

CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

ENGINEERING AND CONSTRUCTION DIVISION

DESIGN GUIDELINE DRAWINGS

FOR SUBMERSIBLE LIFT STATION

6 PUMP VFD SYSTEM

WBS NO. XXXXXX-XXXX-X

MAYOR

ANNISE D. PARKER

CONTROLLER

RONALD C. GREEN

DISTRICT

COUNCIL MEMBERS

BRENDA STARDIG

DISTRICT A

JERRY DAVIS

DISTRICT B

ELLEN R. COHEN

DISTRICT C

DWIGHT BOYKINS

DISTRICT D

DAVID MARTIN

DISTRICT E

RICHARD NGUYEN

DISTRICT F

OLIVER PENNINGTON

DISTRICT G

EDWARD GONZALEZ

DISTRICT H

ROBERT GALLEGOS

DISTRICT I

MIKE LASTER

DISTRICT J

LARRY V. GREEN

DISTRICT K

COUNCIL MEMBERS

AT—LARGE

STEPHEN C. COSTELLO

POSITION 1

DAVID ROBINSON

POSITION 2

MICHAEL KUBOSH

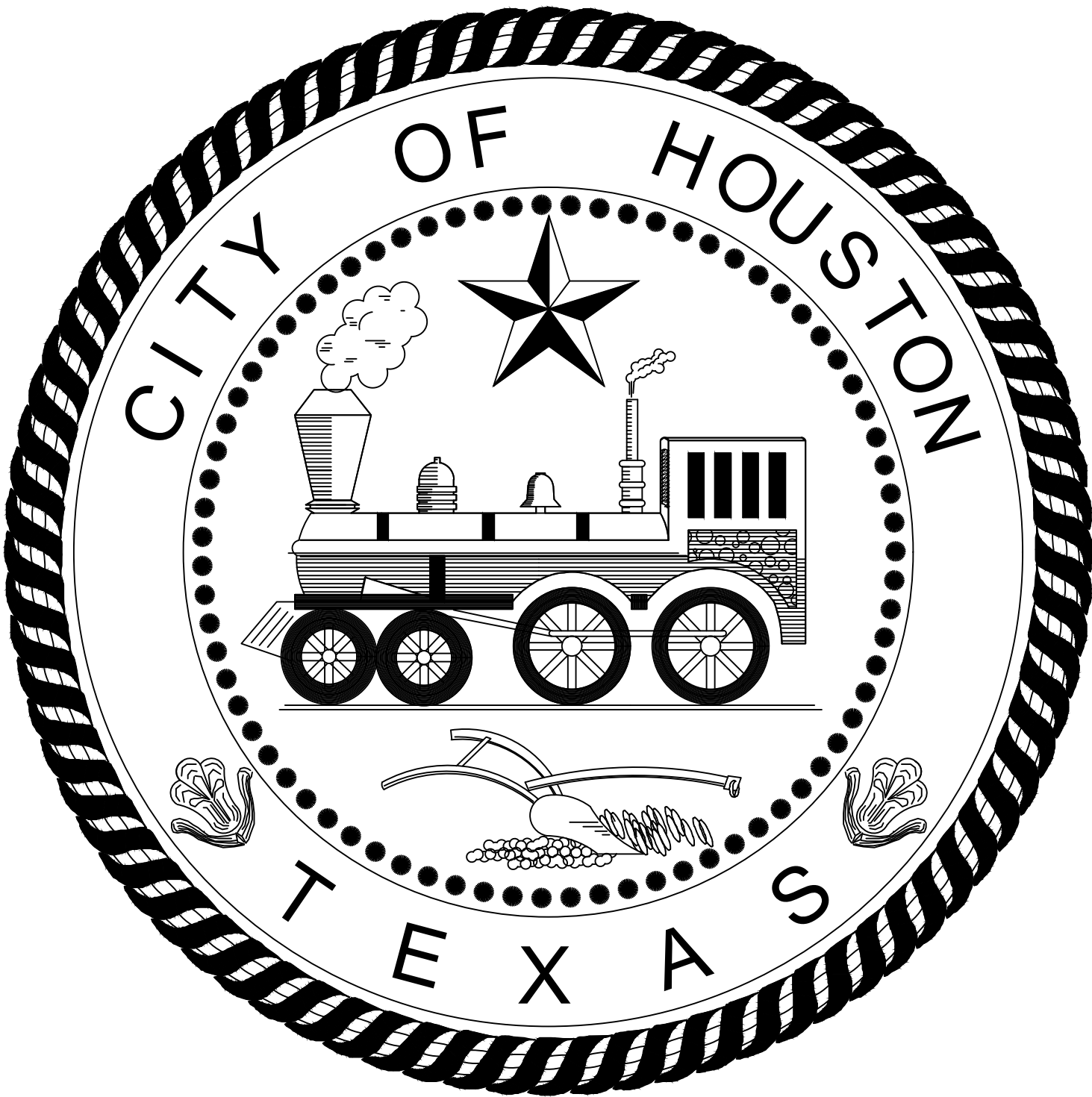
POSITION 3

C.O. "BRAD" BRADFORD

POSITION 4

JACK CHRISTIE

POSITION 5



GENERAL	
NO.	TITLE
—	COVER SHEET
Z0E01	ELECTRICAL SYMBOLS LEGENDS, LIGHTING FIXTURE SCHEDULES & ABBREVIATIONS
LIFT STATION ELECTRICAL PLANS	
NO.	TITLE
01E01	CONDUIT LAYOUT FOR LIFT STATION 6 PUMP VFD ALTERNATE HIGH PROFILE CONFIGURATION
02E01	CONDUIT LAYOUT FOR LIFT STATION 6 PUMP VFD PREFERRED LOW PROFILE CONFIGURATION
03E01	CONDUIT LAYOUT FOR LIFT STATION 6 PUMP VFD ALTERNATE LOW PROFILE CONFIGURATION
03E02	CONDUIT LAYOUT FOR LIFT STATION 6 PUMP VFD ALTERNATE LOW PROFILE CONFIGURATION
INDOOR CONFIGURATION	
NO.	TITLE
Y0E21	6 PUMP VFD INDOOR CONTROL CABINET EQUIPMENT LAYOUT & SCHEDULE
Y0E22	6 PUMP VFD INDOOR CONTROL CABINET BACK DOOR ELEVATION
Y0E23	6 PUMP VFD INDOOR CONTROL CABINET EQUIPMENT LAYOUT
Y0E25	6 PUMP VFD INDOOR MCC INCOMING POWER SCHEMATIC & CONTROL POWER & COMMUNICATIONS WIRING DIAGRAM
Y0E26	6 PUMP VFD INDOOR MCC POWER SCHEMATIC & CONTROL POWER & COMMUNICATIONS WIRING DIAGRAM
Y0E31	6 PUMP VFD INDOOR SINGLE LINE DIAGRAM
Y0E32	6 PUMP VFD INDOOR SINGLE LINE DIAGRAM
Y0E40	6 PUMP VFD INDOOR PROCESS & INSTRUMENTATION DIAGRAM
Y0E41	6 PUMP VFD INDOOR PROCESS & INSTRUMENTATION DIAGRAM
Y0E50	6 PUMP VFD INDOOR CONTROL PANEL CONTROL WIRING DIAGRAM
Y0E51	6 PUMP VFD INDOOR CONTROL PANEL CONTROL WIRING DIAGRAM
Y0E52	6 PUMP VFD INDOOR CONTROL PANEL CONTROL WIRING DIAGRAM
Y0E58	6 PUMP VFD INDOOR PUMP 101 CONTROL WIRING DIAGRAM
Y0E59	6 PUMP VFD INDOOR PUMP 102 CONTROL WIRING DIAGRAM
Y0E60	6 PUMP VFD INDOOR PUMP 103 CONTROL WIRING DIAGRAM
Y0E61	6 PUMP VFD INDOOR PUMP 104 CONTROL WIRING DIAGRAM
Y0E62	6 PUMP VFD INDOOR PUMP 105 CONTROL WIRING DIAGRAM
Y0E63	6 PUMP VFD INDOOR PUMP 106 CONTROL WIRING DIAGRAM

TYPICAL INSTALLATION DETAILS	
NO.	TITLE
Z0C01	SUBMERSIBLE TRANSDUCER WELL LEVEL GAUGING SYSTEM INSTALLATION & DETAILS
Z0E02	6 PUMP VFD INDOOR TYPICAL JUNCTION BOX DETAILS
