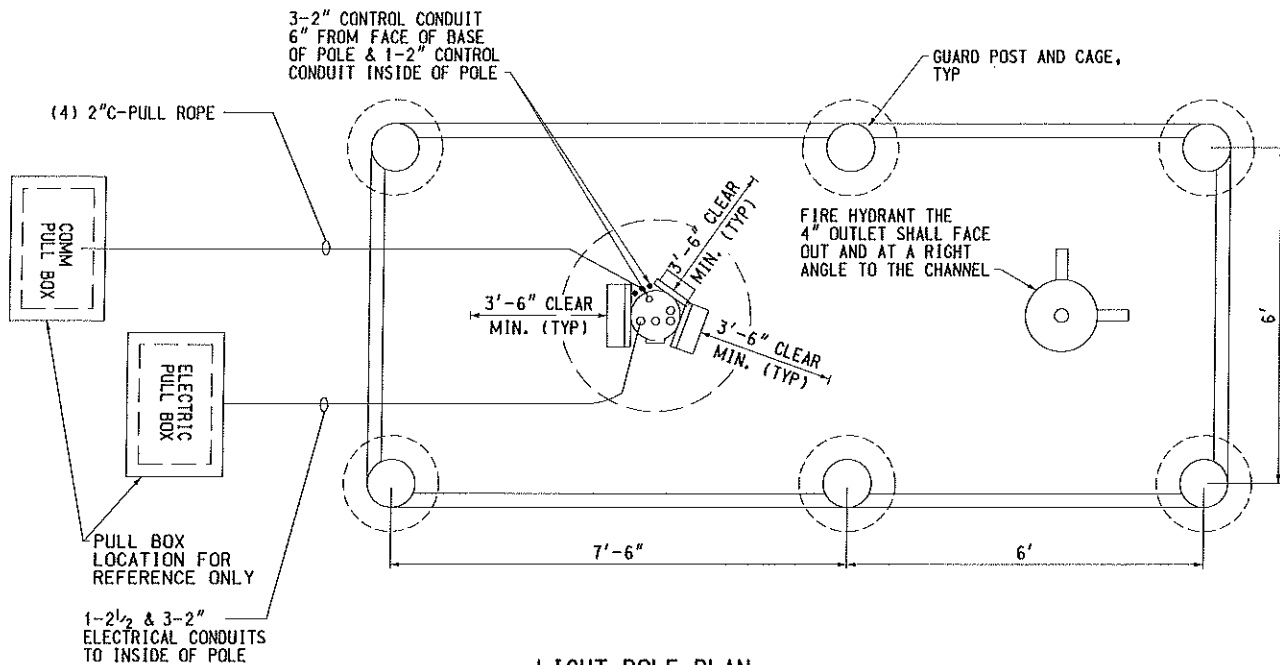
STANDARD PLAN

E-30

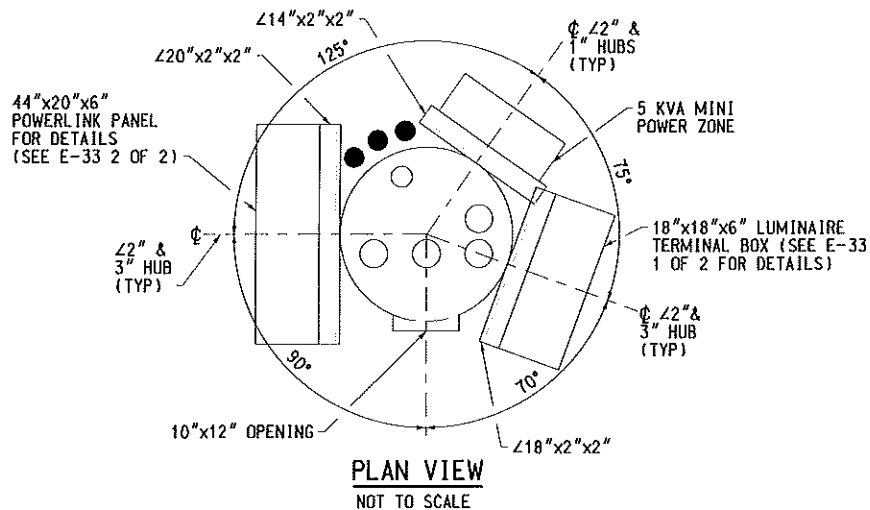
APPROVED BY: *[Signature]*
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410 DATE: 01-31-16

1 OF 1



LIGHT POLE PLAN
NOT TO SCALE

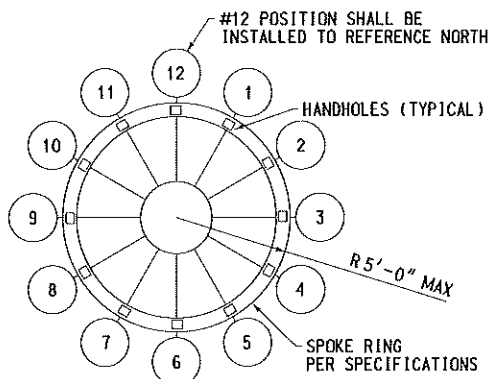


NOTE:

- SEE E-31 (2 OF 2) FOR ELEVATION

NOTE:

- LUMINAIRES #10 AND #4 ON SECURITY LIGHTING CIRCUIT



DOWNLIGHT FIXTURE CONFIGURATION
NOT TO SCALE

NOTE:

- CONTRACTOR SHALL INSTALL "HOLOPHANE" LUMINAIRE (SEE STANDARD PLAN E-30)
- SEE STANDARD PLAN E-32 FOR LIGHT POLE WITHOUT POWERLINK PANEL



Port of
LONG BEACH
The Green Port

**120' LIGHT POLE PLAN
W/ POWERLINK PANEL - WIRING**

STANDARD PLAN

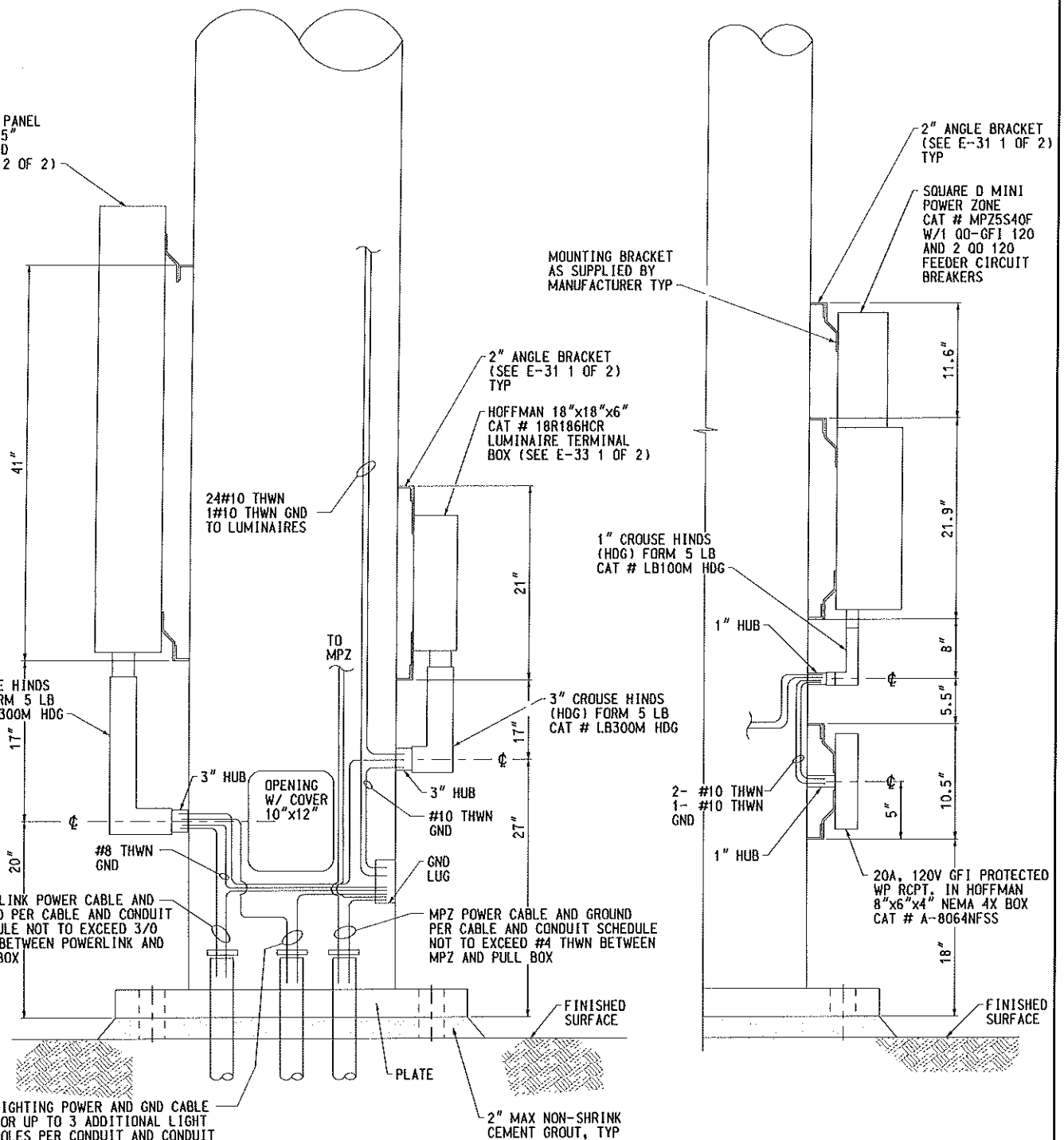
E-31

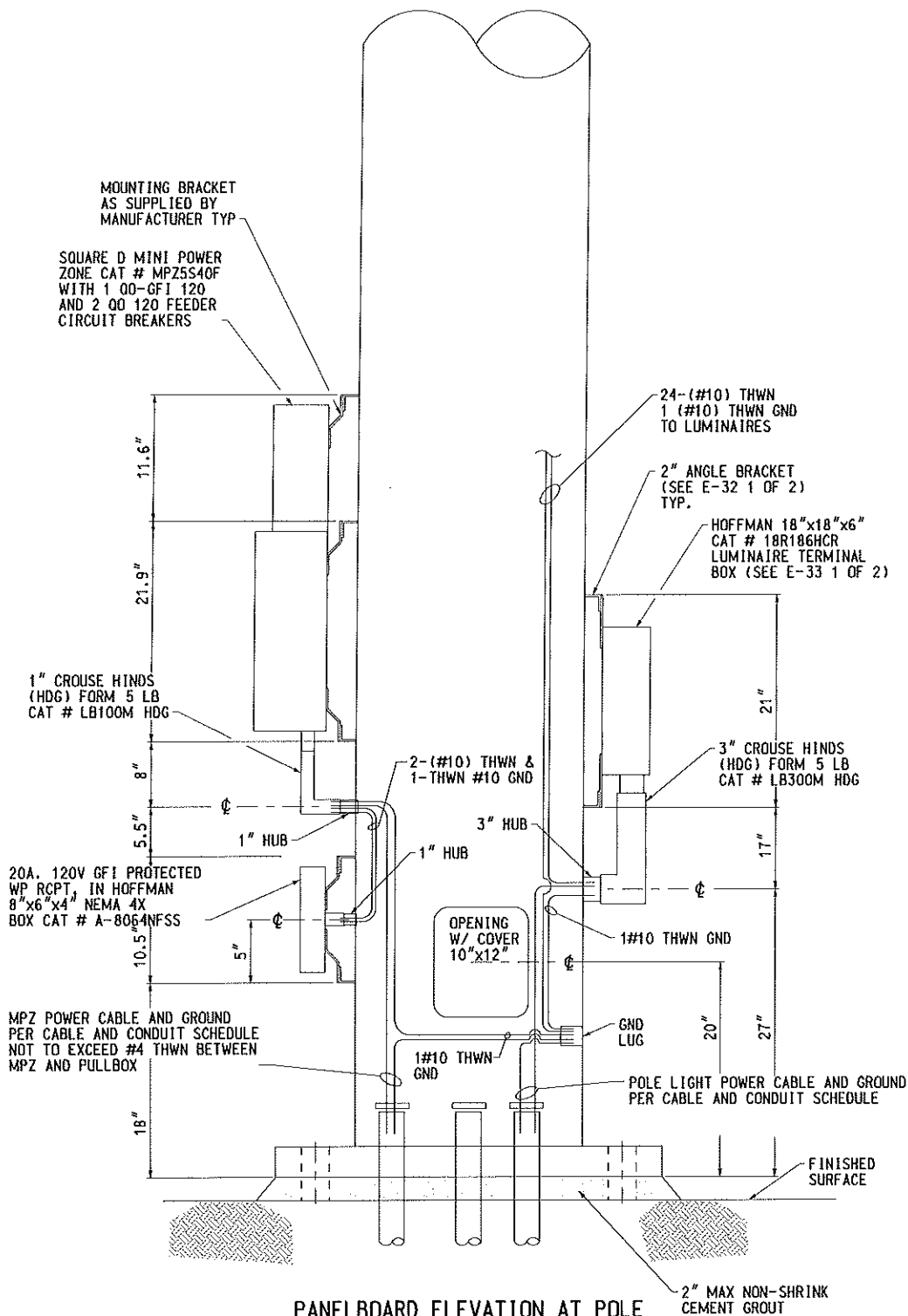
APPROVED BY: *P. R. Chavdarian*
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 2





PANELBOARD ELEVATION AT POLE

NOT TO SCALE

NOTE:

1. SUPPORTS SHALL BE 2" x 2" ANGLE IRON BRACKETS EXTENDING THE HORIZONTAL LENGTH OF ENCLOSURE, LOCATED AS SHOWN. SEE PLAN DETAIL E-32 (1 OF 2). THE ANGLE IRON BRACKETS SHALL BE DRILLED AND THE ENCLOSURES SHALL BE BOLTED TO THEM. THE ANGLE IRON BRACKETS SHALL BE WELDED TO THE POLES PRIOR TO GALVANIZING. IT IS THE RESPONSIBILITY OF THE CONTRACTOR THAT THE ANGLE IRON SUPPORTS ARE NOT BENT OR DAMAGED PRIOR TO ERECTION OF POLES AT THE SITE.
2. SEE E-31 FOR LIGHT POLE WITH POWERLINK PANEL.
3. VERIFY MOUNTING DIMENSIONS WITH BOX MANUFACTURER.
4. SEE LIGHT POLE MANUFACTURER FOR BASE PLATE INFO.



Port of
LONG BEACH
The Green Port

120' LIGHT POLE ELEVATION W/O POWERLINK PANEL - WIRING

STANDARD PLAN

E-32

APPROVED BY:

P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

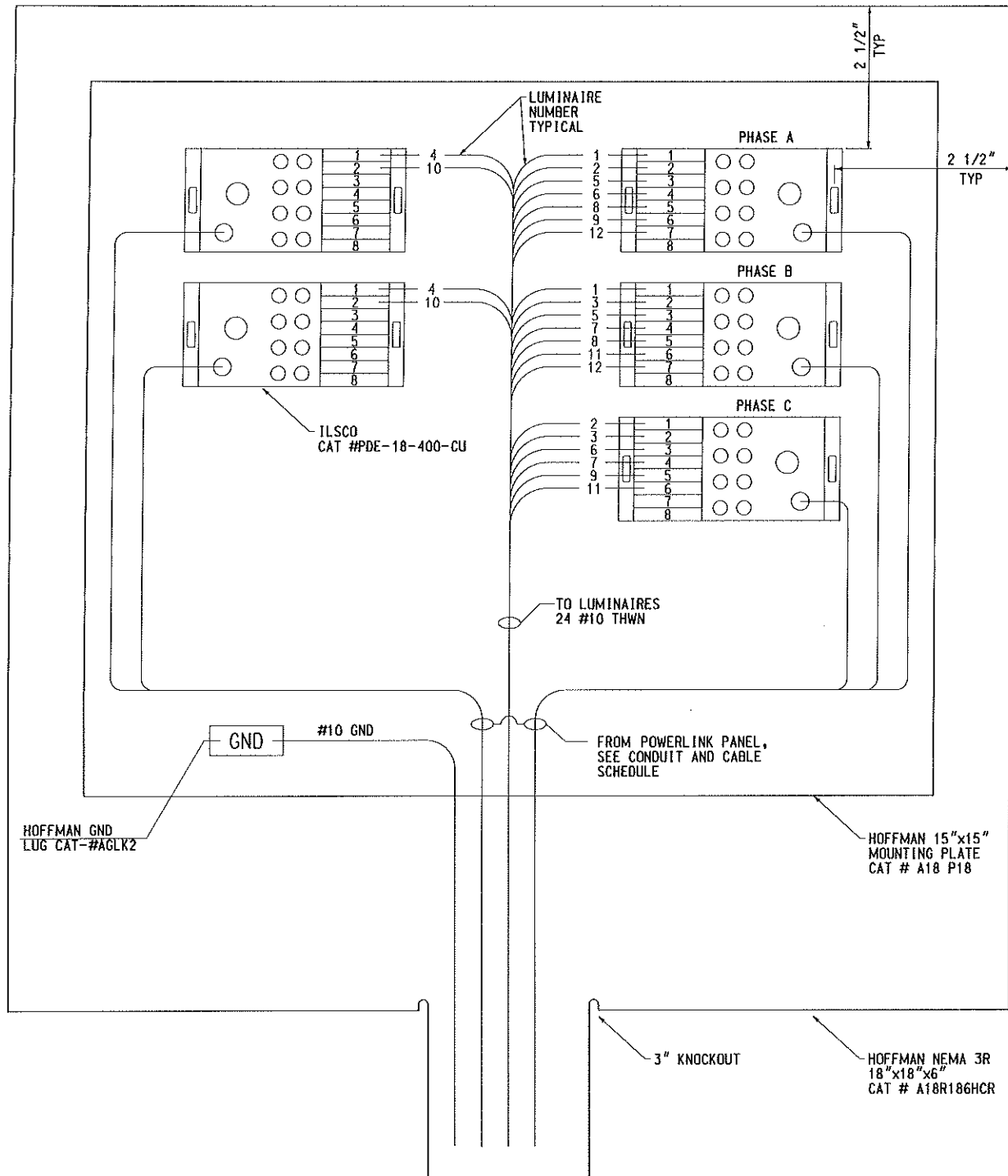
P.E. NO.:

E-8410

DATE:

01-31-16

2 OF 2



NOTE:

1. PROVIDE ENGRAVED PHENOLIC NAMEPLATE ON FRONT OF EACH TERMINAL WIRING/BOX WITH 3" HIGH (MIN.) LETTERING STATING POLE NUMBER AS IDENTIFIED ON PLANS SUCH AS "P01".
2. PROVIDE ENGRAVED PHENOLIC NAMEPLATE ON FRONT OF EACH TERMINAL WIRING/BOX WITH 1" HIGH (MIN.) LETTERING STATING POWER CIRCUITS TO EACH POLE, AS IDENTIFIED ON PLANS SUCH AS "LPSA1-1 REGULAR LPSA1-1 SECURITY".
3. ALL CONDUCTORS SHALL BE MARKED WITH LUMINAIRE NO., AND CIRCUIT NO. USING BRADY HEATSHRINK CABLE SLEAVES, MARKED WITH CABLE I.D. PRINTER.



Port of
LONG BEACH
The Green Port

LUMINAIRE TERMINAL BOX - WIRING

STANDARD PLAN

E-33

APPROVED BY: *[Signature]*
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 2

		LOADS			WATTS			CKT		CKT	WATTS			LOADS
POWERLINK CONTROLLER BUS	POWERLINK G3 1000 CONTROLLER	6			1	X	2	6			6			G3 POWER SUPPLY NF277PSG3
			6		3	X	4		6					
				6	5	X	6			6				
	POLE #1 LUMINAIRES	3600			7	X	8	3600						POLE #2 LUMINAIRES
			3600		9	X	10		3600					
				3600	11	X	12				3600			
	POLE #3 LUMINAIRES	3600			13	X	14	3600						POLE #4 LUMINAIRES
			3600		15	X	16		3600					
				3600	17	X	18				3600			
	POLE #1 SECURITY	1080			19	X	20	1080						POLE #4 SECURITY
			1080		21	X	22		1080					
	POLE #2 SECURITY			1080	23	X	24				180			SPARE POWERLINK BREAKER
		1080			25	X	26							
	POLE #3 SECURITY		1080		27	X	28							SPARE POWERLINK BREAKER
				1080	29	X	30							

POWERLINK G3 CONTROLLER, IN NF 100A PANEL BOARD, 3 POLE MAIN BRREAKER. NEMA 3R ENCLOSURE, 480V 3 PHASE, 3 WIRE.

5-20A, 3 POLE POWERLINK CIRCUIT BREAKERS CAT # ECB34020G3

4-20A, 2 POLE POWERLINK CIRCUIT BREAKERS, CAT # ECB24020G3



Port of
LONG BEACH
The Green Port

POWERLINK G3 CONTROLLER

STANDARD PLAN

E-33

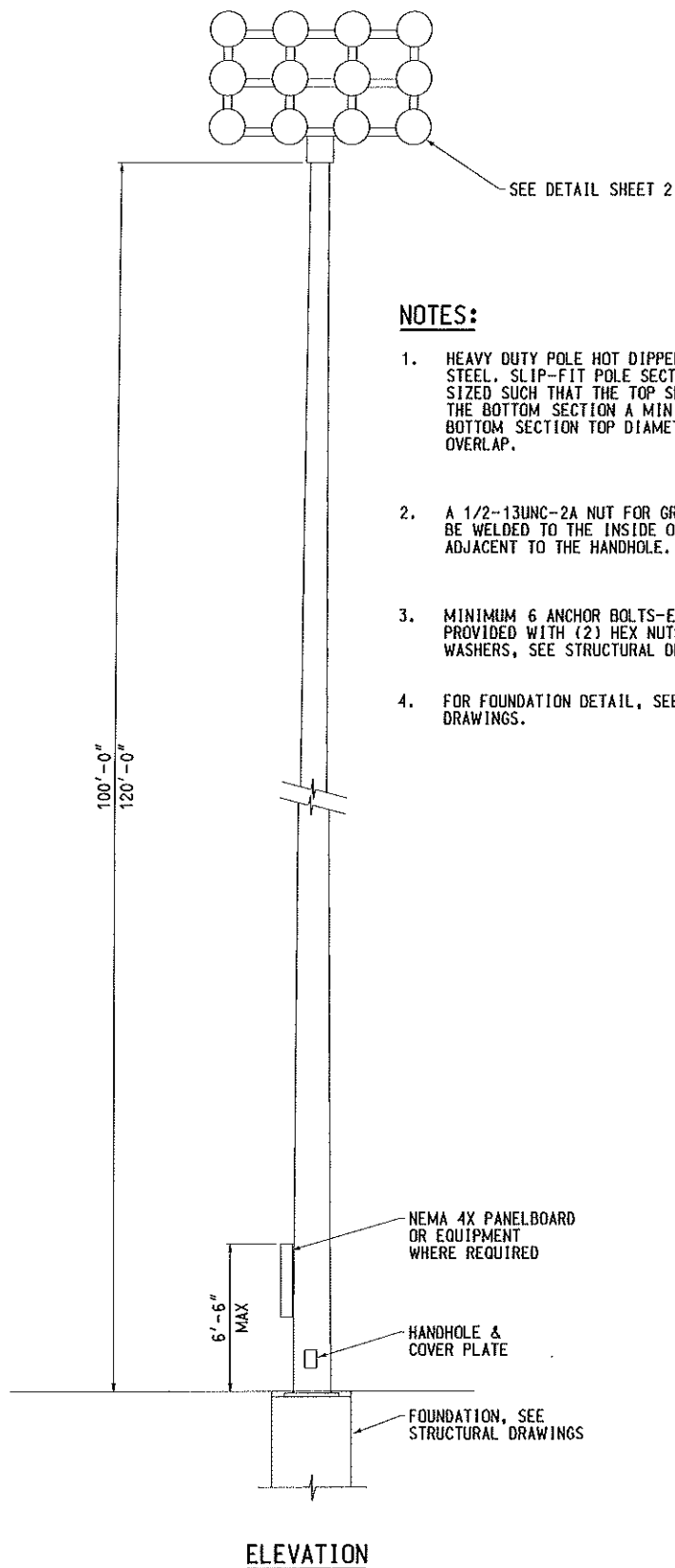
APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

2 OF 2



Port of
LONG BEACH
The Green Port

AREA FLOODLIGHT POLE

STANDARD PLAN

E-34

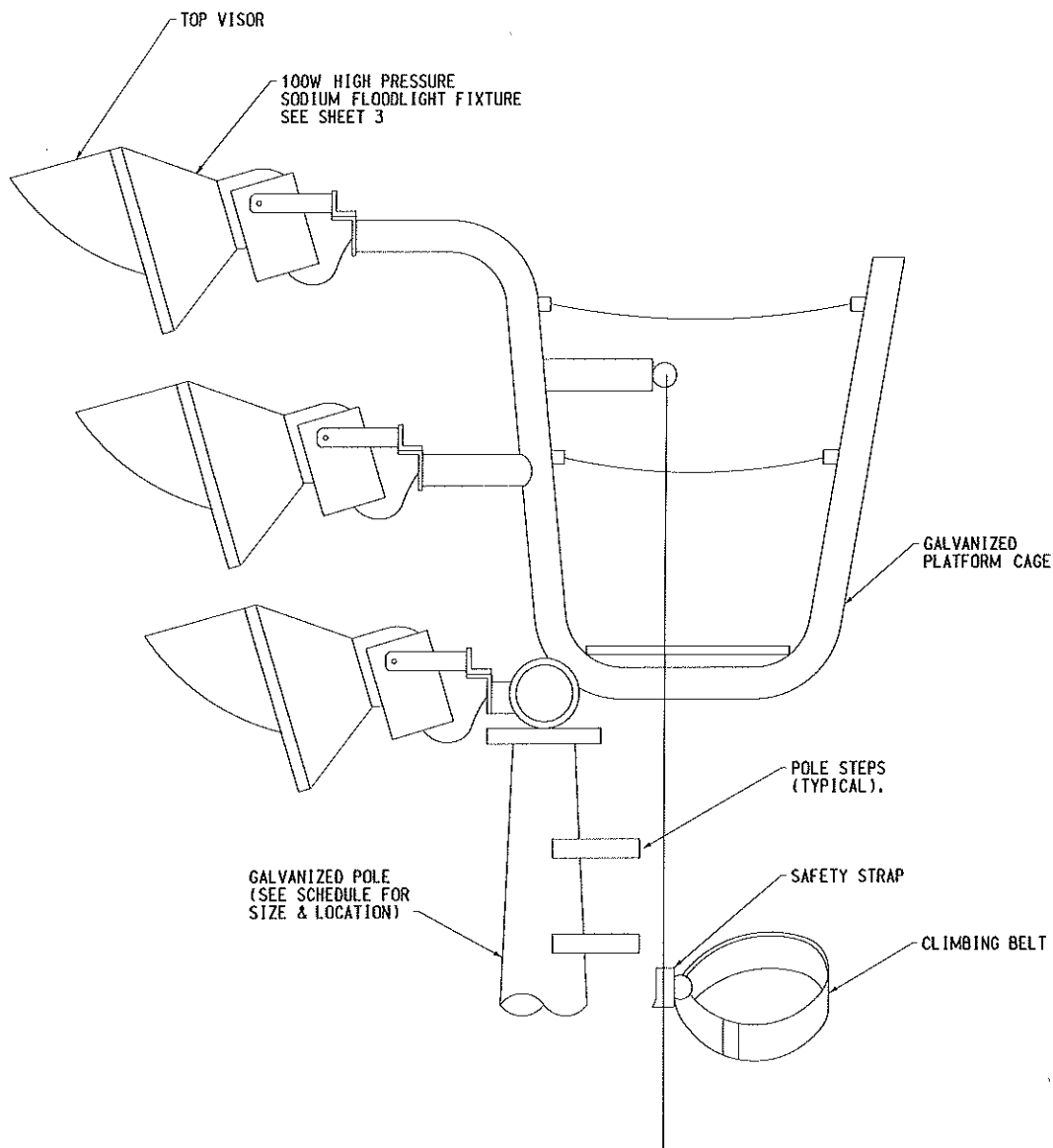
APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 3



TOP DETAIL



Port of
LONG BEACH
The Green Port

AREA FLOODLIGHT POLE

STANDARD PLAN

E-34

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

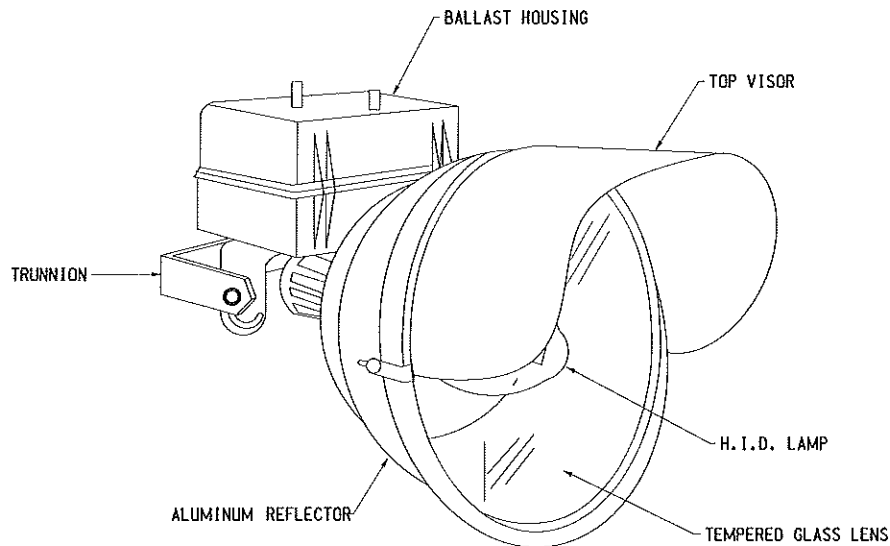
P.E. NO.: E-8410

DATE: 01-31-16

2 OF 3

LUMINAIRE REQUIREMENTS:

1. CAST ALUMINUM COPPER-FREE BALLAST HOUSING.
2. ALUMINUM OUTER SHROUD.
3. SPUN ANODIZED ALUMINUM REFLECTOR.
4. TEMPERED, HEAT RESISTANT CLEAR GLASS LENS.
5. HINGED STAINLESS STEEL DOOR WITH GASKET AND LATCHES.
6. 1,000 WATT HIGH PRESSURE SODIUM.
7. INTEGRAL BALLAST, TYPE AND VOLTAGE AS SPECIFIED.
8. LAMP STABILIZER.
9. MINIMUM 36" 3/C #14 "SO" CORD.
10. ALL HARDWARE, STAINLESS STEEL OR NONCORROSIVE.
11. GALVANIZED STEEL TRUNNION.
12. PORCELAIN SOCKET.
13. AIMING DEVICE.
14. UL "WET LOCATION LABEL".



FIXTURE DETAIL



Port of
LONG BEACH
The Green Port

AREA FLOODLIGHT POLE

STANDARD PLAN

E-34

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

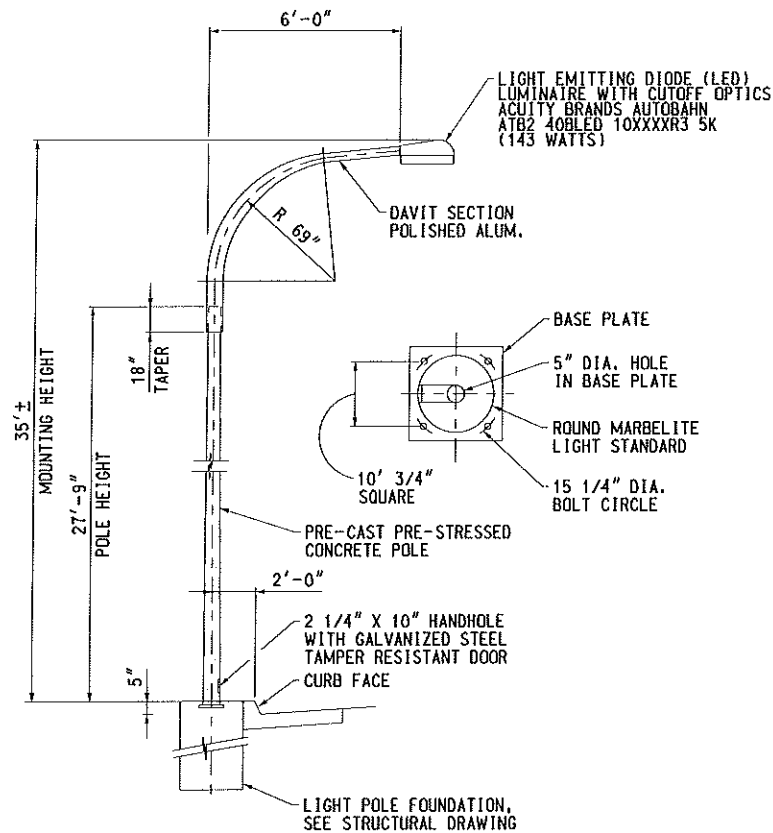
P.E. NO.:

E-8410

DATE:

01-31-16

3 OF 3



NOTES:

1. POLE SHAFT SHALL BE CONSTRUCTED TO WITHSTAND LOADING AS SPECIFIED IN THE LATEST EDITION OF A.A.S.H.T.O. STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNS. LOADING RESULTING FROM LUMINAIRE ARM, AND LUMINAIRE SHALL BE TAKEN INTO ACCOUNT.
2. VERIFY ALL BOLT CIRCLE & SPACING DIMENSIONS WITH MANUFACTURER.



Port of
LONG BEACH
The Green Port

STREET LIGHT POLE DETAIL

STANDARD PLAN

E-36

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

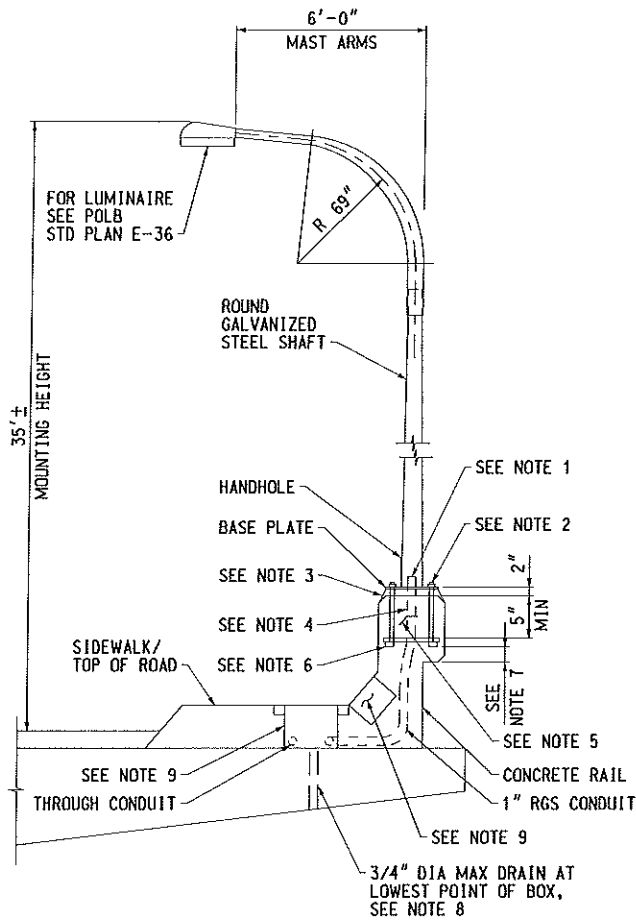
P.E. NO.: E-8410

DATE: 01-31-16

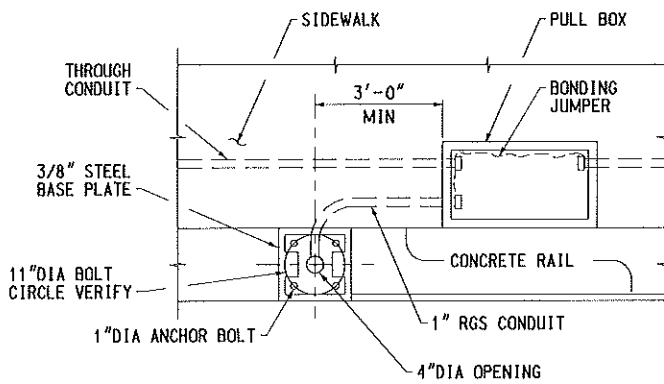
1 OF 1

NOTES:

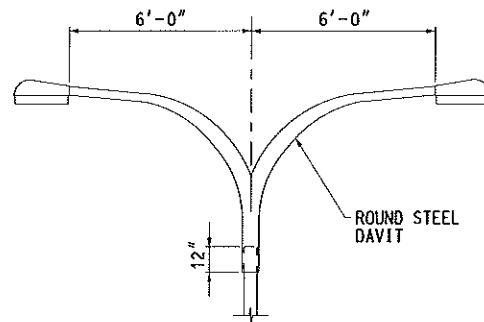
1. TOP OF CONDUIT SHALL BE 2" BELOW BOTTOM OF HANDHOLE DOOR.
2. ANCHOR BOLT LENGTH SHALL BE SUCH THAT THREAD EXTENDS 1/2" MAXIMUM ABOVE NUT ON LEVEL BASE PLATE AFTER GROUTING.
3. AFTER PLUMBING LIGHT STANDARD, GROUT ALL AROUND BOLTS. FINISH WITH A 45 DEGREE SLOPE.
4. 1" STEEL CONDUIT WITH BUSHING.
5. BONDING STRAP.
6. LIGHTPOLE ANCHOR BOLTS SHALL BE HELD IN POSITION FOR PLACING CONCRETE BY MEANS OF ANCHOR PLATES AND SUITABLE TEMPLATES. DEVIATION FROM THE TRUE POSITION, VERTICAL AND HEIGHT, SHALL NOT EXCEED 1/16".
7. MINIMUM 1" SPACE BETWEEN BOLT HEAD AND BOTTOM SURFACE OF CONCRETE RAILING.
8. PLACE DRAIN IN CENTER IF BOX IS HORIZONTAL, OR AT LOW END IF BOX IS INCLINED. WHEN BOX IS MOUNTED IN SLOPING PARAPET DRILL 1/2" ELONGATED DRAIN HOLE INSIDE AT CENTER OR NEAR END AS REQUIRED FOR DRAINAGE.
9. PROVIDE STEEL PULL BOX (9"W X 20"L X 8.5"D) AND COVER.
 - A) AXIS OF PULL BOX SHALL BE PARALLEL TO TOP OF SIDEWALK.
 - B) TOP OF PULL BOX SHALL BE FLUSH WITH THE TOP OF SIDEWALK. MODIFY BASE OF PULL BOX AS REQUIRED.
 - C) BOXES INSIDE OF VERTICAL BARRIER OR RAILING SHALL BE CLOSED DURING POURING OF P.C.C. WITH 1/4" PLYWOOD OF SUFFICIENT SIZE TO PROVIDE 1:1 CHAMFER ON 3 SIDES OF COVER. UPPER EDGE OF PLYWOOD SHALL FIT AGAINST LOWER EDGE OF RAINTIGHT HOOD.



ELEVATION



PLAN



TWIN MAST ARM ELEVATION



Port of
LONG BEACH
The Green Port

BRIDGE LIGHT POLE DETAIL

STANDARD PLAN

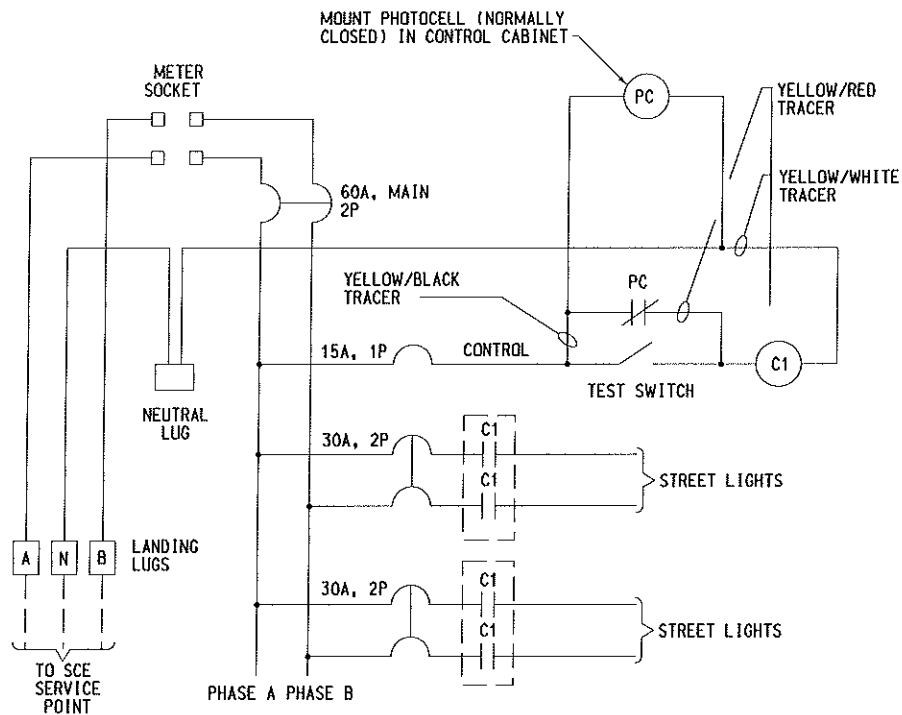
E-37

APPROVED BY: *P. R. Chavdarian*
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

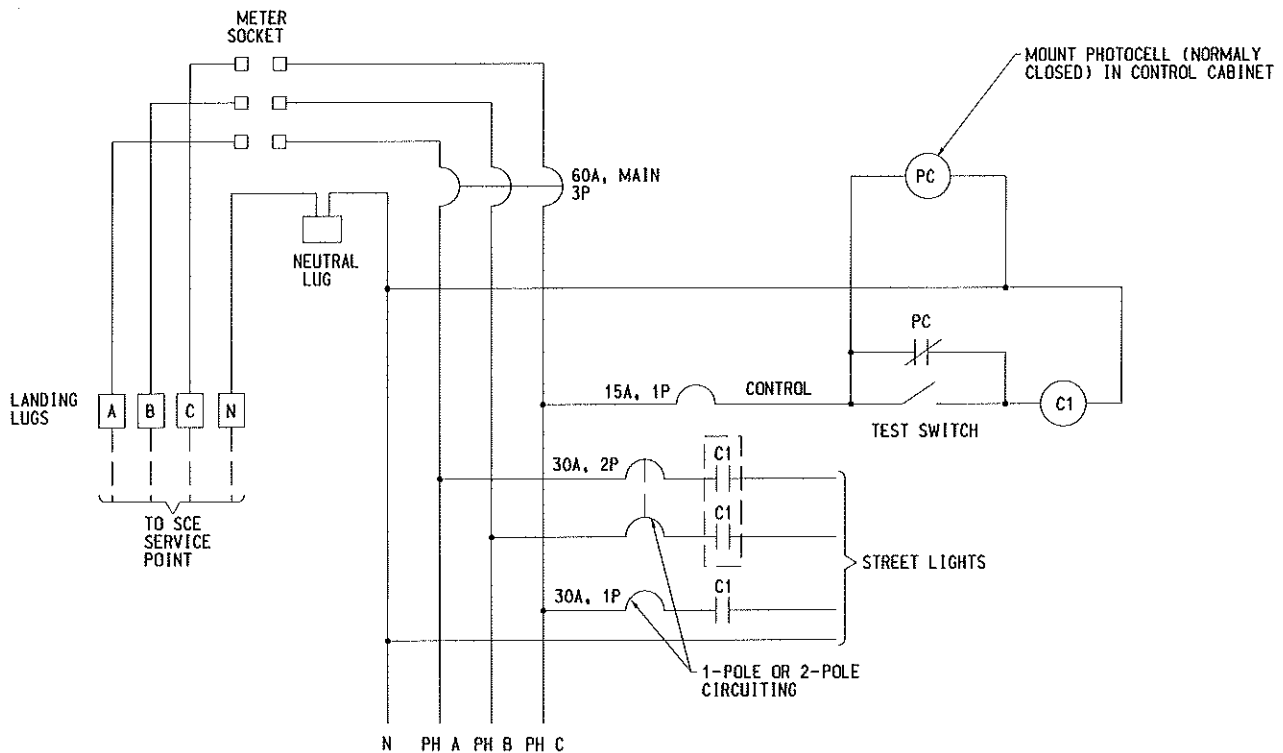
P.E. NO.: E-8410

DATE: 01-31-16

1 OF 1



WIRING DIAGRAM (SINGLE PHASE)



WIRING DIAGRAM (THREE PHASE)