Z0E03	6 PUMP VFD INDOOR TYPICAL ELECTRICAL DETAILS
Z0E04	6 PUMP VFD INDOOR TYPICAL ELECTRICAL DETAILS
Z0E05	6 PUMP VFD INDOOR CONTROL BUILDING — ELECTRICAL
Z0E06	— EXAMPLE — ELECTRICAL SITE PLAN ALTERNATE HIGH PROFILE CONFIGURATION
Z0E07	6 PUMP VFD INDOOR TYPICAL ELECTRICAL DETAILS
Z0E08	6 PUMP VFD INDOOR TYPICAL ELECTRICAL DETAILS
Z0E13	6 PUMP VFD INDOOR MCC ELEVATIONS
Z0E14	6 PUMP VFD INDOOR MCC ELEVATIONS
Z0E15	6 PUMP VFD INDOOR MCC ELEVATIONS
Z0E21	6 PUMP VFD INDOOR CONDUIT SCHEDULE FOR 480 VOLT
Z0E22	6 PUMP VFD INDOOR CONDUIT SCHEDULE FOR 480 VOLT
Z0E42	6 PUMP VFD INDOOR DEVICE RATING SCHEDULE TYPICAL ELECTRICAL DETAILS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	LIGHTING FIXTURE		FLOAT SWITCH
	BRACKET MOUNTED LIGHTING FIXTURE OR HIGH (NUMBER INDICATES LIGHTING PANEL CIRCUIT NUMBER - TYPICAL FOR ALL LIGHTING & RECEPTACLE CIRCUITS)		ELECTRO-PNEUMATIC VALVE
	SINGLE CONVENIENCE RECEPTACLE		SOLENOID VALVE
	DUPLEX CONVENIENCE RECEPTACLE (WP INDICATES CAST WEATHER PROOF OUTLET BOX & COVER)		ELECTRIC THERMOSTAT
	SINGLE SPECIAL PURPOSE RECEPTACLE (LETTER INDICATES TYPE PER SCHEDULE)		TEMPERATURE ACTUATED DEVICE
	TELEPHONE UTILITY SYSTEM OUTLET		SINGLE POLE TOGGLE SWITCH
	LIGHTING PANEL		DOUBLE POLE TOGGLE SWITCH
	UTILITY METERING CABINET		3 - WAY SWITCH
	TELEPHONE UTILITY SYSTEM BACKBOARD		MANUAL MOTOR STARTER WITH THERMAL ELEMENT
	DISTRIBUTION PANEL		MOTOR RATED SWITCH WITH THERMAL ELEMENT IN NEMA 4X SS ENCLOSURE
	CABINET OR PULL BOX		BATTERY POWERED EMERGENCY LIGHTING FIXTURE
	UNFUSED SAFETY SWITCH - 3P, 30A, 600V UNLESS OTHERWISE INDICATED.		UNIT HEATER
	FUSED SAFETY SWITCH - 3P, 600V, 30A MINIMUM OR AS REQUIRED TO ACCOMMODATE FUSE SIZE INDICATED		CLASS 1, DIV I, CONDUIT SEAL
	OUTLET OR JUNCTION BOX		EXPOSED CONDUIT
	COMBINATION PROTECTIVE DEVICE & MAGNETIC STARTER		EXPOSED PUMP CABLE
	SINGLE UNIT PUSHBUTTON STATION		FIELD/GROUND LOOP CONDUCTORS
	2-UNIT PUSHBUTTON STATION		CONDUIT CONCEALED IN FLOOR SLAB OR UNDER FLOOR SLAB. (CONDUITS 1-1/2" OR LARGER SHALL BE INSTALLED UNDER FLOOR SLAB). CONDUITS RUN UNDER FLOOR SLAB SHALL BE ENCASED IN CONCRETE. SEE NOTE 2
	3-UNIT PUSHBUTTON STATION		HOMERUN TO PANEL OR MCC AS NOTED
	ELECTRIC MOTOR - NUMBER INDICATES HORSEPOWER		CONCRETE ENCASED DUCTBANK (SECTION INDICATES CONDUIT CONFIGURATION & DESIGNATIONS)
	FLOW SWITCH		EXPOSED CONDUIT BANK
	"HAND-OFF-AUTOMATIC" SELECTOR SWITCH		AIR TERMINAL
	LIMIT SWITCH		GROUND ROD & WELL
	MAGNETIC REED DOOR SWITCH		KIRK KEY
	MOTION SWITCH		
	PRESSURE SWITCH		
	TORQUE SWITCH		
	PNEUMATIC/ELECTRIC SWITCH		
	PROXIMITY LIMIT SWITCH		
	VACUUM SWITCH		