Port of
LONG BEACH
The Green Port

STREET LIGHTING SERVICE CONTROL CABINET WIRING DIAGRAM

STANDARD PLAN

E-38

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

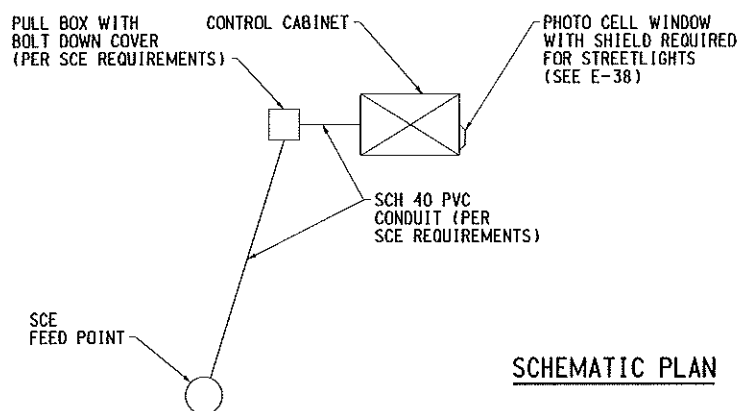
P.E. NO.:

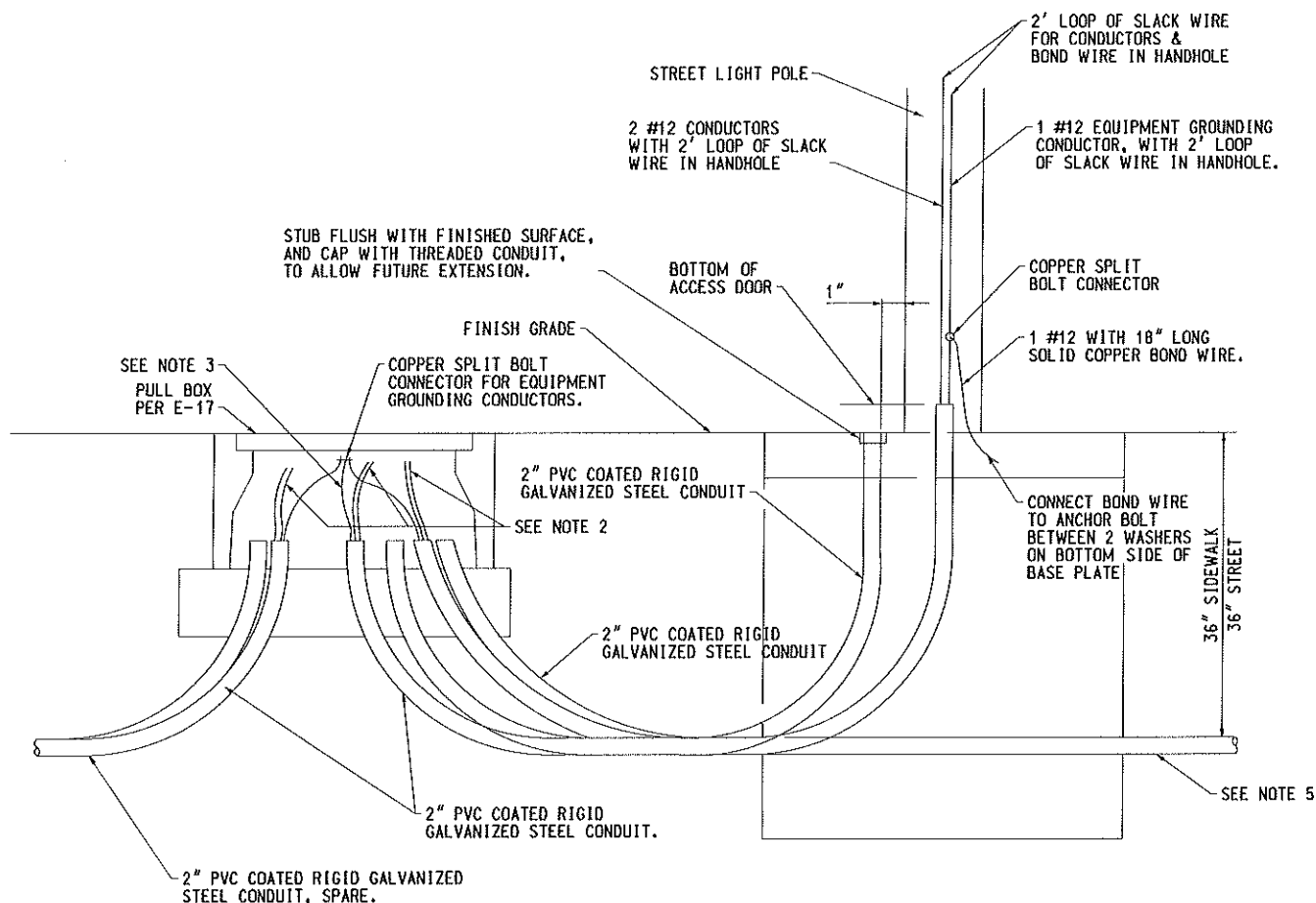
E-8410

DATE:

01-31-16

1 OF 1





NOTES:

1. PULL BOX SHALL BE INSTALLED ADJACENT TO ALL STREET LIGHTS SIZE AS REQUIRED BY NEC, AND STANDARD PLAN E-17.
2. CONNECT CONDUCTORS TO FUSE HOLDER IN PULL BOX. (SEE POLB STD PLAN E-41)
3. EQUIPMENT GROUNDING CONDUCTOR SHALL BE SAME SIZE AS BRANCH CIRCUIT CONDUCTOR BETWEEN STREET LIGHT PULL BOXES.



Port of
LONG BEACH
The Green Port

PULL BOX AND STREET LIGHT CONDUIT AND CONDUCTOR DETAILS

STANDARD PLAN

E-40

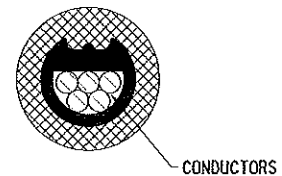
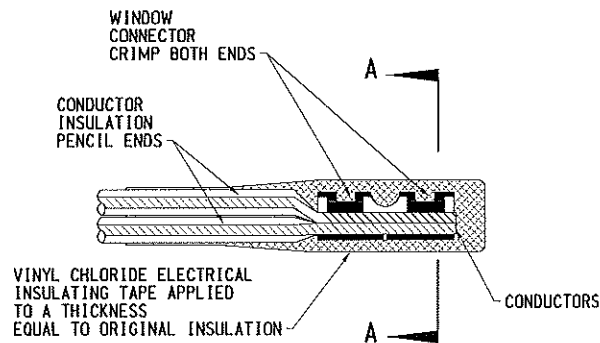
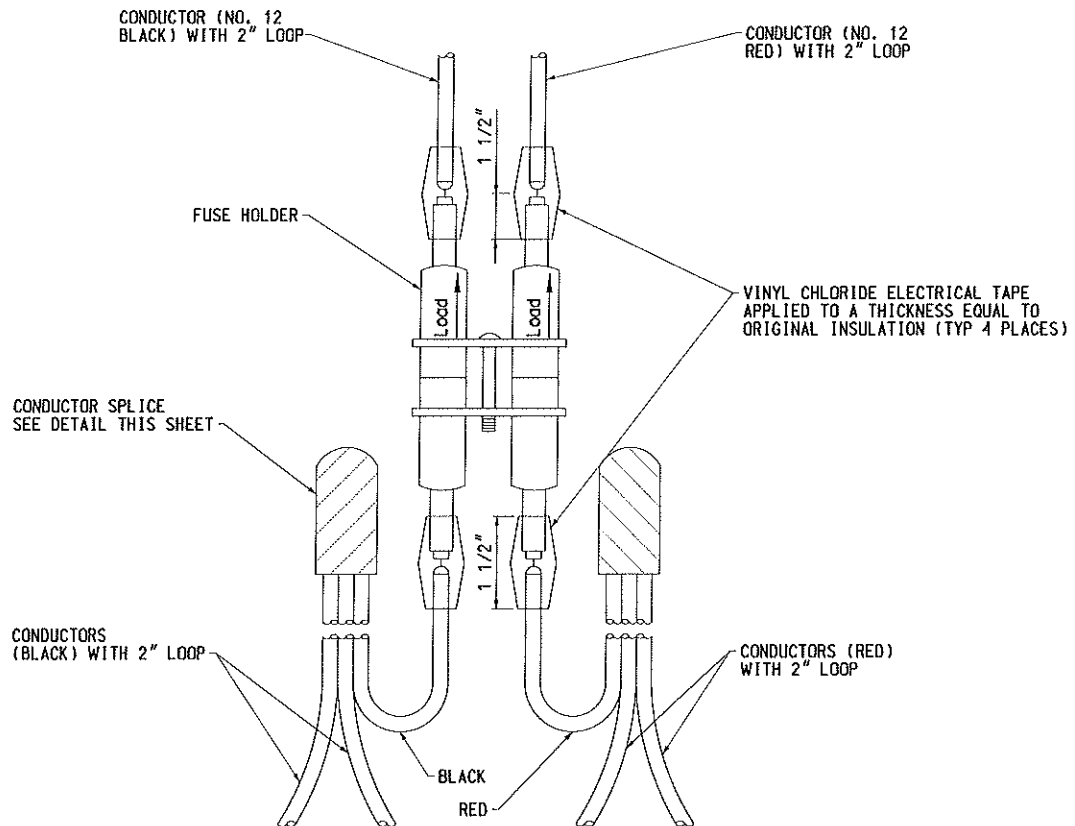
APPROVED BY:

[Signature]
B. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 1



SECTION A-A

CONDUCTOR SPLICE DETAIL
NOT TO SCALE



Port of
LONG BEACH
The Green Port

FUSE HOLDER DETAIL

STANDARD PLAN

E-41

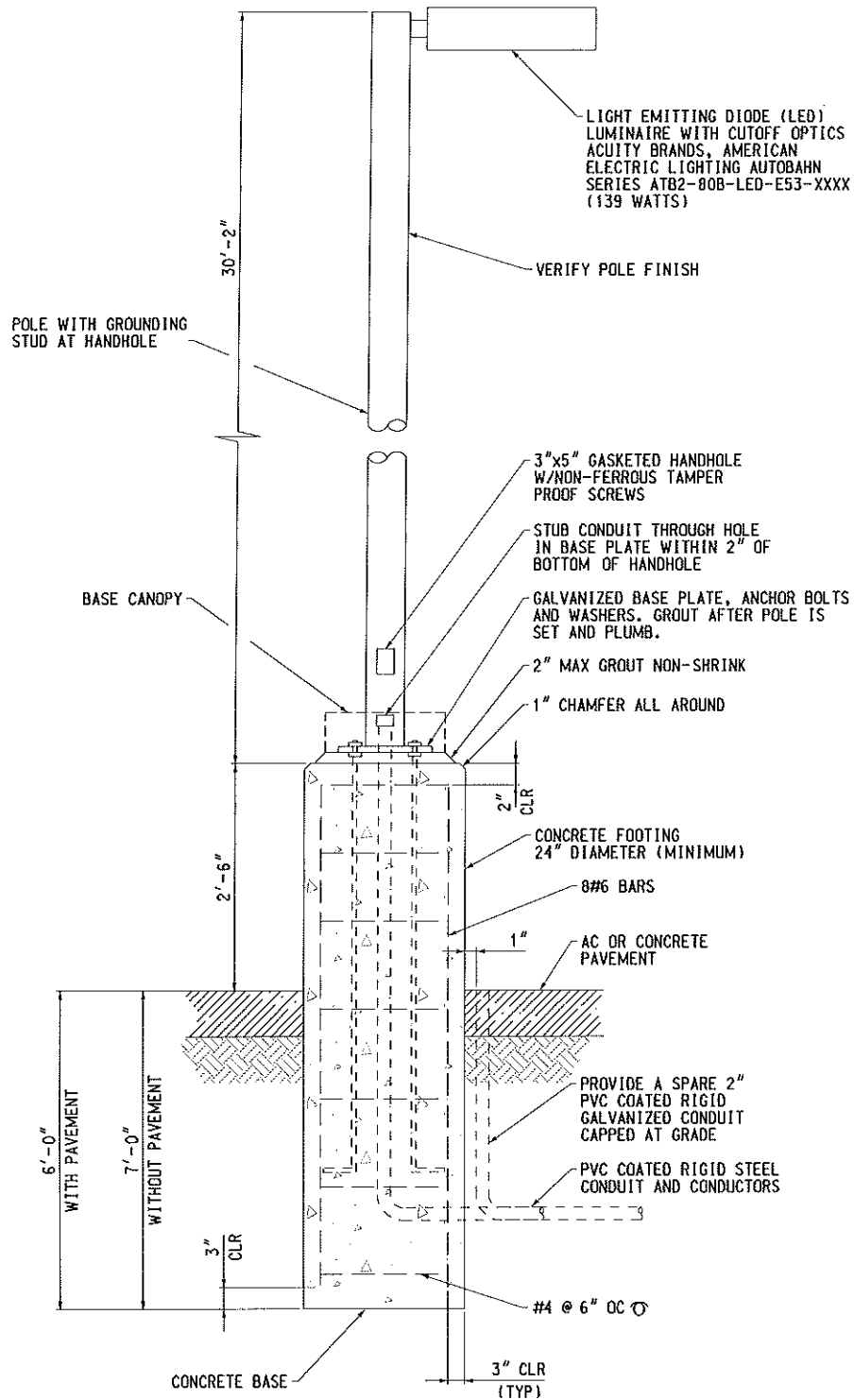
APPROVED BY:

P. R. Chaudhary
P. R. CHAUDHARY SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 1



NOTES:

1. CONCRETE f'_c = 4000 PSI (MINIMUM), W/C = 0.40 MAX
2. REINFORCING STEEL = ASTM615, GRADE 60 OR ASTM A706, GRADE 60
3. COHESIONLESS SOIL, FIXED HEAD CONDITION, UNIFORM SOIL PROFILE
4. WATER TABLE DEPTH 7'-0" BELOW FG, WATER DENSITY = 62.4 PCF
5. 1'-0" DEPTH FROM FG IGNORED FOR PASSIVE PRESSURE.
6. SOIL DENSITY = 110 PCF MIN., SOIL FRICTION ANGLE = 30° MIN.
7. WIND SPEED = 100 MPH (3-SECOND GUST)



Port of
LONG BEACH
The Green Port

PARKING LOT LIGHT POLE DETAIL

STANDARD PLAN

E-42

APPROVED BY:

P. R. Chaudharian
P. R. CHAUDHARIAN SR. ELECTRICAL ENGINEER

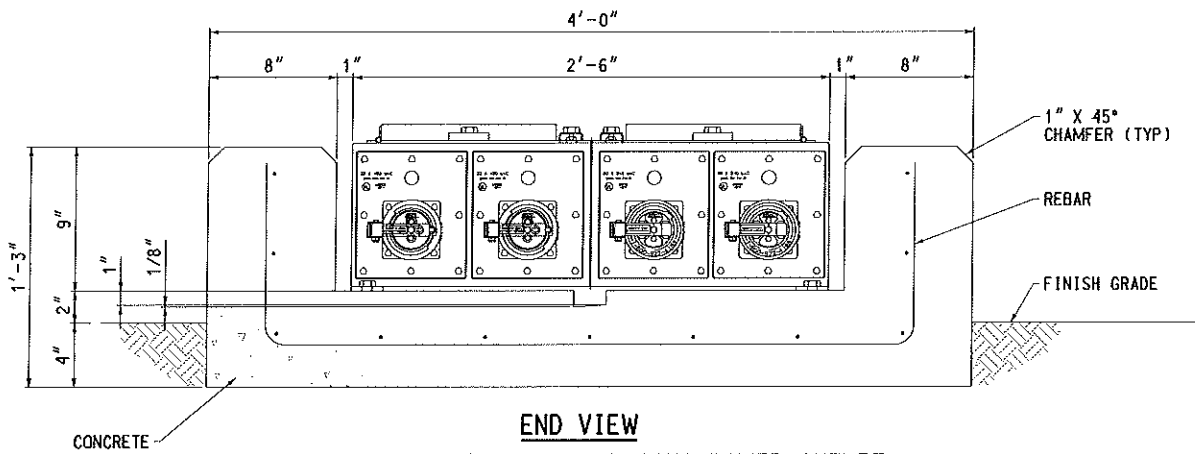
P.E. NO.:

E-8410

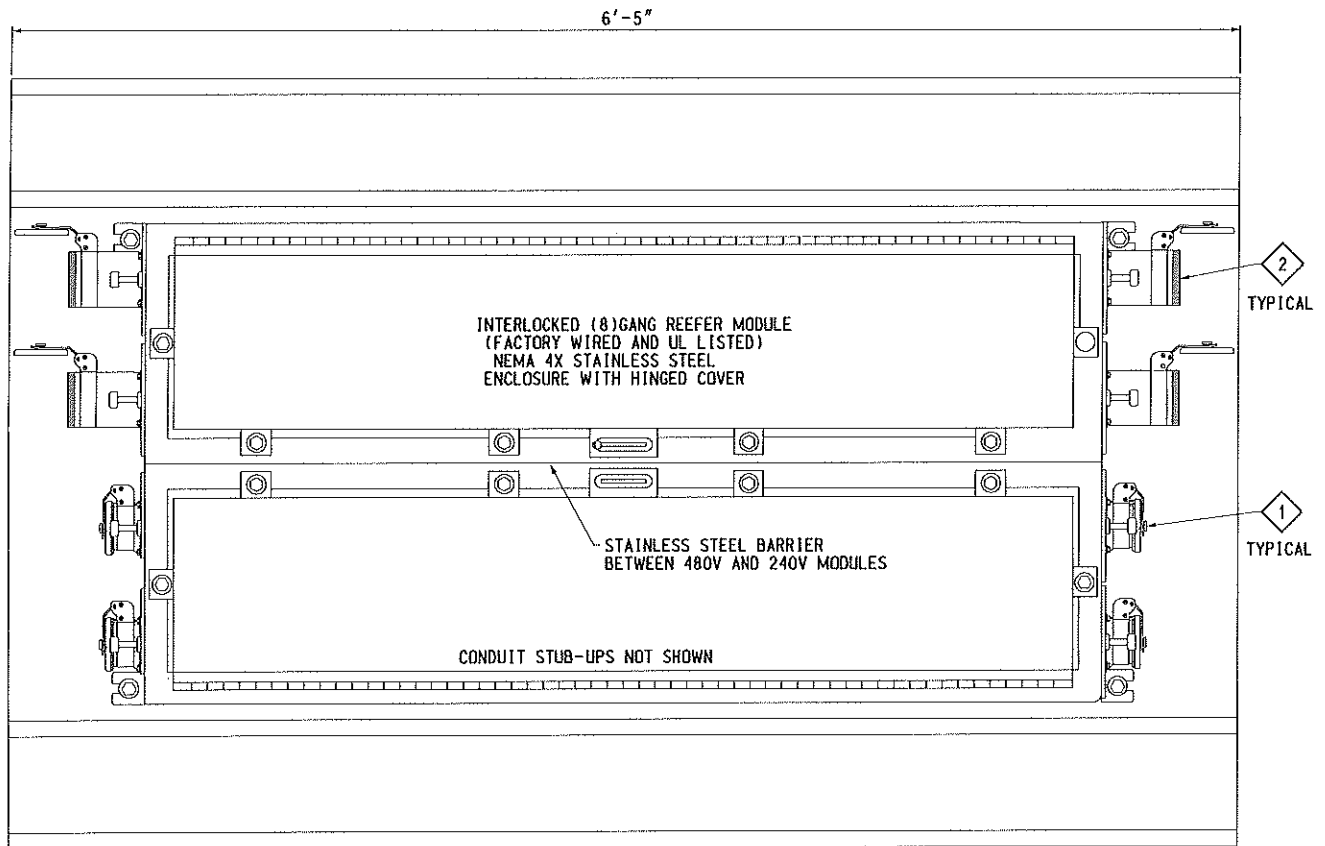
DATE:

01-31-16

1 OF 1



BUNKER FOR 480V/240V 8-GANG POWER OUTLET



PLAN VIEW

BUNKER FOR 480V/240V 8-GANG POWER OUTLET

NOTE:

- 1 INTERLOCKED 480V REEFER MODULE WITH CIRCUIT BREAKER.
- 2 INTERLOCKED 240V REEFER MODULE WITH CIRCUIT BREAKER.
- 3 CONCRETE SHALL BE CLASS 560-C-3250 WITH A MAXIMUM SLUMP OF 5", FC'=3250 P.S.I. COMPRESSIVE STRENGTH AT 28 DAYS, UON ON THE CONTRACT PLANS, REINFORCING STEEL IF REQUIRED SHALL BE DEFORMED REBARS WITH Fy EXCEEDING 60,000 P.S.I., ASTM A615 AND ASTM A706, GRADE 60. PLACING OF REINFORCEMENT AND SPLICING LENGTH SHALL CONFORM TO ACI CODES 318-13.

FOR INFORMATION ONLY



Port of
LONG BEACH
The Green Port

**BUNKER FOR 480V/240V
8-GANG POWER OUTLET**

STANDARD PLAN

E-49

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

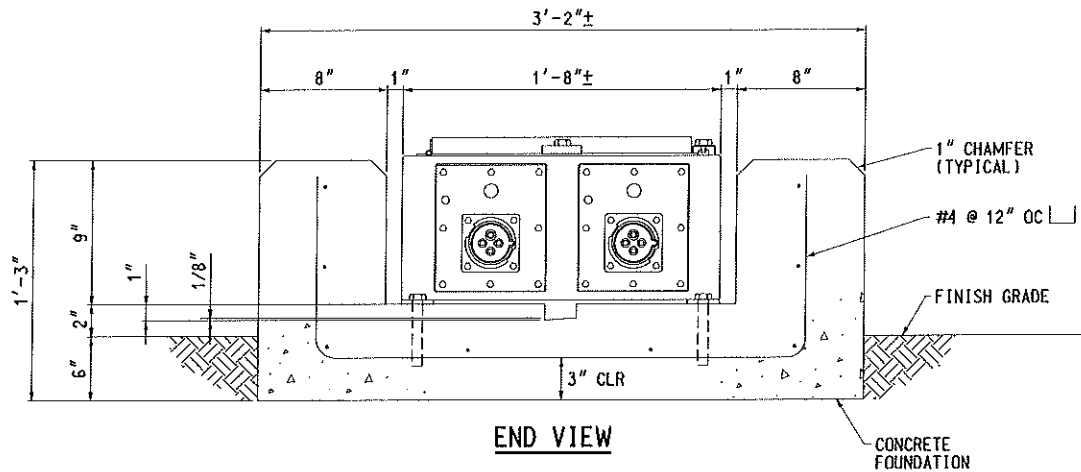
P.E. NO.:

E-8410

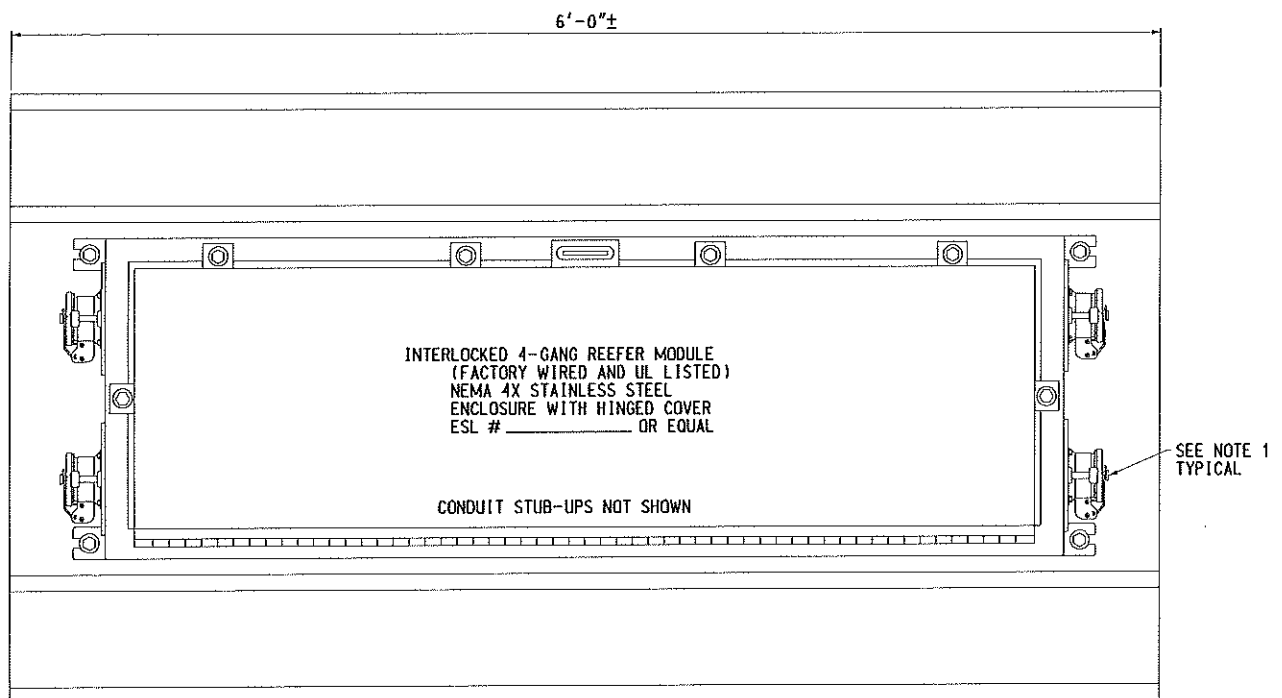
DATE:

01-31-16

1 OF 1



BUNKER FOR 480V 4-GANG POWER OUTLET



PLAN VIEW

BUNKER FOR 480V 4-GANG POWER OUTLET

NOTES:

1. INTERLOCKED 480V REEFER MODULE WITH CIRCUIT BREAKER.
2. RECEPTACLE COVER SHALL BE SNAP TYPE (SCREW TYPE NOT ACCEPTABLE).
3. CONCRETE SHALL BE CLASS 560-C-3250 WITH A MAXIMUM SLUMP OF 5", FC'=3250 P.S.I. COMPRESSIVE STRENGTH AT 28 DAYS, UNLESS OTHERWISE NOTED ON THE CONTRACT PLANS, REINFORCING STEEL IF REQUIRED SHALL BE DEFORMED REBARS WITH F_y EXCEEDING 60,000 P.S.I.. ASTM A615 AND ASTM A706, GRADE 60. PLACING OF REINFORCEMENT AND SPLICING LENGTH SHALL CONFORM TO ACI CODE, LATEST EDITION.



Port of
LONG BEACH
The Green Port

**BUNKER MOUNTED
4-GANG REEFER OUTLET ASSEMBLY**

STANDARD PLAN

E-50

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

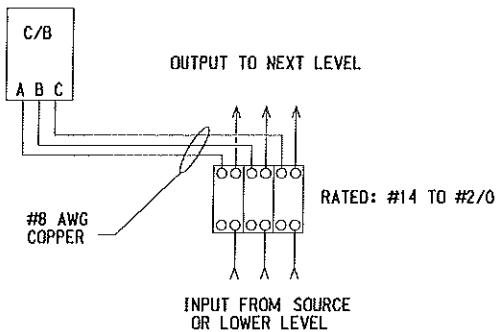
P.E. NO.:

E-8410

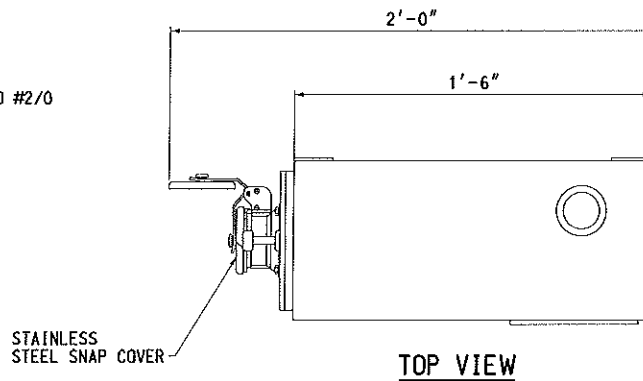
DATE:

01-31-16

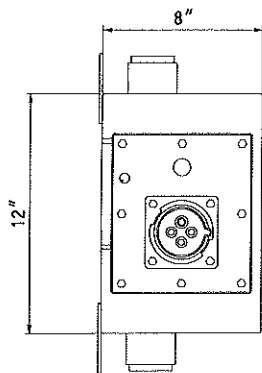
1 OF 1



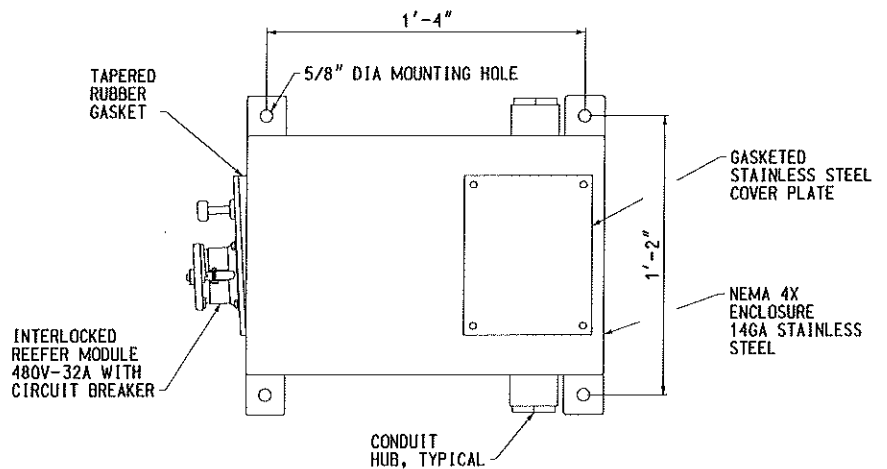
WIRING DIAGRAM
(FOR 1-GANG)



TOP VIEW



SIDE VIEW
(SNAP COVER NOT SHOWN)



FRONT VIEW

NOTES:

1. SHALL BE FACTORY WIRED AND UL LISTED
2. SPECIFY AIC REQUIREMENTS



Port of
LONG BEACH
The Green Port

**1-GANG RACK MOUNTED
REEFER OUTLET ASSEMBLY**

STANDARD PLAN

E-51

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

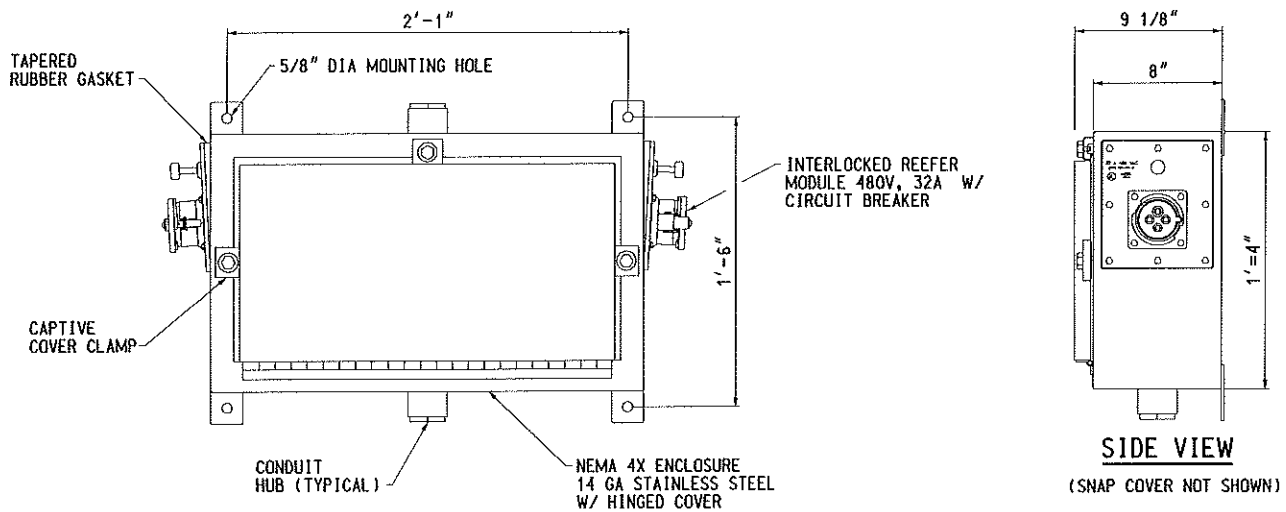
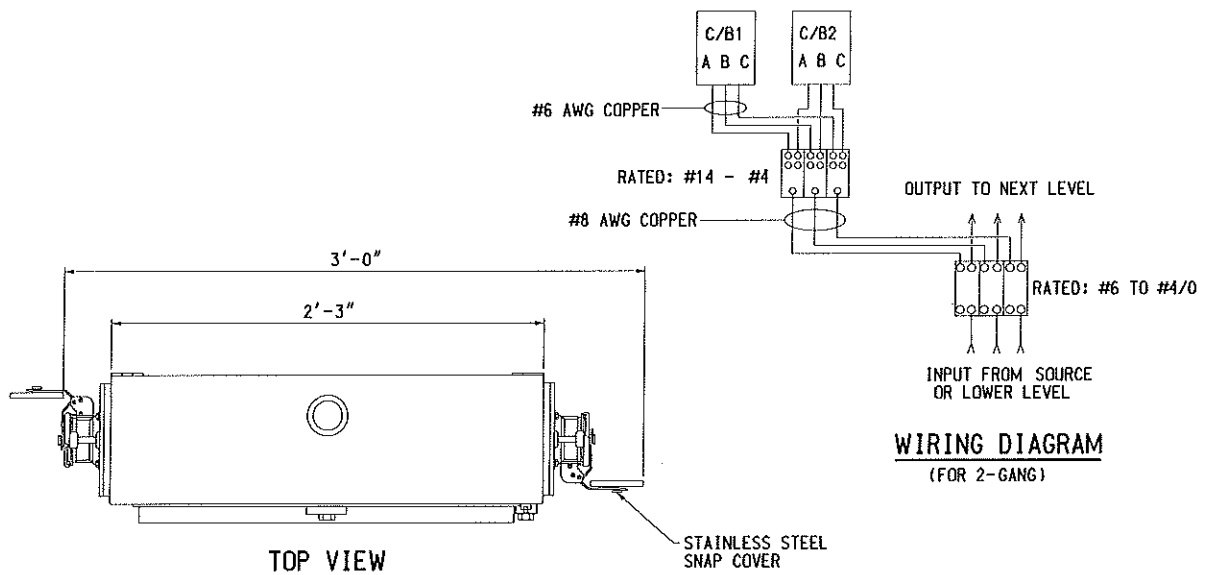
P.E. NO.:

E-8410

DATE:

01-31-16

1 OF 1



NOTES:

1. SHALL BE FACTORY WIRED AND UL LISTED
2. AIC RATING OF BREAKERS SHALL BE 65,000A UON



Port of
LONG BEACH
The Green Port

2-GANG RACK MOUNTED REEFER OUTLET ASSEMBLY

STANDARD PLAN

E-52

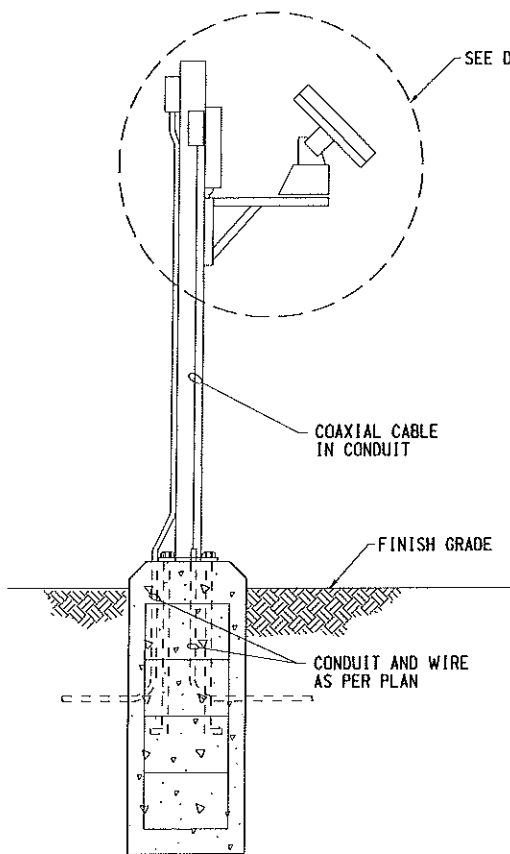
APPROVED BY:

P.R. Chavdarian
P.R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

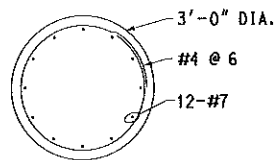
DATE: 01-31-16

1 OF 1

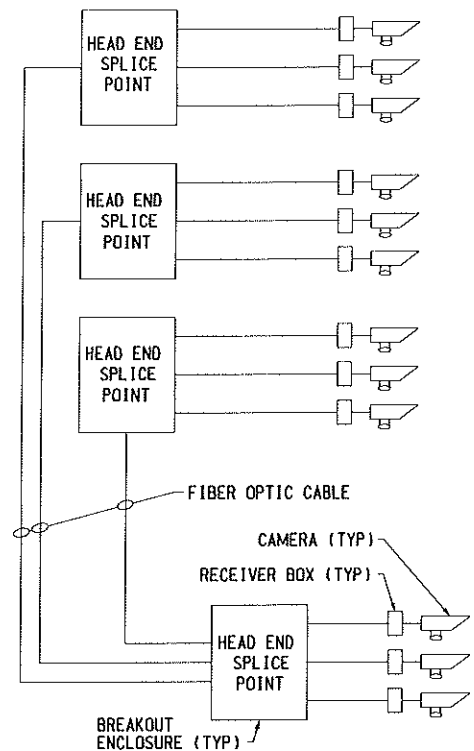


NOTES:

1. INSTALL BASE PLATE & ANCHOR BOLTS PER POLE SUPPLIER'S REQUIREMENTS.
2. FOOTING DIMENSIONS AND DESIGN TO BE VERIFIED, BASED ON PROPOSED POLE DIMENSIONS.

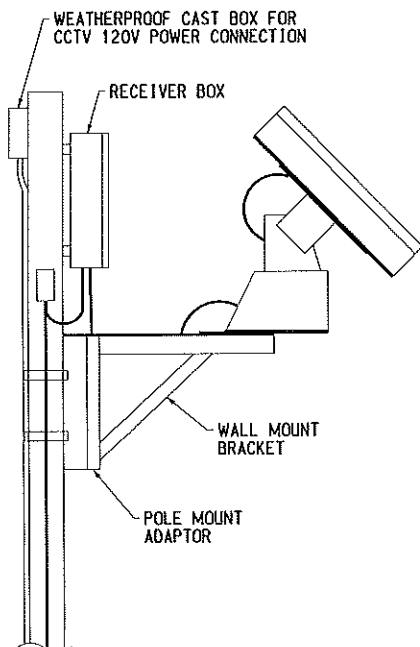


SECTION A-A

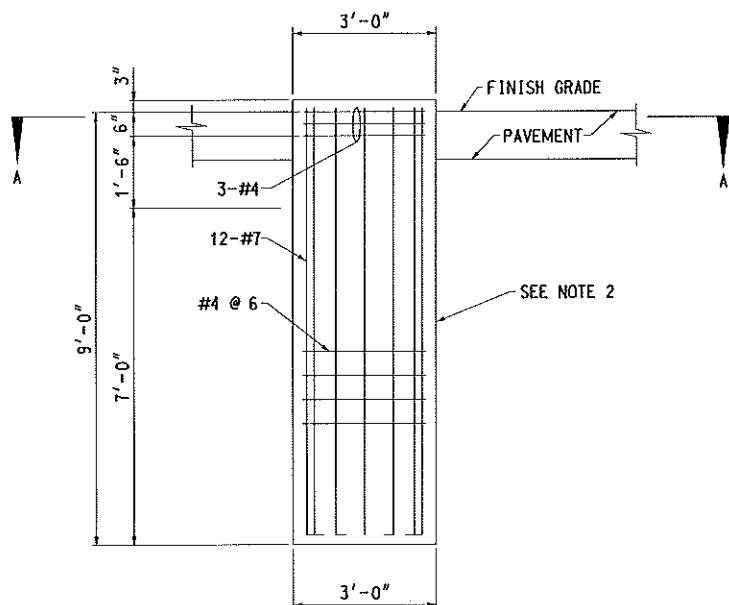


CCTV DIAGRAM

SECTION



CAMERA DETAIL



EMBEDDED FOUNDATION FOR CAMERA POLE
(VERIFY DIMENSIONS)



Port of
LONG BEACH
The Green Port

CAMERA POLE AND CAMERA MOUNTING DETAILS

STANDARD PLAN

E-60

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

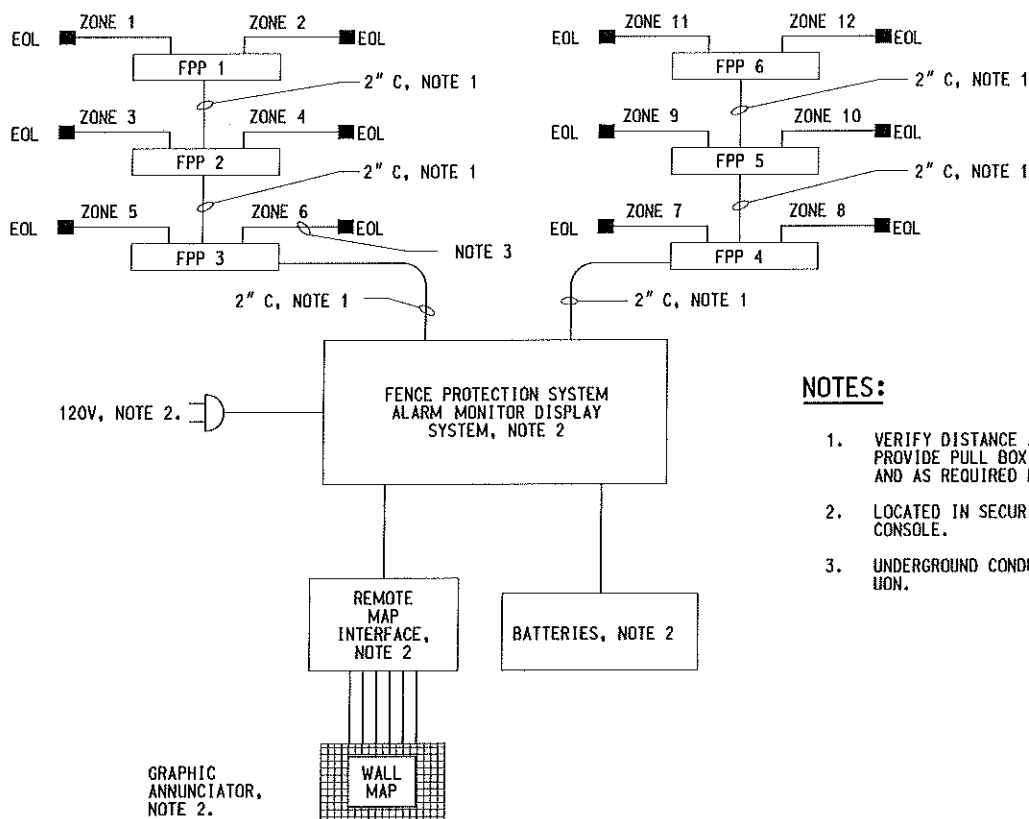
P.E. NO.:

E-8410

DATE:

0131-16

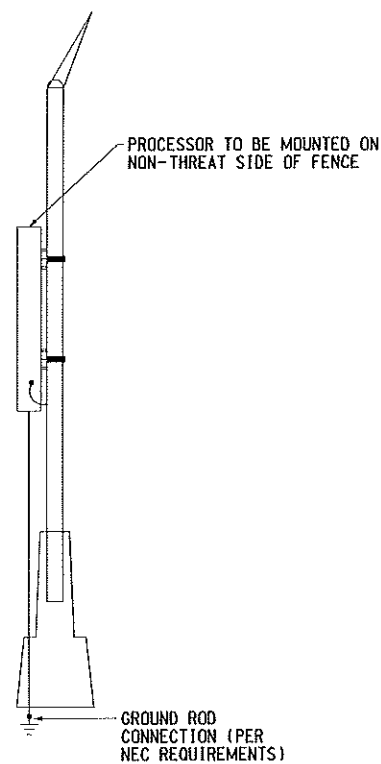
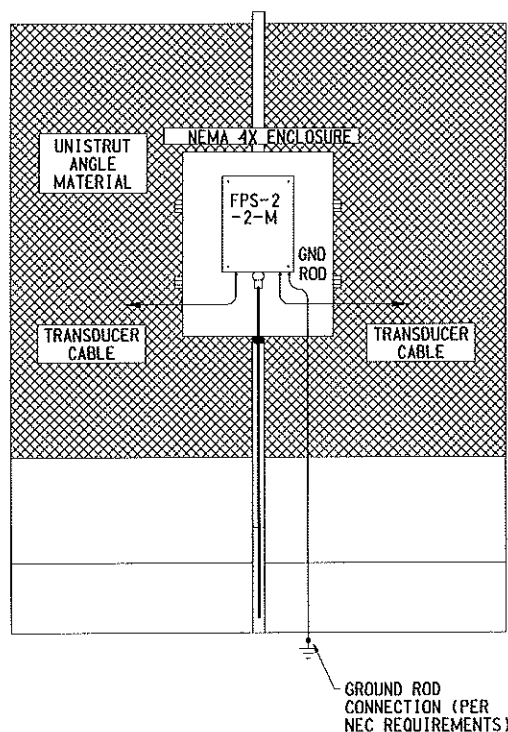
1 OF 1



NOTES:

1. VERIFY DISTANCE AND ROUTING IN THE FIELD. PROVIDE PULL BOX AS SHOWN ON CONTRACT PLANS AND AS REQUIRED PER NEC STANDARDS.
2. LOCATED IN SECURITY BUILDING SECURITY CONSOLE.
3. UNDERGROUND CONDUITS AT RAIL GATES ARE 1" I.D.