SYMBOL	DESCRIPTION
	CONTACT, NORMALLY OPEN
	CONTACT, NORMALLY CLOSED
	PUSHBUTTON, NORMALLY CLOSED
	PUSHBUTTON, NORMALLY OPEN
	SELECTOR SWITCH
	OVERLOADS
	FUSE
	PILOT LIGHT, PUSH TO TEST
	AUXILIARY STARTER CONTACTS
	PRESSURE SWITCH, OPENS ON RISE
	PRESSURE SWITCH, CLOSSES ON RISE
	LEVEL OR LEAK DETECTION SWITCH
	LIMIT SWITCH, NORMALLY CLOSED
	LIMIT SWITCH, NORMALLY OPEN
	LIMIT SWITCH, NORMALLY OPEN, HELD CLOSED
	LIMIT SWITCH, NORMALLY CLOSED, HELD OPEN
	TEMPERATURE ACTUATED SWITCH, OPENS ON RISE
	TEMPERATURE ACTUATED SWITCH, CLOSSES ON RISE
	VACUUM SWITCH, OPENS ON RISE
	VACUUM SWITCH, CLOSSES ON RISE
	THERMAL OVERLOAD
	SOLID STATE MOTOR PROTECTION RELAY (MPR)
	SPACE HEATER
	GROUND CONNECTION
	SOLENOID
	MOTORIZED TIME DELAY RELAY
	TIME DELAY RELAY
	TIME DELAY CONTACT (O=OPEN, X=CLOSED, DESIGNATION INDICATES CONTACT POSITION WHEN RELAY IS RESET-TIMING-TIMED OUT)
	AUXILIARY RELAY
	CONTROL POWER TRANSFORMER
	MOTOR STARTER OPERATING COIL

WIRE NUMBER USED ON WIRING DIAGRAM & TERMINAL BLOCKS

RELAY DESIGNATION

SYMBOL	DESCRIPTION
	MECHANICAL/ELECTRICAL LINK
	ELECTRICAL SIGNAL
	CONNECTION TO PIPING
	DISCRETE FIELD MOUNTED INSTRUMENT
	INTERNAL OR INACCESSIBLE DISCRETE DEVICE
	PANEL MOUNTED DISCRETE DEVICE
	PLC INPUT/OUTPUT
	CHECK VALVE
	ISOLATION VALVE
	SERIAL INPUT
	RELAY

IDENTIFICATION LETTERS			
FIRST LETTER	SUCCEEDING LETTERS		
MEASURED OR INITIATING VARIABLE	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A NOT USED	ALARM		
E NOT USED	SENSOR (PRIMARY ELEMENT)		
H HAND			HIGH
I CURRENT (ELEC)	INDICATE		
J POWER			
L LEVEL			LOW
R NOT USED	RECORD		
S NOT USED		SWITCH	
Y EVENT, STATE OR PRESENCE		RELAY, COMPUTE, CONVERT	
Z POSITION, DIMENSION			

ABBREVS	
A	----- AMP
ADJ	----- ADJUSTABLE
AFF	----- ABOVE FINISHED FLOOR
AI	----- ANALOG INPUT
ALT	----- ALTERNATOR
AO	----- ANALOG OUTPUT
AT&T	----- AT&T TELEPHONE
C	----- CONDUIT
CA	----- CABLE
CAB	----- CABINET
CAT.	----- CATALOG
CB	----- CIRCUIT BREAKER
CKT	----- CIRCUIT
COMM	----- COMMUNICATIONS
CONT	----- CONTINUED
CPT-N	----- CONTROL POWER TRANSFORMER NEUTRAL
CU	----- CENTRAL PROCESSING UNIT
CT	----- CURRENT TRANSFORMER
CU	----- COPPER
CW	----- COOL WHITE
DI	----- DISCRETE INPUT
DIREC	----- DIRECTIONAL
DIV	----- DIVISION
DN	----- DOWN
DO	----- DISCRETE OUTPUT
ETM	----- ELAPSED TIME METER
G.E.	----- GENERAL ELECTRIC
GFI	----- GROUND FAULT INTERRUPT
GN	-----

SYMBOL	DESCRIPTION
	SEPARABLE CONTACTS
	CIRCUIT BREAKER
	COMBINATION MOTOR STARTER
	VOLTMETER
	VOLTMETER SWITCH
	CURRENT TRANSFORMER (CT) DESIGNATION INDICATES QUANTITY & RATIO
	POTENTIAL TRANSFORMER
	LIGHTING TRANSFORMER
	POWER FACTOR CORRECTION CAPACITOR
	PHASE FAILURE/UNDERVOLTAGE MONITOR RELAY
	FUSE
	MOTOR OVERLOAD
	SOLID STATE OVERLOAD
	FUSED DISCONNECT SWITCH
	SURGE ARRESTOR
	VARIABLE FREQUENCY DRIVE

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS.