TYPICAL FENCE PROTECTION SYSTEM INTERCONNECTION DIAGRAM



FENCE PROTECTION PROCESSOR ELEVATION



Port of
LONG BEACH
The Green Port

FENCE PROTECTION SYSTEM DETAILS

STANDARD PLAN

E-61

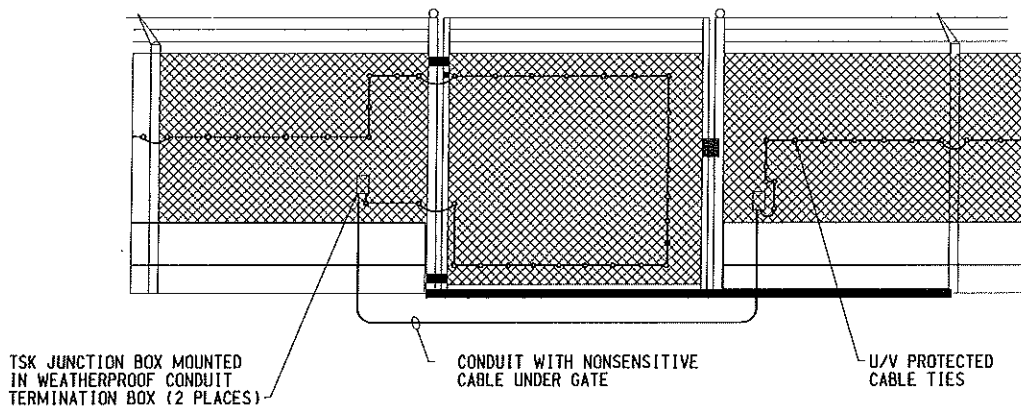
APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

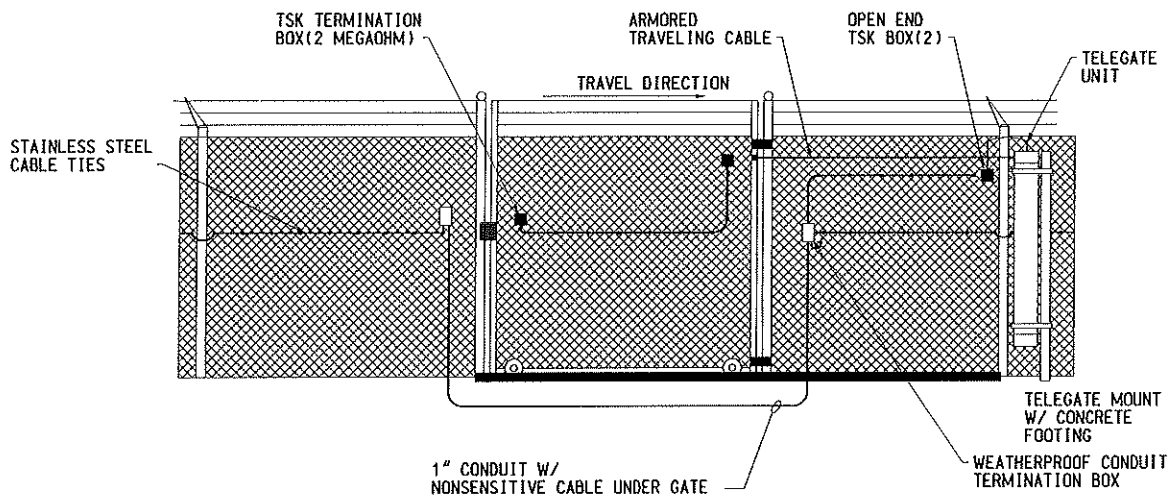
P.E. NO.: E-8410

DATE: 01-31-16

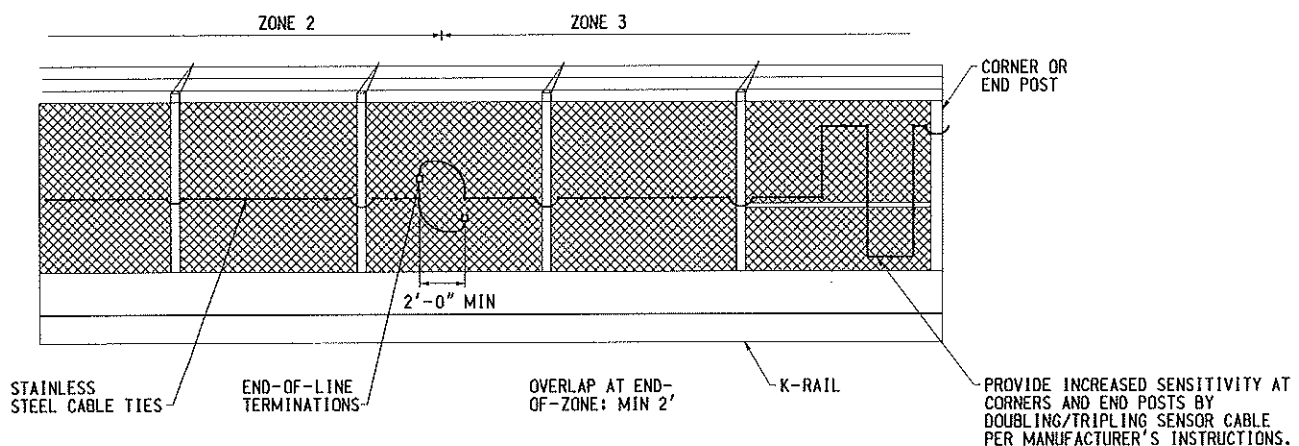
1 OF 2



SWINGING GATE HELISENSOR CABLE INSTALLATION



HELISENSOR CABLE AT GATE ELEVATION



HELISENSOR CABLE ELEVATION



Port of
LONG BEACH
The Green Port

FENCE PROTECTION SYSTEM DETAILS

STANDARD PLAN

E-61

APPROVED BY:

P.R. Chavdarian
P.R. CHAVDARIAN SR. ELECTRICAL ENGINEER

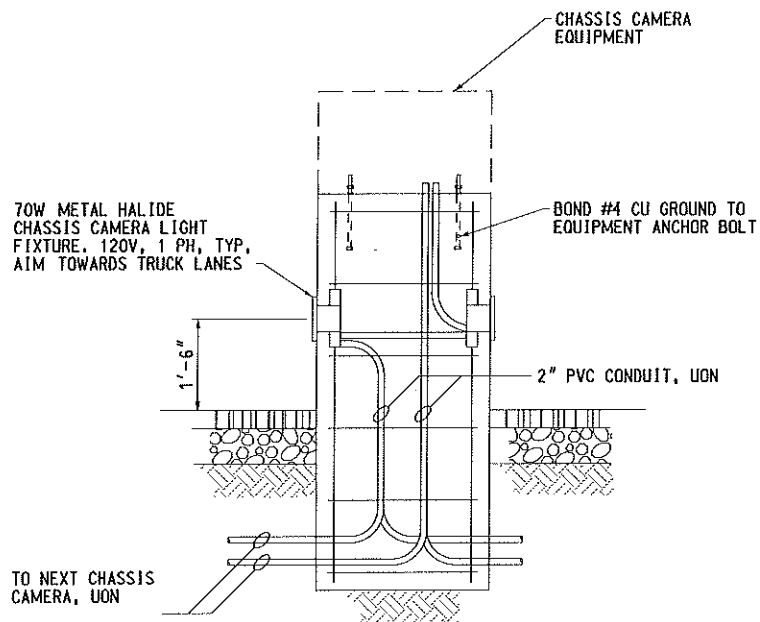
P.E. NO.:

E-8410

DATE:

01-31-16

2 OF 2



Port of
LONG BEACH
The Green Port

CHASSIS CAMERA DETAIL

STANDARD PLAN

E-63

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

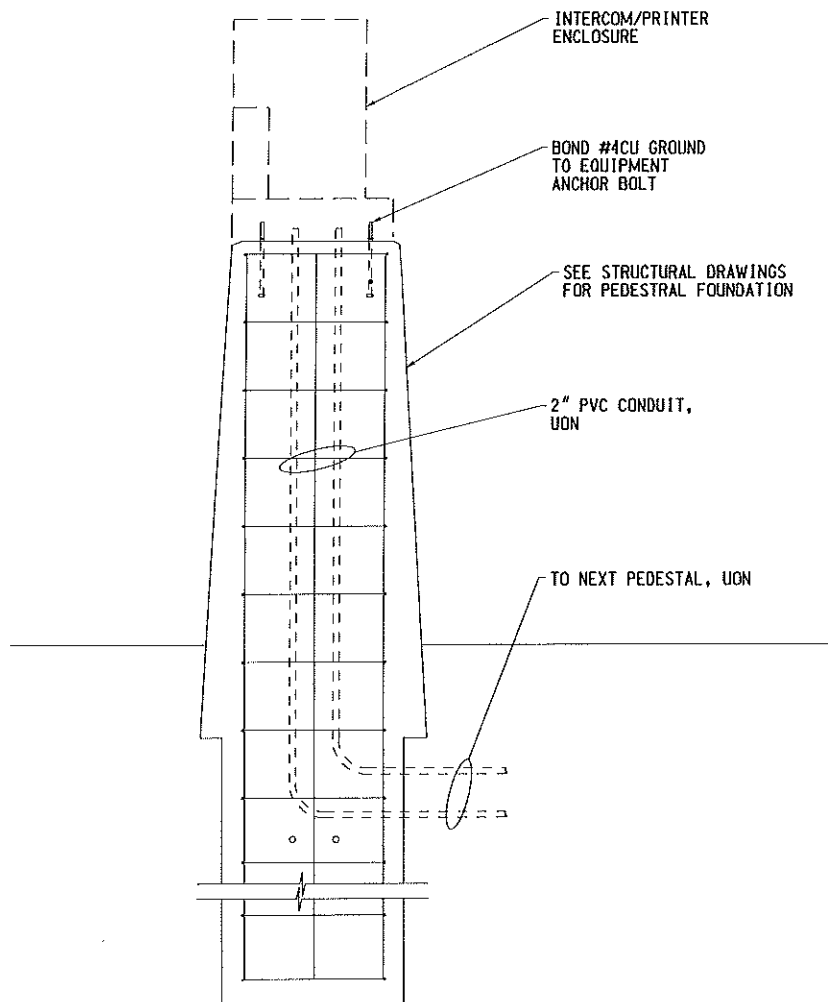
P.E. NO.:

E-8410

DATE:

01-31-16

1 OF 1



Port of
LONG BEACH
The Green Port

INTERCOM PEDESTAL DETAIL

STANDARD PLAN

E-64

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

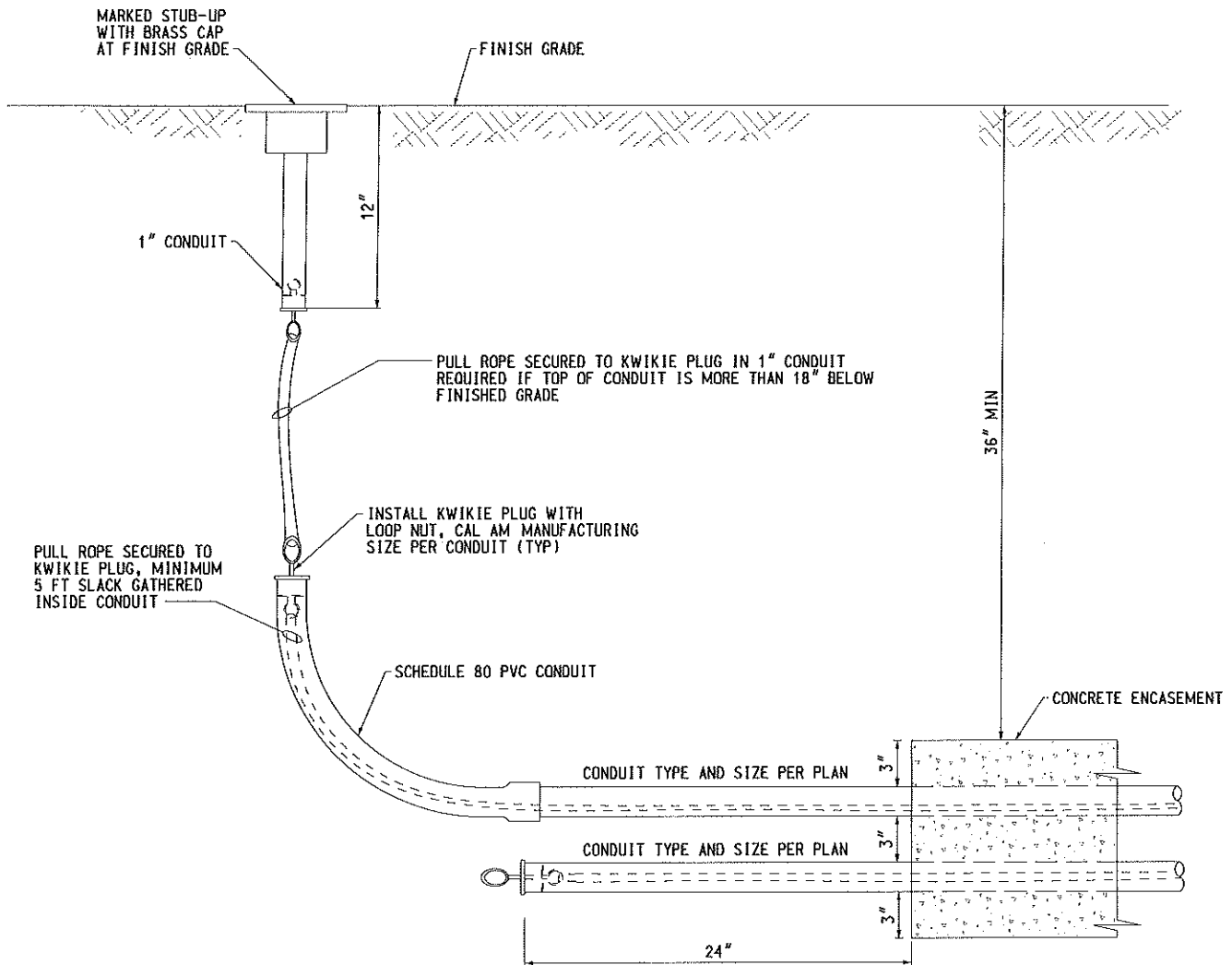
P.E. NO.:

E-8410

DATE:

01-16-31

1 OF 1



NOTE:

1. ENGRAVE BRASS CAP INDICATING FUNCTION, CONDUIT QTY AND SIZE.
RECORD ALL ACTUAL STUB-OUT LOCATIONS ON RECORD DRAWINGS.
2. NOT TO SCALE.



Port of
LONG BEACH
The Green Port

CONDUIT STUB DETAIL - SECTION

STANDARD PLAN

E-70

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 1

[illegible]

Port of
LONG BEACH
The Green Port

RACEWAY & CONDUCTOR SCHEDULE

STANDARD PLAN

E-80

APPROVED BY:

APPROVED BY: P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.:

E-8410

DATE: 01-31-16

1 OF 1

UNDERGROUND PULL BOX SCHEDULE

DESIGNATION	SIZE	REFERENCE DETAIL	COVER MARKING	REMARKS



Port of
LONG BEACH
The Green Port

UNDERGROUND PULL BOX SCHEDULE

STANDARD PLAN

E-81

APPROVED BY:

P.R. Chaudhary
P. R. CHAUDHARY SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 1

[illegible]

STANDARD PLAN

APPROVED BY:

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 1

[illegible]

Port of
LONG BEACH
The Green Port

Port of LONG BEACH The Green Port	LIGHT FIXTURE SCHEDULE		STANDARD PLAN
			E-83
APPROVED BY: <u>P. R. Chavdarian</u> P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER			P.E. NO.: <u>E-8410</u> DATE: <u>01-31-16</u>
			1 OF 1

STANDARD PLAN

E-83

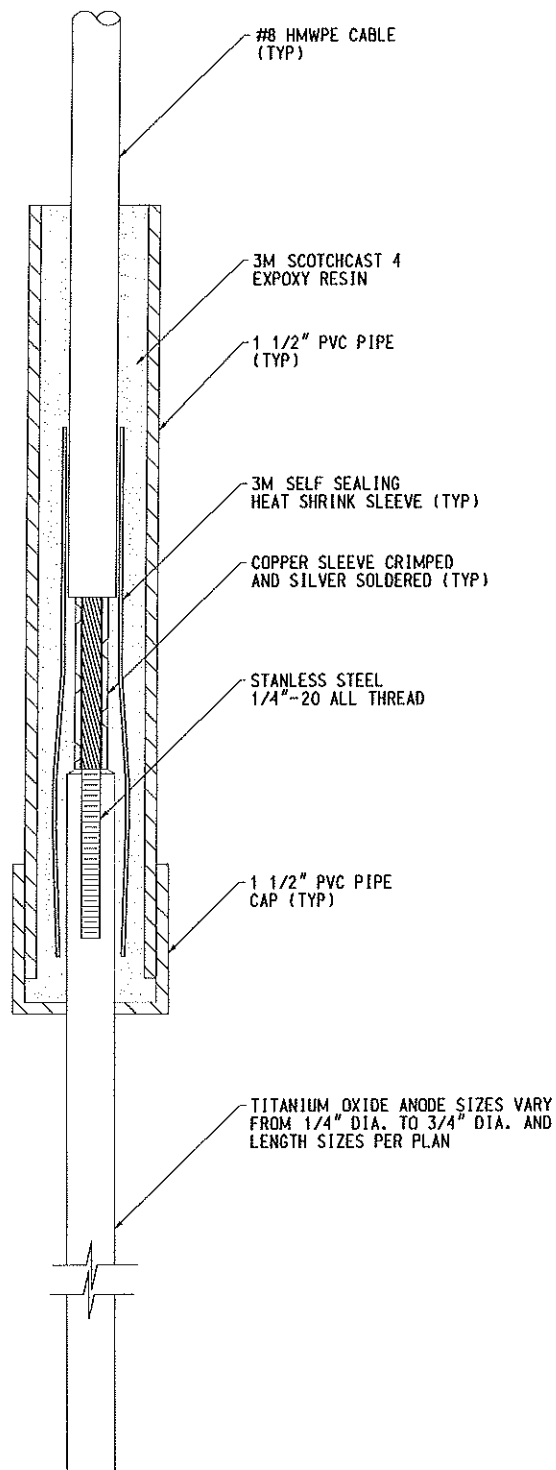
APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 1



ANODE ASSEMBLY
NOT TO SCALE

NOTE:

1. ANODE ASSEMBLY (CABLE, HEAD & ROD) ASSEMBLED & MANUFACTURED BY OTHERS.
2. DO NOT SCALE DRAWINGS



Port of
LONG BEACH
The Green Port

**TYPICAL TITANIUM OXIDE ROD
ANODE CONNECTION DETAIL**

STANDARD PLAN

E-84

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

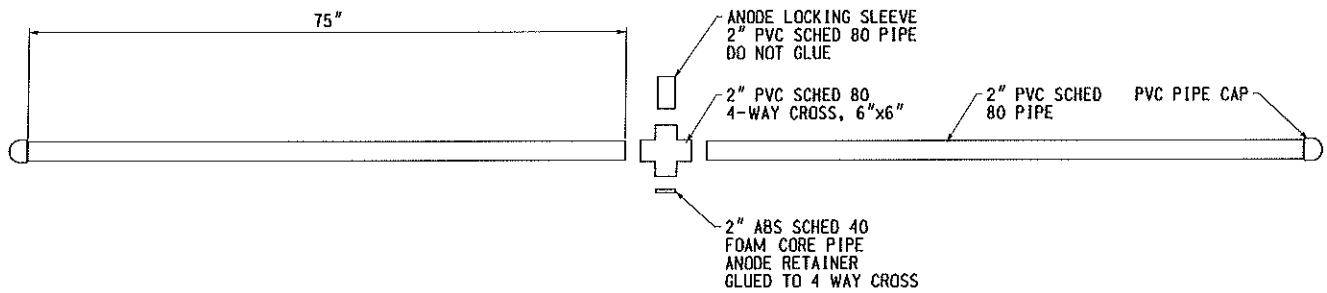
P.E. NO.:

E-8410

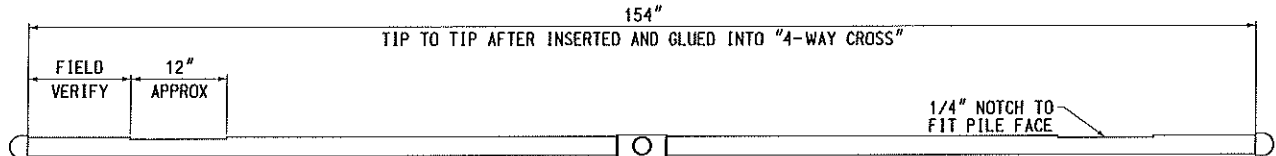
DATE:

01-31-16

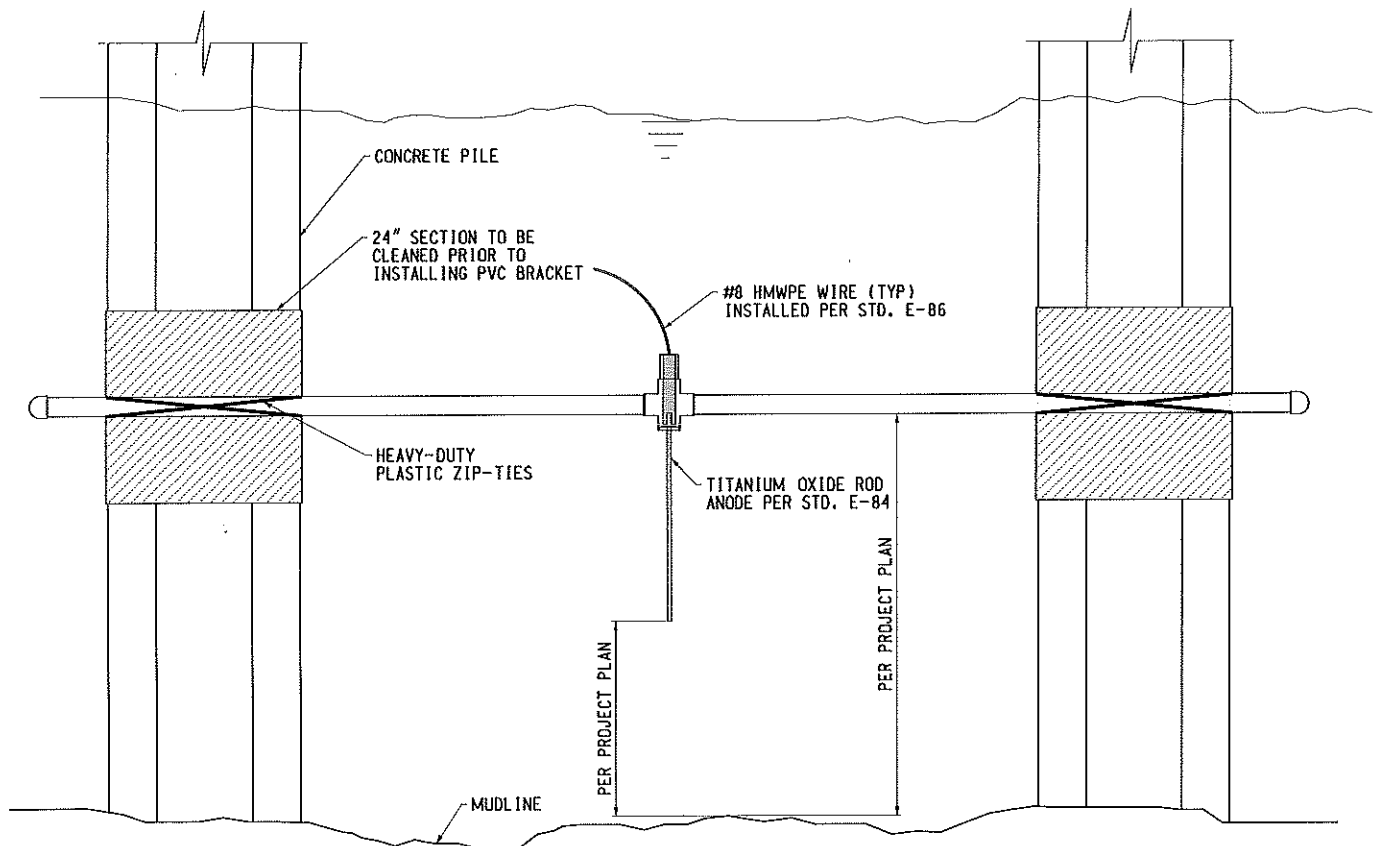
1 OF 1



ELEVATION



PLAN VIEW ASSEMBLED



**CONSTRUCTED
ELEVATION**

NOTE:
DO NOT SCALE DRAWINGS



Port of
LONG BEACH
The Green Port

ANODE BRACKET SYSTEM BETWEEN PILES

STANDARD PLAN

E-85

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

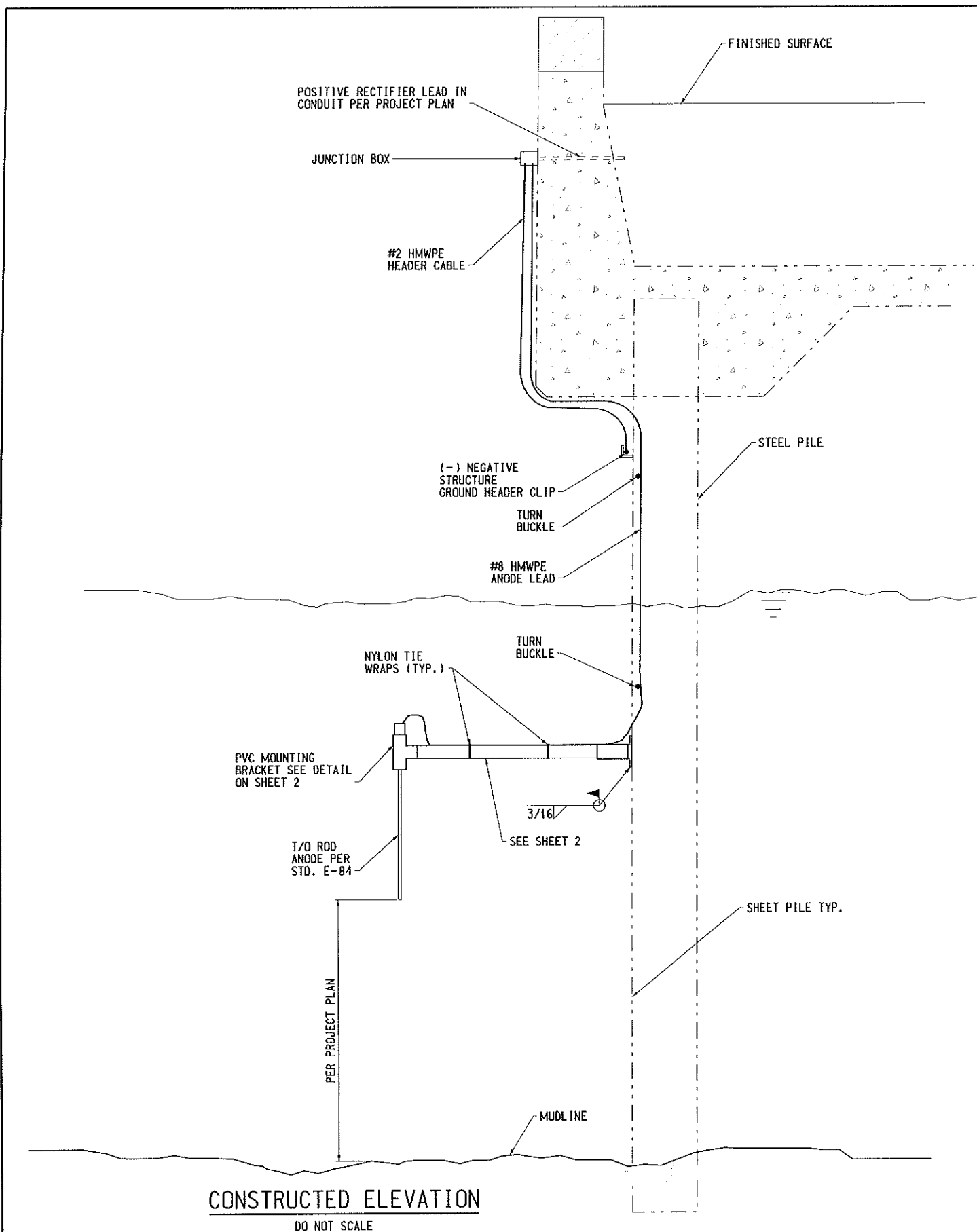
P.E. NO.:

E-8410

DATE:

01-31-16

1 OF 1



ANODE BRACKET SYSTEM AT STEEL BULKHEAD

STANDARD PLAN

E-86

APPROVED BY:

B. R. Chavdarian
B. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

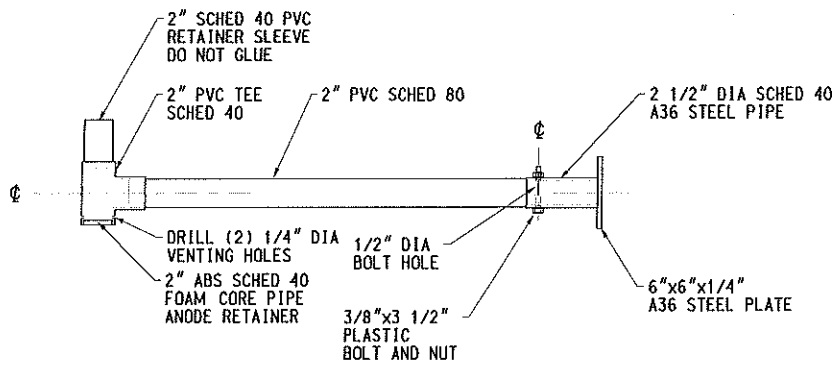
P.E. NO.:

E-8410

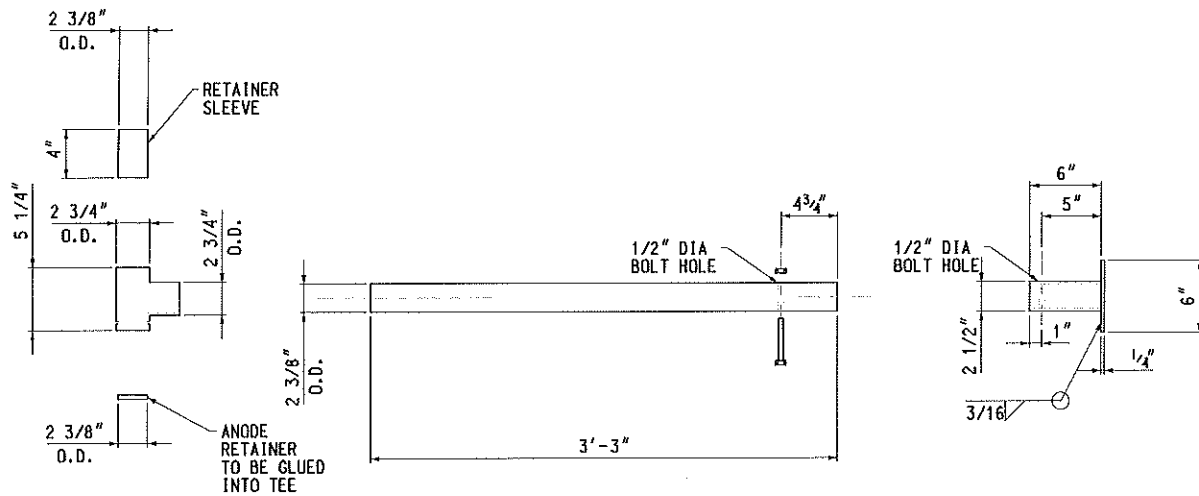
DATE:

01-31-16

1 OF 2



ELEVATION (ASSEMBLED)



ELEVATION (PRE-ASSEMBLED)



Port of
LONG BEACH
The Green Port

PVC MOUNTING BRACKET

STANDARD PLAN

E-86

APPROVED BY:

[Signature]
B. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.:

E-8410

DATE:

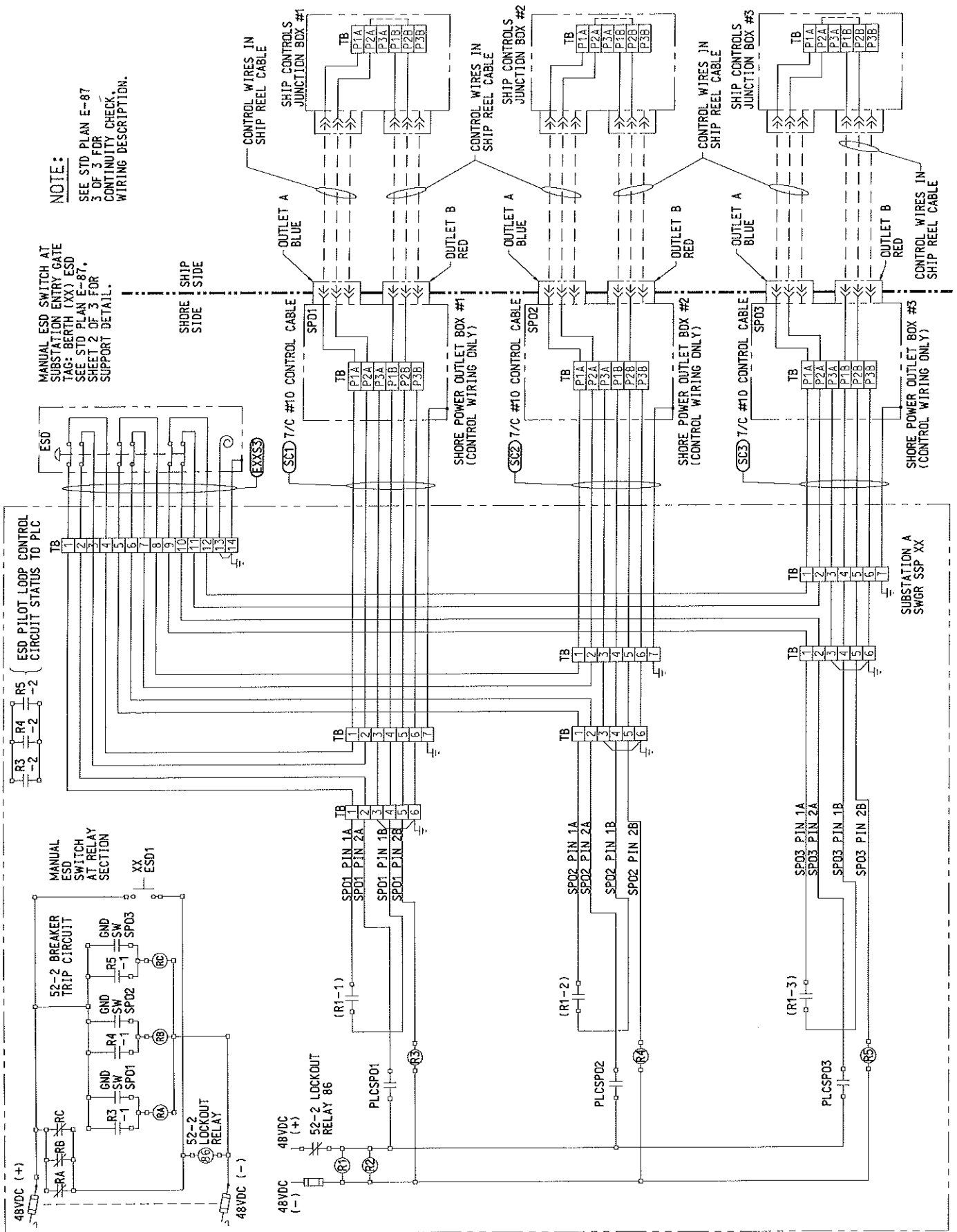
01-31-16

2 OF 2

NOTE:

SEE STD PLAN E-87
3 OF 3 FOR
CONTINUITY CHECK,
WIRING DESCRIPTION.

MANUAL ESD SWITCH AT
SUBSTATION ENTRY GATE
TAG: BERTH (XX) ESD
SEE STD PLAN E-87,
SHEET 2 OF 3 FOR
SUPPORT DETAIL.



Port of
LONG BEACH
The Green Port

SHORE TO SHIP POWER, PILOT LOOP CONTINUITY CHECK WIRING DIAGRAM

STANDARD PLAN

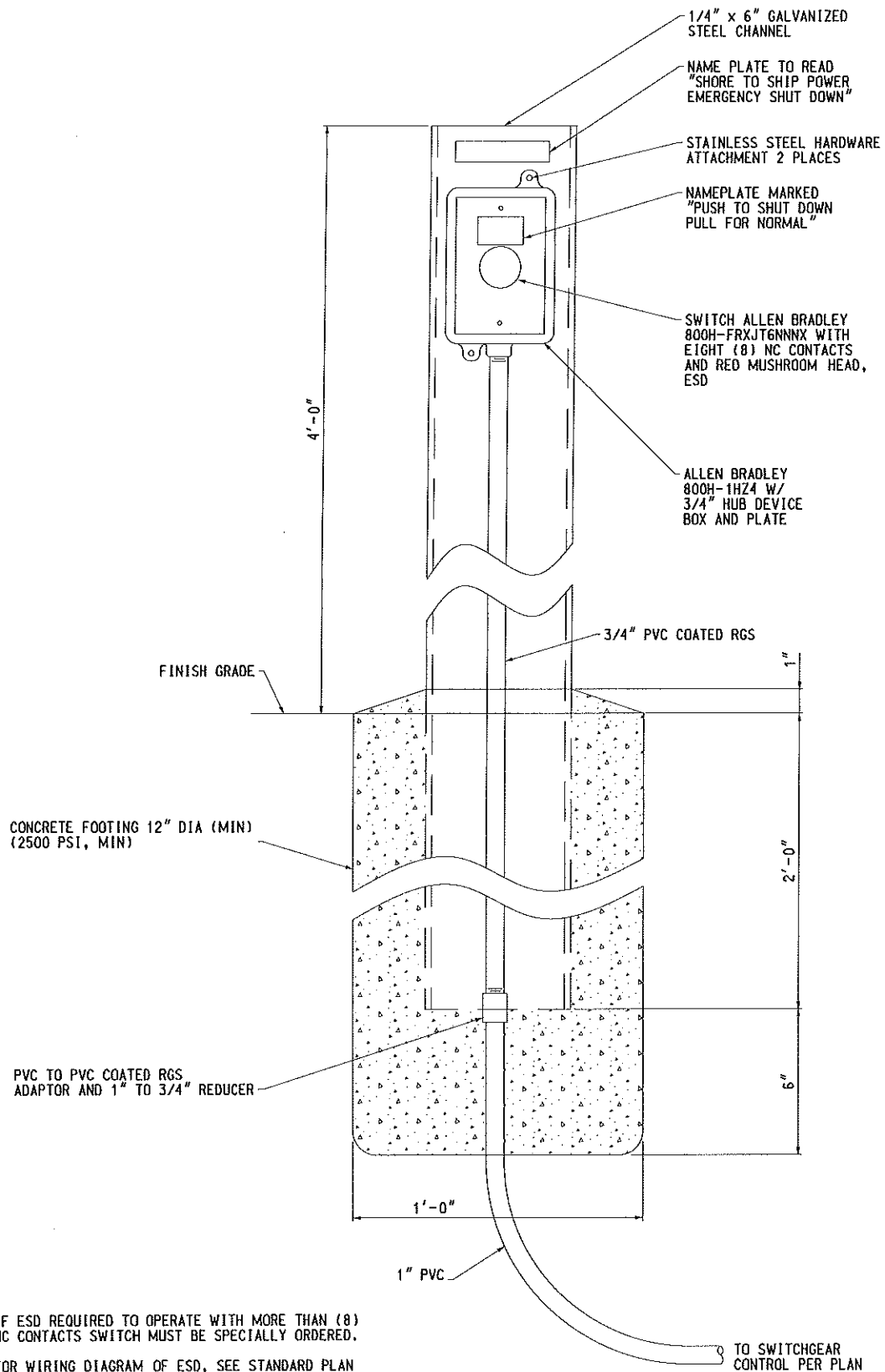
E-87

APPROVED BY: *[Signature]*
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 4



NOTES:

1. IF ESD REQUIRED TO OPERATE WITH MORE THAN (8) NC CONTACTS SWITCH MUST BE SPECIALLY ORDERED.
2. FOR WIRING DIAGRAM OF ESD, SEE STANDARD PLAN E-87, SHEET 1 OF 3.

ESD SUPPORT DETAIL



Port of
LONG BEACH
The Green Port

SHORE TO SHIP POWER, PILOT LOOP CONTINUITY CHECK WIRING DIAGRAM

STANDARD PLAN

E-87

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.:

E-8410

DATE:

01-31-16

2 OF 4

PILOT LOOP CONTINUITY CHECK WIRING DESCRIPTION:

ALL POWER DELIVERY SYSTEM INTERLOCKS, SWITCHGEAR CONTROL AND PROTECTION STATUS SHALL BE MONITORED AND RECORDED BY THE PROGRAM LOGIC CONTROLLER (PLC). STATUS OF THE MONITORED COMPONENTS SHALL BE PROVIDED FOR REAL TIME REVIEW AT THE HUMAN MACHINE INTERFACE (HMI) (PLC & HMI NOT SHOWN IN WIRING DIAGRAM 1 OF 3).

48VDC TO THE 52-2 BREAKER TRIP CIRCUIT AND PILOT LOOP CIRCUIT COMES DIRECTLY FROM BATTERIES AND IS ENERGIZED AT ALL TIMES.

1. INITIAL CONDITIONS WHEN SHIP AT BERTH AND IS NOT CONNECTED TO SPO, THE STATUS OF THE COMPONENTS IN THE WIRING DIAGRAM ARE:
 - 1.1 GROUND SWITCHES (NOT SHOWN IN WIRING DIAGRAM 1 OF 3) FOR SPO1, SPO2, & SPO3 ARE "CLOSED"
 - 1.1.1 CONTACTS GND SW SPO1, GND SW SPO2 & GND SW SPO3 ARE "CLOSED"
 - 1.1.2 RELAYS RA, RB & RC ARE "ENERGIZED"
 - 1.1.3 CONTACTS RA, RB & RC ARE "OPEN"
 - 1.1.4 52-2, LOCKOUT RELAY 86 IS "DE-ENERGIZED"
 - 1.1.5 52-2, LOCKOUT RELAY 86 SWITCH IS IN THE "RESET" POSITION
 - 1.1.6 CONTACT 52-2, LOCKOUT RELAY 86 SWITCH IS "CLOSED"
 - 1.1.7 RELAY R1 AND R2 ARE "ENERGIZED"
 - 1.1.8 CONTACTS R1-1, R1-2, R1-3, R1-4, R2-1, R2-2, R2-3 & R2-4 ARE "CLOSED". (RELAY CONTACTS R1-4, R2-1, R2-2, R2-3 & R2-4 ARE NOT SHOWN IN WIRING DIAGRAM 1 OF 3)
 - 1.1.9 RELAY R3 IS "DE-ENERGIZED"
 - 1.2 CONTACTS R3-1 AND R3-2 ARE "OPEN"
 - 1.2.1 RELAY R4 IS "DE-ENERGIZED"
 - 1.2.2 CONTACTS R4-1 AND R4-2 ARE "OPEN"
 - 1.2.3 RELAY R5 IS "DE-ENERGIZED"
 - 1.2.4 CONTACTS R5-1 AND R5-2 ARE "OPEN"
 - 1.2.5 CONTACTS PLCSPO1, PLCSPO2 & PLCSPO3 ARE "OPEN"
 - 1.2.6 6.6KV BREAKER IS "OPEN" AND RACKED IN. (NOT SHOWN IN WIRING DIAGRAM 1 OF 3)
2. CONDITION, SHIP AT BERTH: SPO1 TO BE ENERGIZED
 - 2.1 SHIP PLUGS ARE INSERTED INTO SPO1 OUTLETS (OUTLET A BLUE AND OUTLET B RED)
 - 2.1.1 SHIP PILOT LOOP IS CONTINUOUS TO SHIP CONTROLS JUNCTION BOX #1 IN THE CONTINUITY CHECK WIRING DIAGRAM
 - 2.1.2 SPO1 SELECTED TO POWER SHIP AT HMI (NOT SHOWN IN WIRING DIAGRAM 1 OF 3) AFTER PLC TIME DELAY OF 10 SECONDS CONTACT PLCSPO1 IS "CLOSED" COMPLETING THE SHORE PILOT LOOP IN THE CONTINUITY CHECK WIRING DIAGRAM
 - 2.1.3 RELAY R3 IS "ENERGIZED"
 - 2.1.4 CONTACT R3-1 IS "CLOSED" (RELAY RA WILL NOW REMAIN ENERGIZED WHEN GROUND SWITCH SPO1 "OPENED")
 - 2.1.5 CONTACT R3-2 IS "CLOSED" (INDICATES TO PLC THAT THE PILOT LOOP CONTINUITY CHECK WIRING IS CONTINUOUS)
 - 2.1.6 GROUND SWITCH SPO1 IS "OPENED" (NOT SHOWN IN WIRING DIAGRAM 1 OF 3)
 - 2.1.7 CONTACT GND SW SPO1 IS "OPENED"
 - 2.1.8 AFTER ALL OTHER CONDITIONS (NOT SHOWN IN WIRING DIAGRAM 1 OF 3) ARE MET, BREAKER 52-2 MAY BE CLOSED
3. ANY BREAK IN THE PILOT LOOP CONTINUITY CHECK WIRING WILL TRIP BREAKER 52-2. THE SEQUENCE OF OPERATION ARE:
 - 3.1 RELAY R3 WILL "DE-ENERGIZE"
 - 3.1.1 CONTACT R3-2 WILL "OPEN" (INDICATES TO PLC THAT THE PILOT LOOP CONTINUITY CHECK WIRING IS OPEN AND PLC WILL INITIATE A TRIP SIGNAL TO BREAKER 52-2 (NOT SHOWN IN WIRING DIAGRAM 1 OF 3)
 - 3.1.2 SIMULTANEOUSLY CONTACT R3-1 WILL "OPEN"
 - 3.1.3 RELAY RA WILL "DE-ENERGIZE"
 - 3.1.4 CONTACT RA WILL "CLOSE"
 - 3.1.5 52-2 LOCKOUT RELAY 86 WILL "ENERGIZE" AND TRIP BREAKER 52-2
 - 3.1.6 52-2 LOCKOUT RELAY 86 CONTACT WILL "OPEN" AND 52-2 LOCKOUT RELAY 86 WILL PHYSICALLY NEED TO BE "RESET" PRIOR TO THE 52-2 BREAKER BEING RECLOSED
 - 3.1.7 RELAYS R1 & R2 WILL "DE-ENERGIZE"
 - 3.1.8 CONTACTS R1-1, R1-2, R1-3, R1-4, R2-1, R2-2, R2-3 & R2-4 WILL "OPEN" (CONTACTS R1-4, R2-1, R2-2, R2-3 & R2-4 ARE NOT SHOWN IN THE WIRING DIAGRAM 1 OF 3)
 - 3.1.9 CONTACT R1-1 WILL "OPEN" SHIP SIDE PILOT LOOP CONTINUITY CHECK WIRING



Port of
LONG BEACH
The Green Port

SHORE TO SHIP POWER, PILOT LOOP CONTINUITY CHECK WIRING DIAGRAM

STANDARD PLAN

E-87

APPROVED BY: *[Signature]*
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410 DATE: 01-31-16

3 OF 4

DRAWING NOTES:

1. SHIPSIDE PILOT LOOP CONTROL WIRING IS THE RESPONSIBILITY OF THE SHIP OPERATOR AND IS NOT SHOWN ON DRAWING.
2. AFTER COMPLETION OF TESTING AND COMMISSIONING OF THE PILOT LOOP CONTROL CIRCUIT PERMANENT WIRING SHALL BE PROVIDED BY SHIP OPERATOR FOR SHIPSIDE PILOT LOOP CONTROL.
3. USE BELOW TO DESIGNATE RELAYS AND CONTACTS ON DRAWINGS.
4. XXSPOX

└── SPO NUMBER
└── SHORE POWER OUTLET
└── SUBSTATION NUMBER



Port of
LONG BEACH
The Green Port

SHORE TO SHIP POWER, PILOT LOOP CONTINUITY CHECK WIRING DIAGRAM

STANDARD PLAN

E-87

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.:

E-8410

DATE:

01-31-16

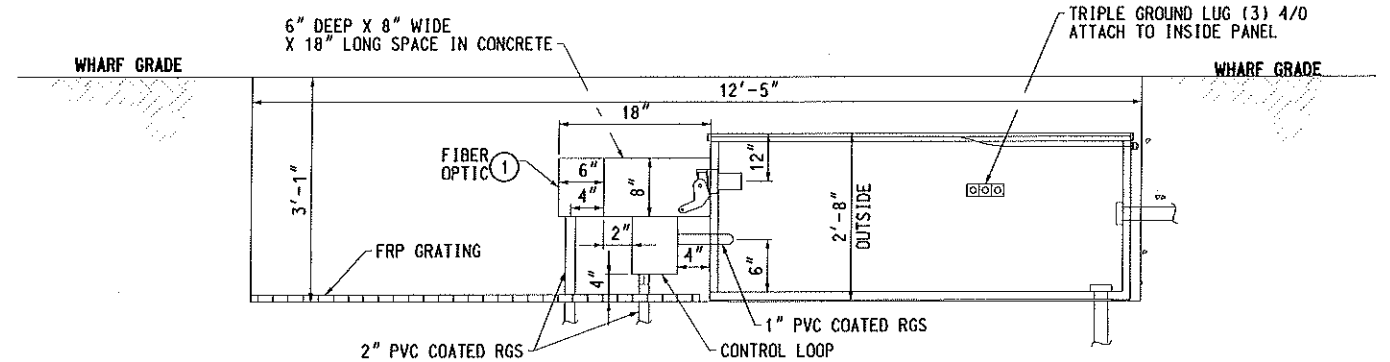
4 OF 4

GENERAL NOTES

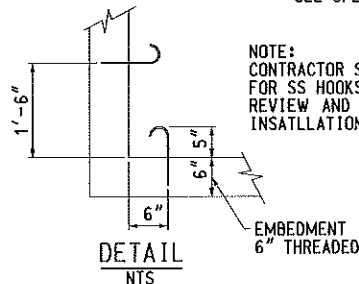
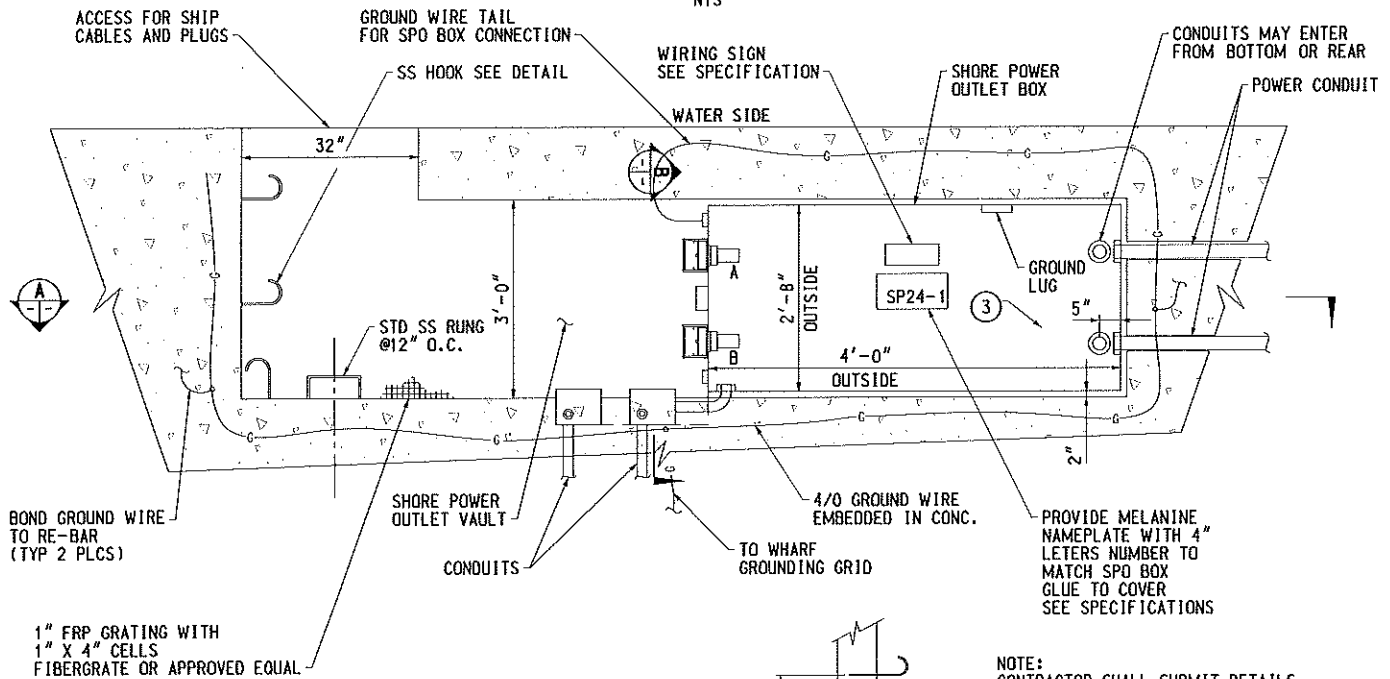
1. CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A TEMPLATE TO THE MANUFACTURER OF THE SHORE POWER OUTLET BOXES TO PRE-PUNCH THE OUTLET BOX CONDUIT HOLES. IF THE CONTRACTOR DOES NOT SUPPLY THE TEMPLATE, THEY SHALL BE RESPONSIBLE FOR THE FIELD CONSTRUCTION OF THE CONDUIT HOLES.
2. SHORE POWER OUTLET BOX SHALL BE AISI 304 STAINLESS AND ALL HARDWARE SHALL BE 316 STAINLESS STEEL.
3. CAVOTEC SYSTEM IS SHOWN TO SET MINIMUM REQUIRED STANDARD. SHORE POWER OUTLET RECEPTACLES ARE SPECIFIED TO MATE WITH TENANT VESSEL SHORE POWER PLUGS. IF ANY SUBSTITUTION OF MATERIALS FOR THE SPECIFIED SYSTEM IS PROPOSED, THE SUBSTITUTE MUST BE PHYSICALLY PROVIDED TO THE ENGINEER FOR PREVIEW PRIOR TO APPROVAL BY THE ENGINEER. TENANT'S WRITTEN CONCURRENCE OF SUBSTITUTION IS NECESSARY AND REQUIRED BEFORE THE CITY WILL APPROVE SUBSTITUTION. THESE SUBMITTAL REQUIREMENTS ARE IN ADDITION TO ALL OTHER PROJECT SUBMITTAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH ALL PARTIES INVOLVED TO SECURE WRITTEN APPROVAL.

CONSTRUCTION NOTES

- ① PULLBOX (TYP) - 8"x6"x6" CAST ALUMINUM FLANGED RECESSED COVER BOX COMPLETE WITH BACKPLATE, GASKET, AND STAINLESS STEEL HARDWARE. 6" ABOVE VAULT FLOOR. PROVIDE 2" CONDUIT INTO SIDE OF SHORE POWER OUTLET BOX FROM PULLBOX.
- ② PLACE MEMBRANE AROUND 8"x6"x6" BOXES TO PROTECT FROM CONCRETE. FIBER OPTIC BOX TO BE PROVIDED BY CAVOTEC. 2" PVC COATED RGS CONDUIT MAY ENTER 8"x6"x6" BOXES FROM BOTTOM OR EITHER SIDE.
- ③ SHALL HAVE WARNING SIGN ON SPO, "DANGER-HIGH VOLTAGE-KEEP OUT".



SECTION A
NTS



DETAIL
NTS



SHORE TO SHIP POWER POWER OUTLET VAULT ENCLOSURE

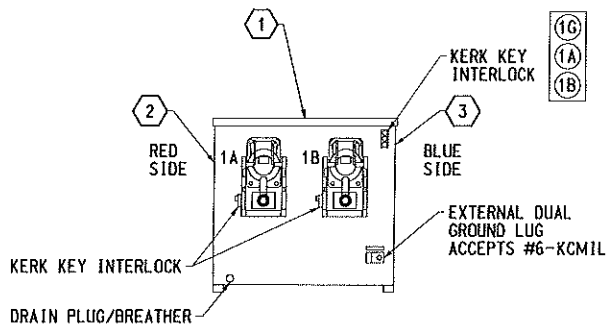
STANDARD PLAN

E-88

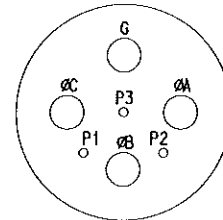
APPROVED BY: *P. R. Chavdarian* P.E. NO.: E-8410 DATE: 01-31-16

P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

1 OF 2



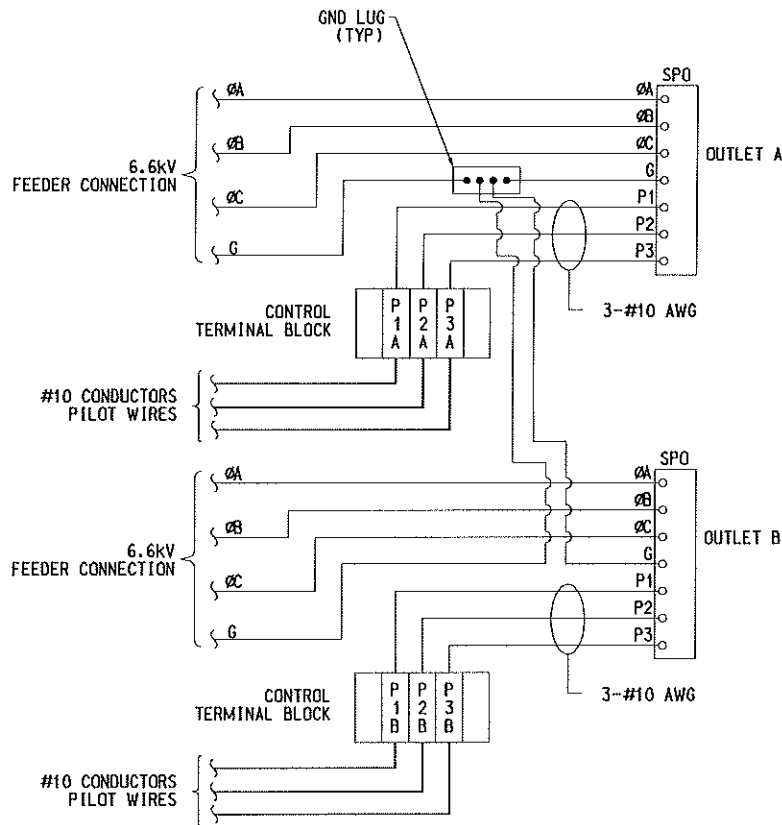
SECTION B



SHORE POWER OUTLET
FACE CONFIGURATION
PHASE SEQUENCE:
ABC COUNTERCLOCKWISE

CAVOTEC PART NUMBERS AND REQUIREMENTS

- 1 COMPLETE SYSTEM PC5-AX04-K1855
INCLUDES BOX SOCKETS, INTERNAL WIRING
AND COMPONENTS.
- 2 RED FEMALE SOCKET PC5-VX04-K18503KL-6MT0, 350AMP, 16KAIC
- 3 BLUE FEMALE SOCKET PC5-VX04-K18503KL-MT1, 350AMP, 16KAIC



SHORE POWER OUTLET BOX INTERNAL WIRING



Port of
LONG BEACH
The Green Port

SHORE TO SHIP POWER POWER OUTLET VAULT ENCLOSURE

STANDARD PLAN

E-88

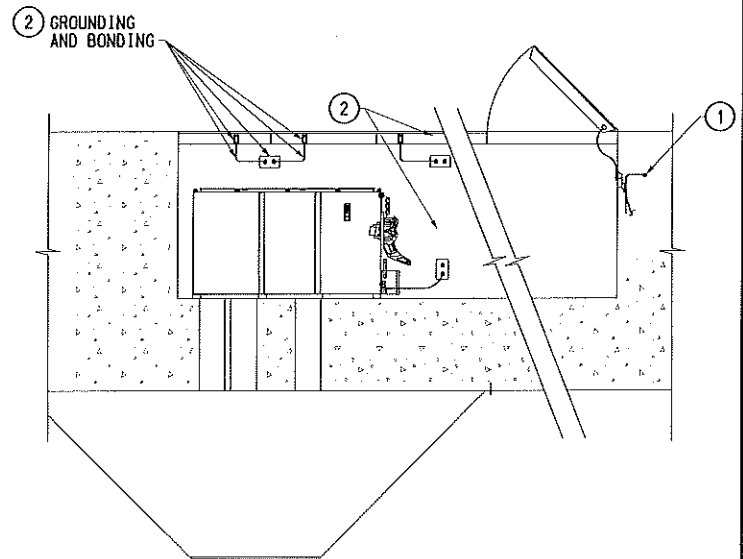
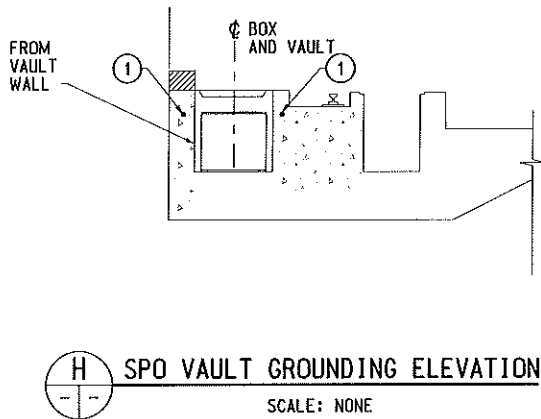
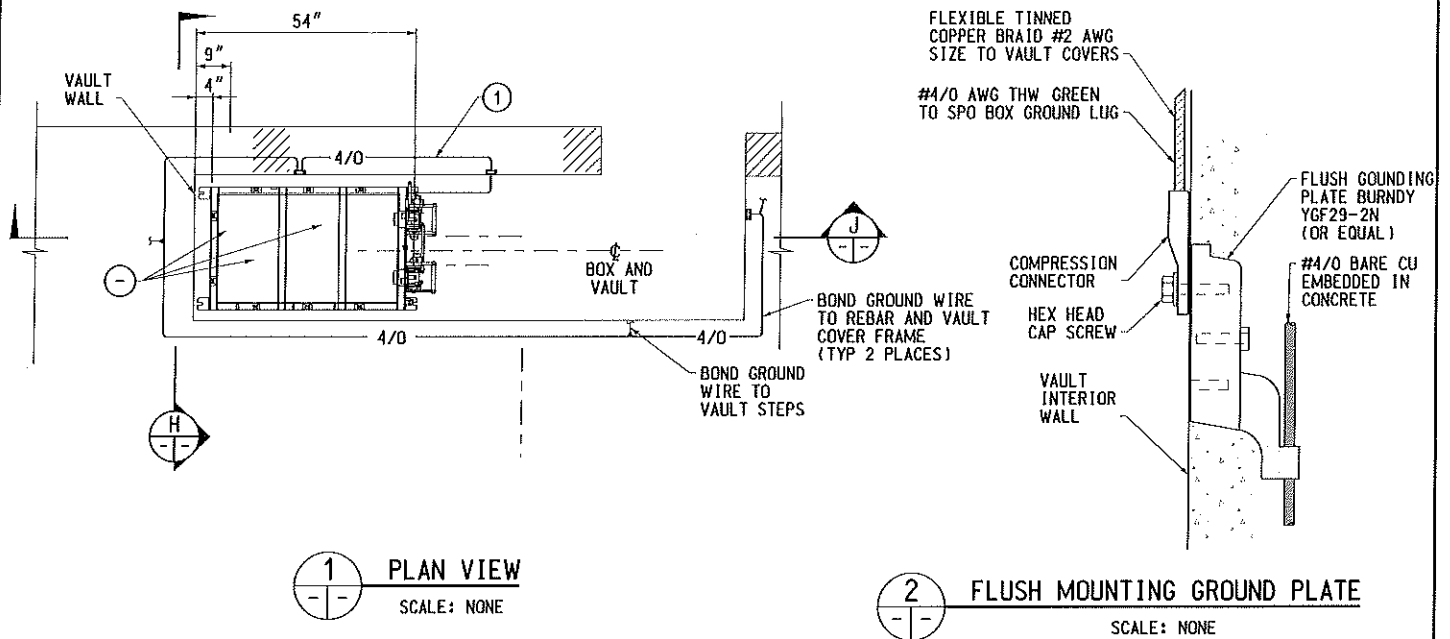
APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

2 OF 2



CONSTRUCTION NOTES:

- ① PROVIDE #4/0 BARE CU GROUND WIRE EMBEDDED IN CONCRETE AND CONNECT TO FLUSH MOUNTED GROUNDING PLATES IN VAULT WALL. BOND EMBEDDED GROUND WIRE TO REBAR, VAULT COVER FRAME AND VAULT STEPS. CONNECT #4/0 CU GREEN WIRE FROM GROUNDING PLATE TO GROUND LUG ON CAVOTEC BOX. CONNECT FLEXIBLE TINNED COPPER BRAID FROM GROUNDING PLATE TO VAULT COVERS. LOOP BRAID TO ALLOW FOR OPENING OF COVERS.
- ② GROUND PLATES FOR VAULT COVER BONDING TO BE MOUNTED WITH TOP EDGE OF PLATE 1" BELOW BOTTOM OF FRAME COVER.