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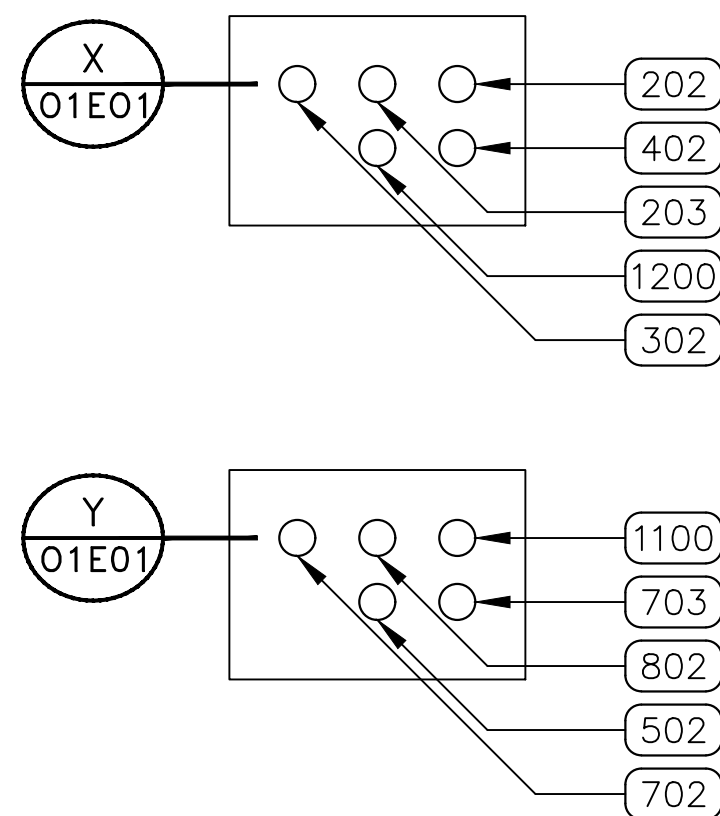
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D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

TYPE	MFG & CATALOG NO.	LAMP SIZE	MOUNTING	REMARKS	TYPE	MFG & CATALOG NO.	LAMP SIZE	MOUNTING	REMARKS
LED 	LITHONIA ZL2N-L48-5000LM-MDD-MVOLT-50K-8CR1WH OR APPROVED EQUAL	4' LED	PENDANT MOUNT 9'-6" AFF	4' PENDENT OR SURFACE MOUNTED		EDWARDS SIGNAL ALARM BEACON	13W LED	STEM MOUNTED	RED POLYCARBONATE LENS SUITABLE FOR WET LOCATIONS - 120V, SERIES 105 XBR
LED 	LITHONIA ZL2N-L24-200LM-MDD-MVOLT-40K-8CR1WH 120V OR EQUAL	2' LED	SURFACE	FIXTURE MOUNTED IN CONTROL PANEL		LITHONIA C5X1FT 530MA DRIVER 120V OR EQUAL	51W COATED LED	POLE MOUNT	WITH 120 VOLT DRIVER AND PHOTOCELL TYPE III FORWARD THRO
	LITHONIA D5XW1 530MA DRIVER 120V OR EQUAL	36W LED	WALL MOUNT 12" ABOVE DOOR FRAME	VANDAL RESISTANT LEXAN REFRACTOR & PHOTOCELL					

TYPE	MFG & CATALOG NO.	DESCRIPTION
	KENALL HL SERIES OR APPROVED EQUAL	TWO 4.5W LED LAMPS. 8W NICKEL CADMIUM BATTERY, 120V OPERATION RATED TO SUPPORT 4 LAMPS FOR 1 1/2 HOURS. PROVIDE MOUNTING HARDWARE AS REQ'D.
	KENALL HL SERIES OR APPROVED EQUAL	REMOTE SINGLE LAMP 4.5W LED LAMP IN THERMOPLASTIC HOUSING COMPLETE WITH SWIVEL MOUNT, MOUNTING BOX AND HARDWARE

SCALE:	NONE	DESIGNED BY:	
SUBMITTED:		DRAWN BY:	
DATE:		SHEET NO.	OF SHEETS
SURVEY BY:		DWG. NO.	
FIELD BOOK NO.		ZOE01-0516	



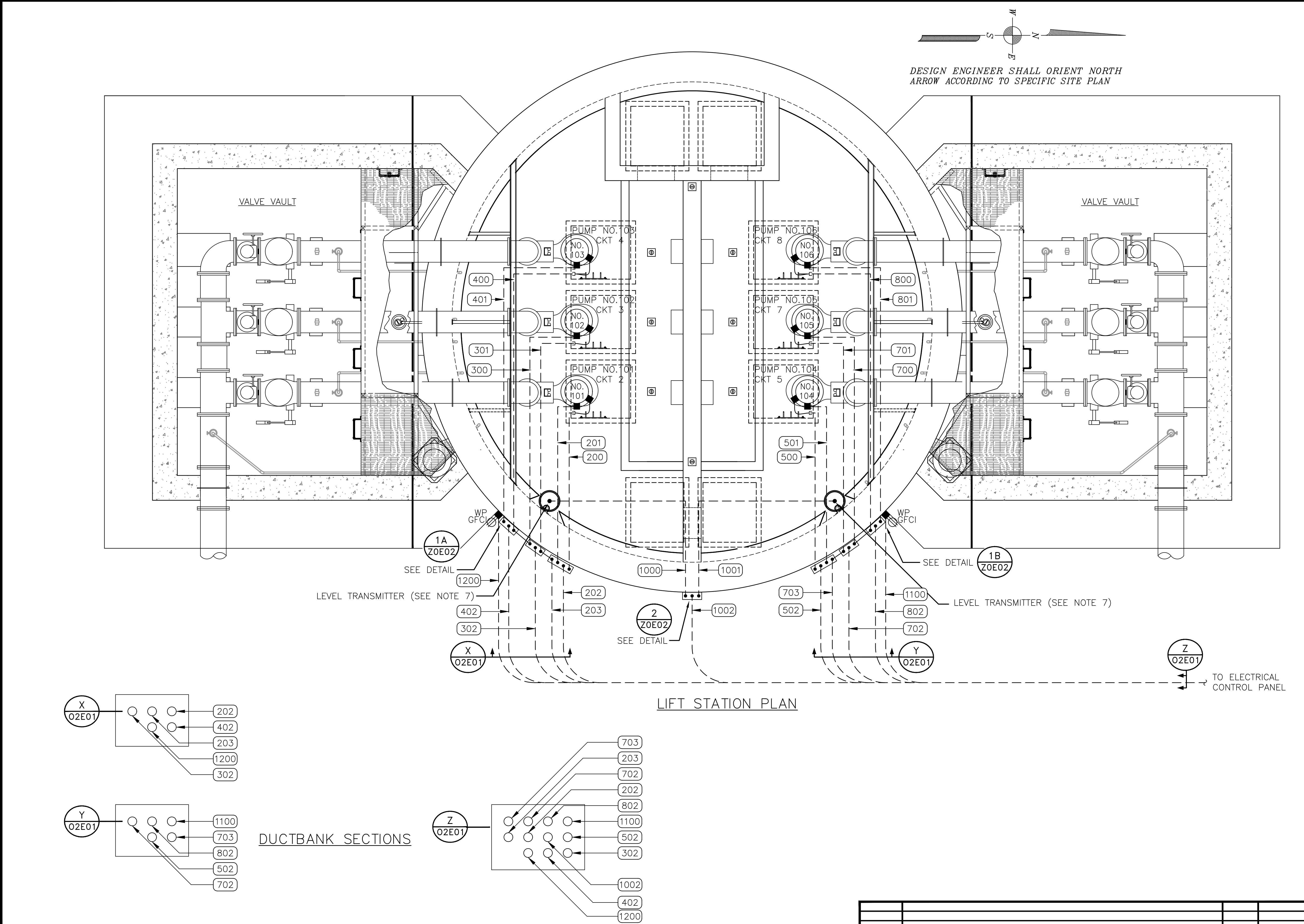
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ORIGINAL SCALE IN INCHES
FOR REDUCED PLANS

SCALE: XX" = 1'-0"	DESIGNED BY:
SUBMITTED:	DRAWN BY:
DATE:	SHEET NO. OF SHEETS
SURVEY BY:	DWG. NO.
FIELD BOOK NO.	01E01-0516

REV. NO.	DESCRIPTION	APP'D	DATE

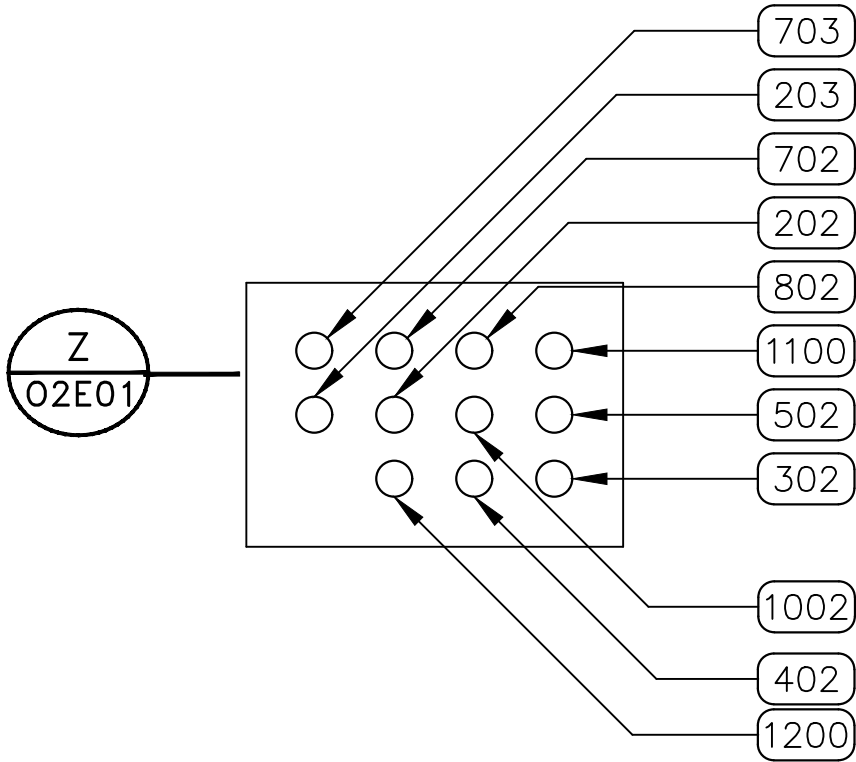
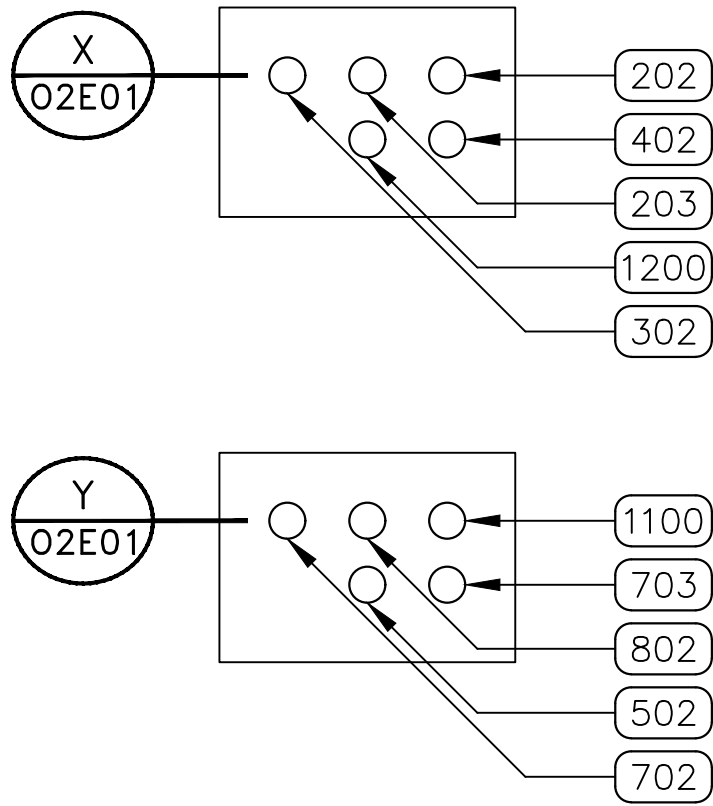