Port of
LONG BEACH
The Green Port

SHORE POWER OUTLET GROUNDING DETAILS

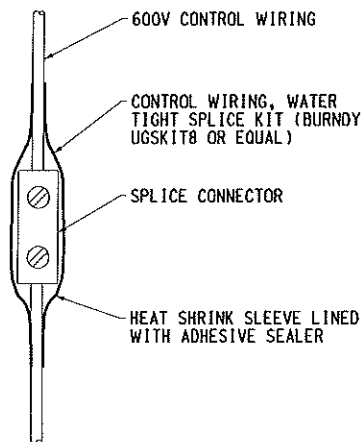
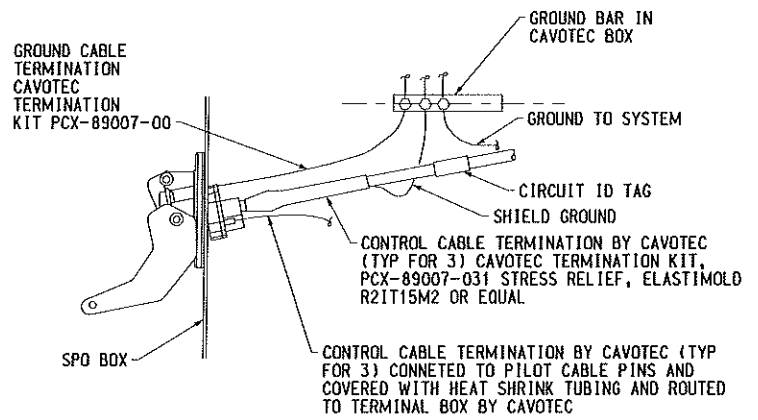
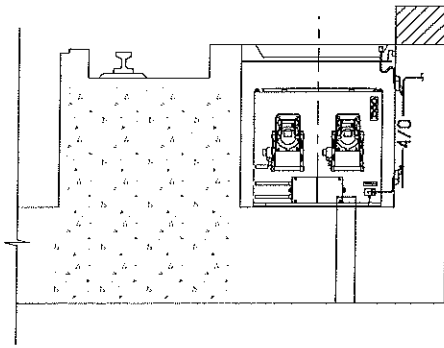
STANDARD PLAN

E-89

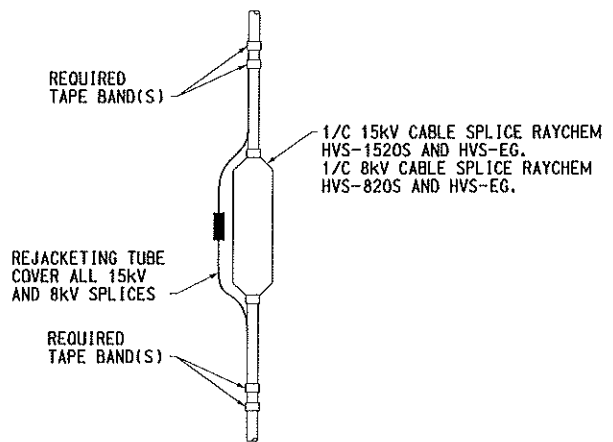
APPROVED BY: *P. R. Chavdarian*
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410 DATE: 01-31-16

1 OF 2



1 600V CONTROL WIRING SPLICE
SCALE: NONE



2 15kV AND 8kV IN LINE SPLICE
SCALE: NONE



Port of
LONG BEACH
The Green Port

SHORE POWER OUTLET GROUNDING DETAILS

STANDARD PLAN

E-89

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

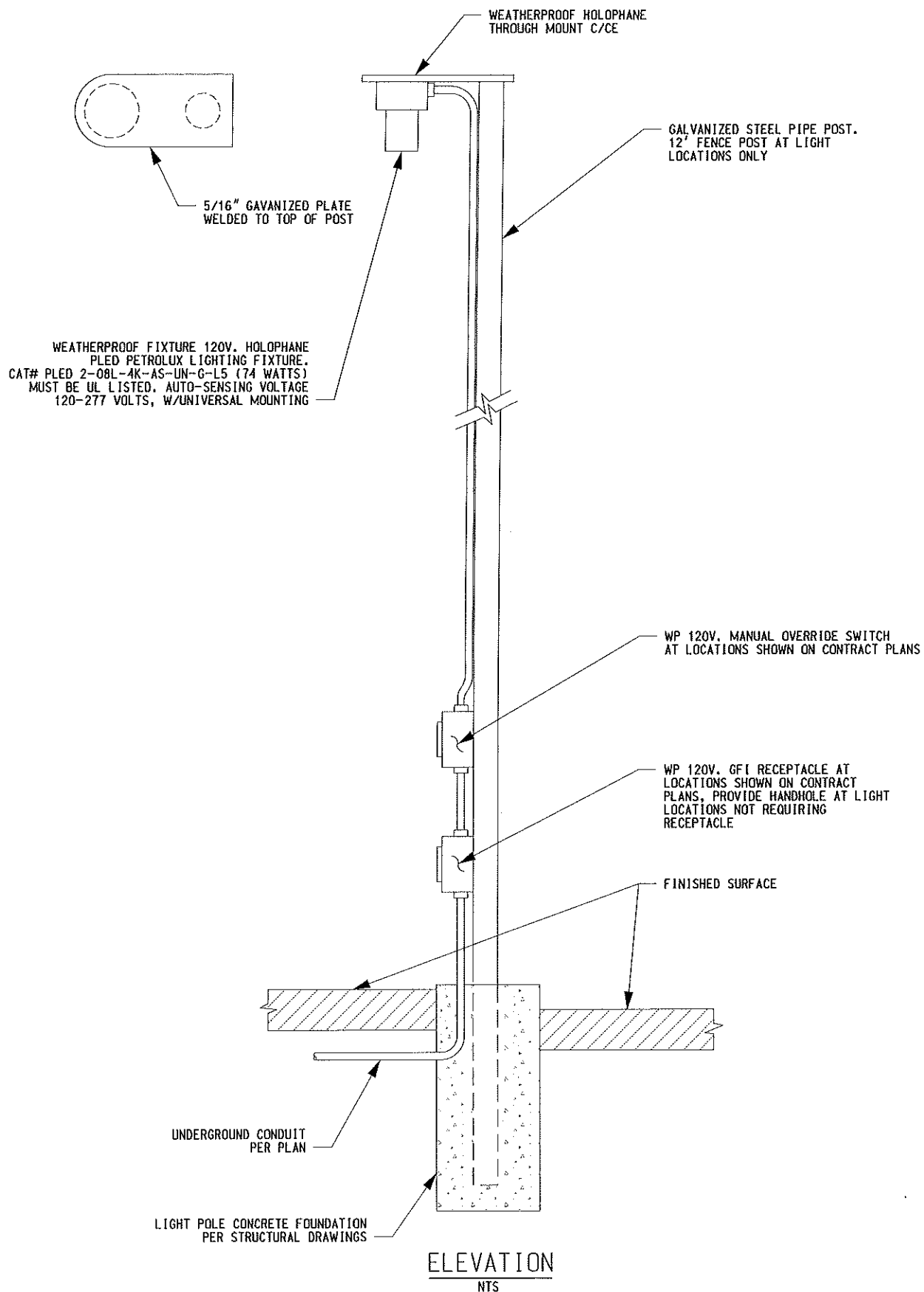
P.E. NO.:

E-8410

DATE:

01-31-16

2 OF 2



Port of
LONG BEACH
The Green Port

TYPICAL SUBSTATION LIGHT POLE

STANDARD PLAN

E-90

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.:

E-8410

DATE:

01-31-16

1 OF 1

Project:

Page:

Location:

Date:

Contract:

SN:

Engineer:

Study Case:

Revision:

Filename:

Config:

Arc Fault at Bus:
Bolted Fault Current:

Nominal kV =
Base kV =

Prefault Voltage = 100% of nominal bus kV
100% of Base kV

System Grounding =

Total Arcing Fault Current: = kA
Total Bolted Fault Current: = KA

FCT = Seconds
= Cycles

For Protective Device
Relay: Type:

Working Distance = 18.00 inch
Incident Energy = cal/cm²

Hazard/Risk Level =
Flash Protection Boundary =

Device		Individual Contribution					Incident Energy			
ID	Type	Bolted (kA)	Arising (kA)	FCT (cycles)	Arising (kA)	FCT (cycles)	Protective Device ID for FCT	incident E (cal/cm ²)	FPB (ft)	Hazard Risk Level

ARC FLASH CALCULATION RESULTS



Port of
LONG BEACH
The Green Port

TYPICAL ARC FLASH CALCULATIONS

STANDARD PLAN

E-91

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

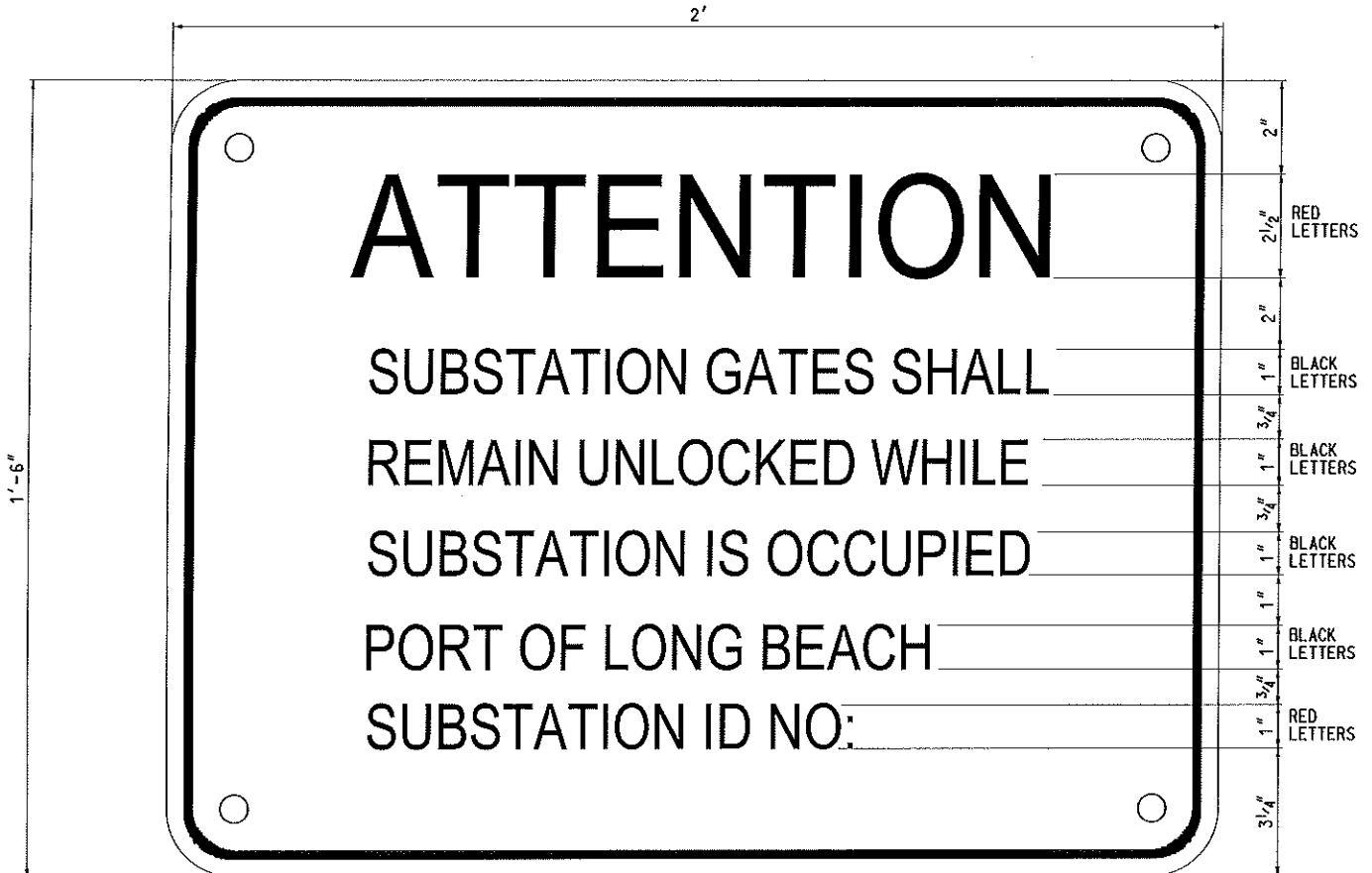
1 OF 1

SUBSTATION GATE STANDARD

GATES ON PORT OF LONG BEACH SUBSTATION FENCING ARE NORMALLY LOCKED AND ACCESSIBLE TO QUALIFIED PERSONS ONLY. THEY ARE UNLOCKED ONLY WHEN QUALIFIED PERSONS ARE WITHIN THE SUBSTATION FENCING.

PERSONNEL GATES WILL NOT HAVE CLOSERS, LATCHES OR PANIC HARDWARE. THE GATES WILL BE EQUIPPED WITH A CUT-OUT FOR KNOX PADLOCK AND CHAIN FOR SECURING WHEN QUALIFIED PERSONNEL ARE NOT PRESENT. THE GATES WILL SWING FREELY WHEN UNLOCKED AND CHAIN IS REMOVED.

ALL OUTDOOR SUBSTATIONS WILL HAVE WARNING SIGNS AS REQUIRED BY NEC 110.34(C) AND SIGNAGE AS IDENTIFIED BELOW INDICATING THAT SUBSTATION GATES SHALL REMAIN UNLOCKED WHILE SUBSTATION IS OCCUPIED.



GENERAL NOTES: CONTRACTOR SHALL PROVIDE:

1. SIZE: 18" X 24"
MATERIAL: SINGLE SHEET 0.08"
ALUMINUM PANEL WITH HIGH
INTENSITY RETRO REFLECTIVE
BACKGROUND WITH
ANTI-GRAFFITI COATING
2. DIMENSIONS, COLORS AND
TYPE OF LETTERS AS SHOWN
3. SUBSTATION ID SHALL BE
PROVIDED TO THE
MANUFACTURER AT THE TIME
OF ORDER



Port of
LONG BEACH
The Green Port

SUBSTATION GATE STANDARD

STANDARD PLAN

E-92

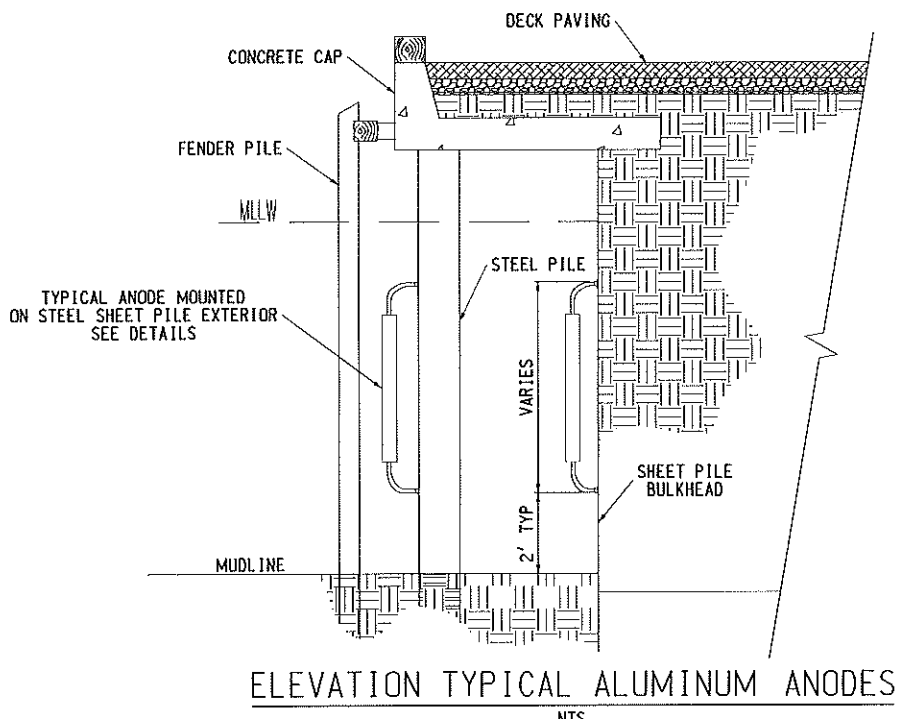
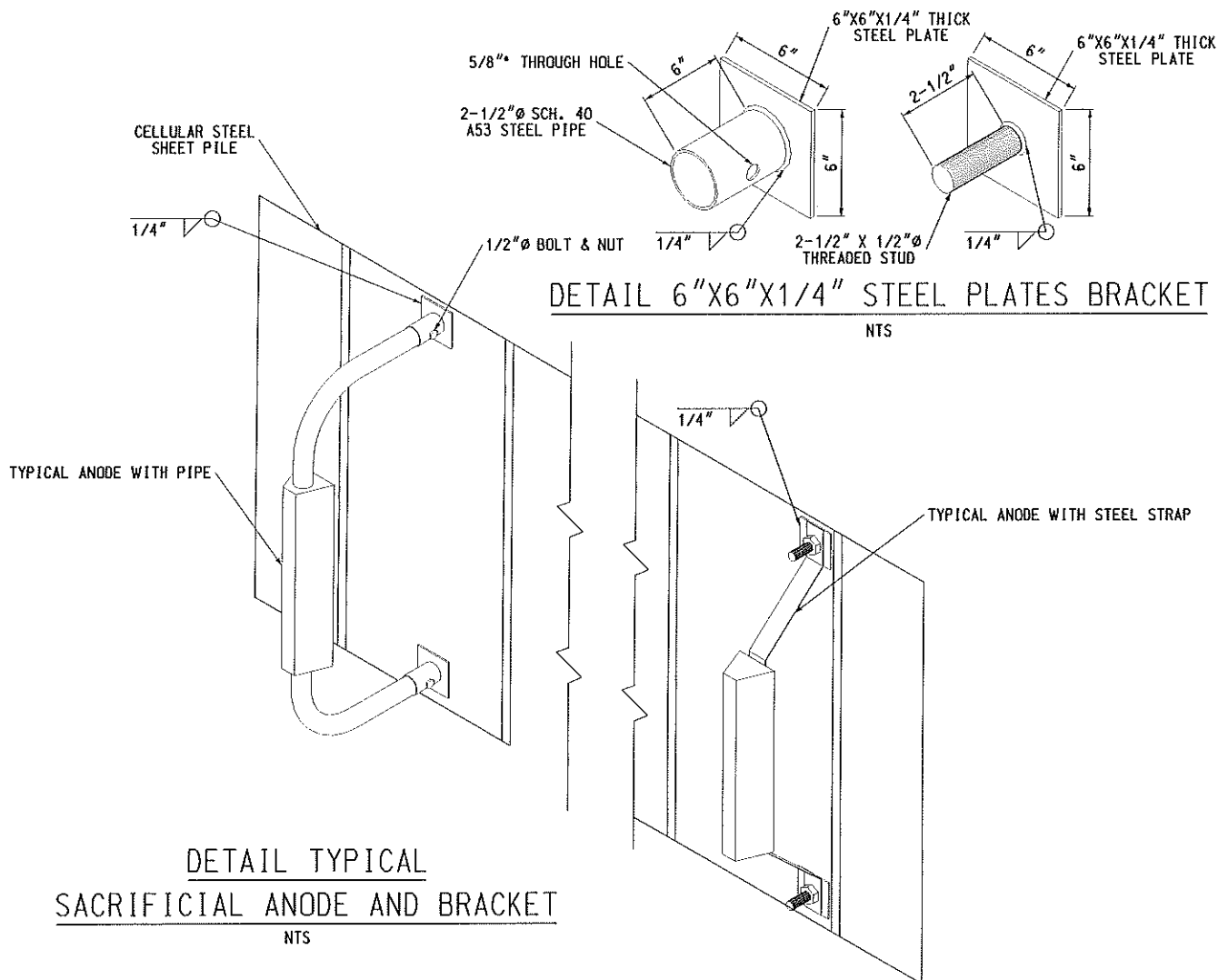
APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.: E-8410

DATE: 01-31-16

1 OF 1



Port of
LONG BEACH
The Green Port

SACRIFICIAL ANODE BRACKET SYSTEM FOR STEEL PILE AND SHEET PILE

STANDARD PLAN

E-93

APPROVED BY:

P. R. Chavdarian
P. R. CHAVDARIAN SR. ELECTRICAL ENGINEER

P.E. NO.:

E-8410

DATE:

01-31-16

1 OF 1

Project:
Location:
Contract:
Engineer:
Filename: PierC_Cold_Turning

Study Case: PIER C SC

Page: 1
Date: 02-02-2009
SN: P2S-ENG01N
Revision: Base
Config: Normal

Arc Fault at Bus: SUB 3
Bolted Fault Current: 1/2 Cycle

Nominal LV = 12,000 V
Base LV = 12,000 V
Prefault Voltage = 100% of nominal bus LV
100% of base LV
System Grounding = Grounded
Total Arcing Fault Current = 11,154 kA
Total Bolted Fault Current = 11,520 kA
FCT = 0.508 Seconds
= 30.505 cycles
For Protective Device: CIR4 @ Ia = 11,154 kA
Relay: SUB3 RELAY Type: Overcurrent
Working Distance = 18.00 inch
Incident Energy = 13.63 cal/cm²
Hazard/Risk Level* = 3
Flash Protection Boundary = 5.03 ft

Device		Individual Contribution			Incident Energy			Hazard Risk		
ID	Type	Bolted (kA)	Aring (kA)	FCT (cycles)	Aring (kA)	FCT (cycles)	Protective Device ID for FCT	Incident E (cal/cm ²)	FTB (ft)	Hazard Risk Level*

ARC FLASH CALCULATION RESULTS - TYP

SCALE: NTS



DANGER



Arc Flash and Shock Hazard	
Flash Protection Boundary	5.1 ft
Incident Energy	13.6
Working Distance	18 in
Required PPE Level	3
Shock Hazard Voltage	
Limited Approach	10.0
Restricted Approach	2.16
Prohibited Approach	0.6 ft
Equipment SUB 3	



02-02-2009

ARC FLASH LABEL - TYP

SCALE: NTS

NOTES:

1. THIS IS A SAMPLE REPORT, SHOWING THE MINIMUM DATA AS A RESULT OF ARC FLASH CALCULATIONS, IN ACCORDANCE WITH IEEE STD. 1584.
2. CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE THIS DATA AND SUPPORTING CALCULATIONS PRIOR TO SUBMITTING LABELS FOR ARC FLASH WARNING.

NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE LABELS, COMPLETE WITH DATA BASED ON AND SUPPORTED BY CALCULATIONS, AND MOUNT ON APPROPRIATE EQUIPMENT.
2. SUBMIT PROPOSED LABELS TO THE CITY AND OBTAIN APPROVAL OF THE CITY PRIOR TO RELEASING ORDER TO LABEL MANUFACTURER.