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O2E01-6VFD.DWG

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0 1 2 3

ORIGINAL SCALE IN INCHES
FOR REDUCED PLANS

DUCTBANK SECTIONS



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- NOTES:**
1. THE ELECTRICAL INSTALLATION WITHIN THE WET WELL SHALL BE EXPLOSION PROOF IN ACCORDANCE WITH ARTICLE 510 OF THE NEC FOR CLASS I, DIVISION 1, GROUP C & D.
 2. INSTALL CONDUIT SEALS VERTICALLY WITHIN 18 INCHES OF WALL PENETRATION OR JUNCTION BOX. DO NOT INSTALL ANY CONDUIT FITTINGS WITHIN VALVE VAULT PRIOR TO SEALING FITTING. FOR MOTOR FEEDER AND CONTROL CABLES, INSTALL TYPE CSBE CABLE SEALING FITTING AT JUNCTION BOX.
 3. ENTRANCE AND EXPLOSION PROOF SEAL IN CONDUITS TO CONTROL BUILDING OR PANEL.
 4. WHERE JUNCTION BOXES ARE SHOWN, THEY SHALL BE USED FOR PULLING OR TERMINATION PURPOSES ONLY. SPLICES WILL NOT BE ALLOWED EXCEPT AS PROVIDED BY NOTE 2 AND AT LIGHTING AND RECEPTACLE TERMINATIONS. FOR MOTOR FEEDER AND CONTROL CABLES, INSTALL TYPE CSBE CABLE SEALING FITTING AT JUNCTION BOX ENTRANCE AND EXPLOSION PROOF SEAL IN CONDUITS TO CONTROL BUILDING OR PANEL.
 5. TERMINATE PUMP POWER & CONTROL CONDUITS WITH CSBE SEAL. ATTACH STAINLESS STEEL SPLIT SLEEVE CABLE SUPPORT ON EACH POWER AND CONTROL CABLE.
 6. ALL PUMP POWER AND CONTROL CABLE LEADS MUST BE THE SAME LENGTH REGARDLESS OF PUMP LOCATION FROM TERMINAL/JUNCTION BOX.
 7. LEVEL TRANSMITTERS SHOWN IN APPROXIMATE LOCATION. ACTUAL LOCATION SHALL BE OPPOSITE SIDE OF INLET PIPE.

CONDUIT LAYOUT FOR LIFT STATION
6 PUMP VFD
PREFERRED LOW PROFILE CONFIGURATION

PROJECT NO. R-000265-0XXX-X

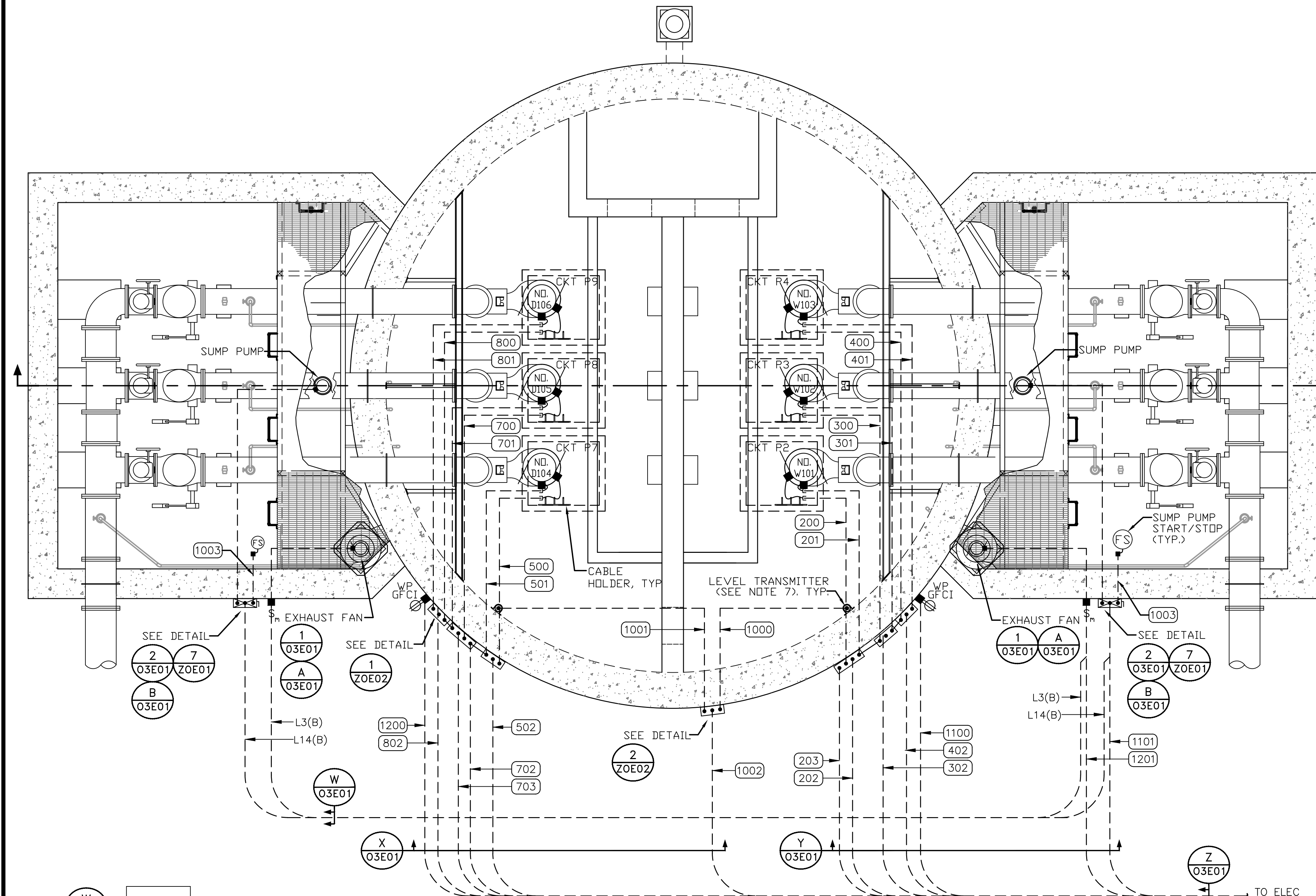
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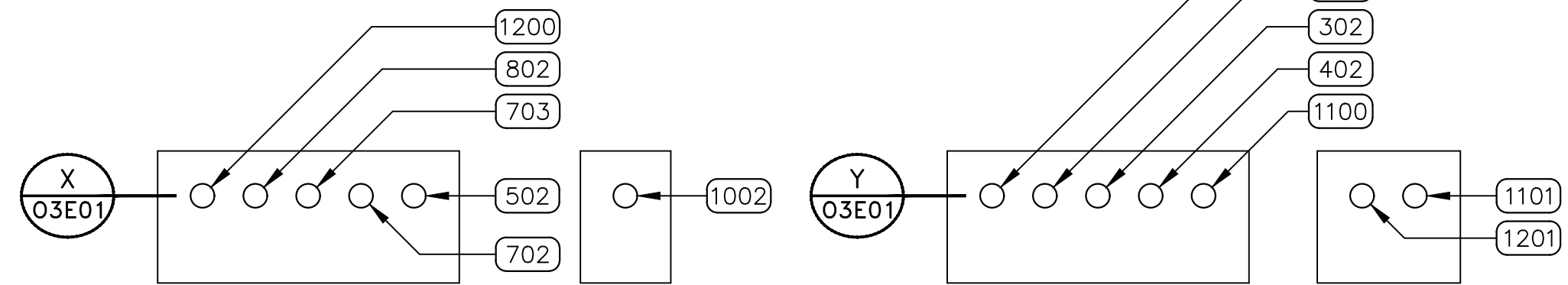
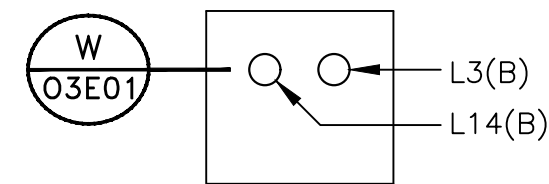
DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET Z0C0X

REV. NO.	DESCRIPTION	APP'D	DATE

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LIFT STATION PLAN



DUCTBANK SECTIONS

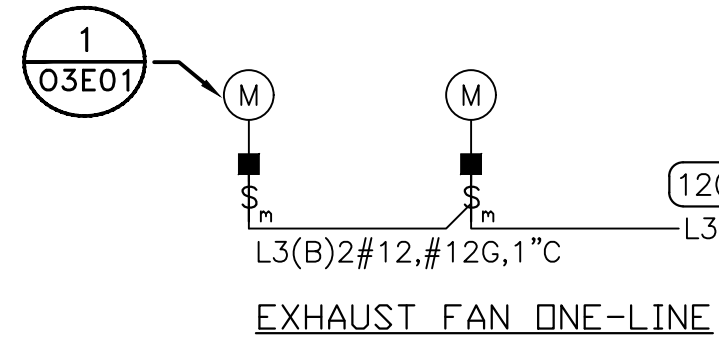
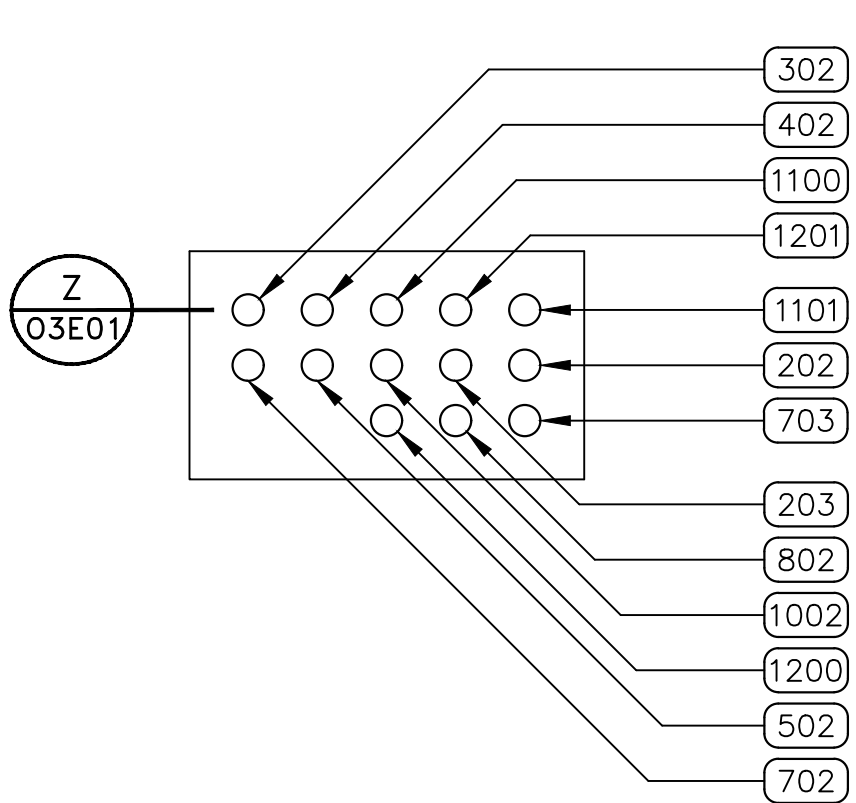


DIAGRAM A 03E01

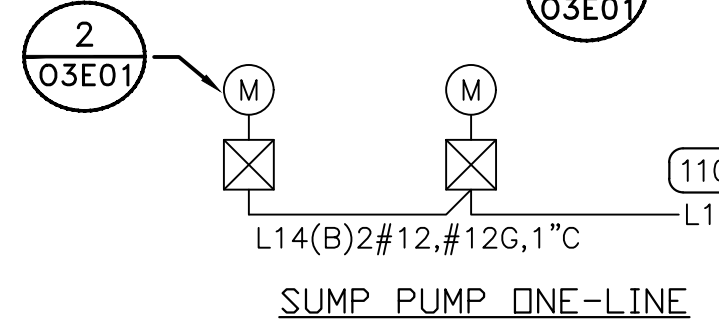
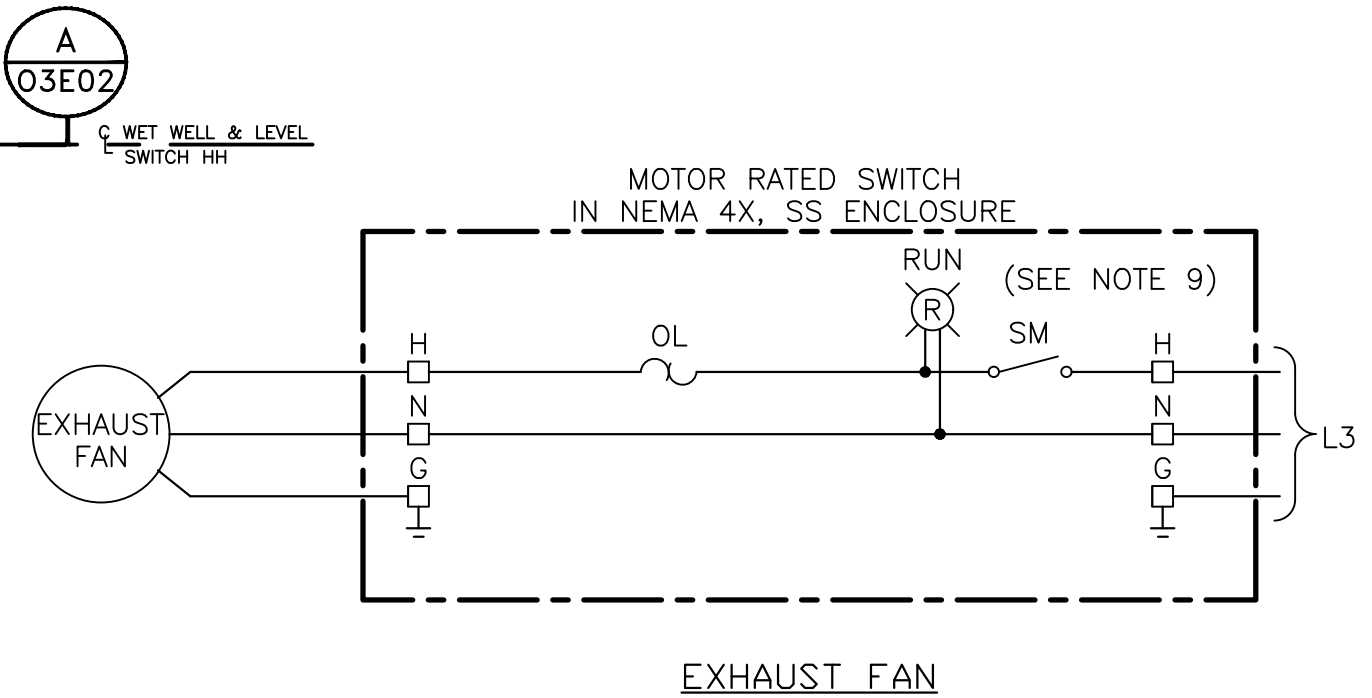
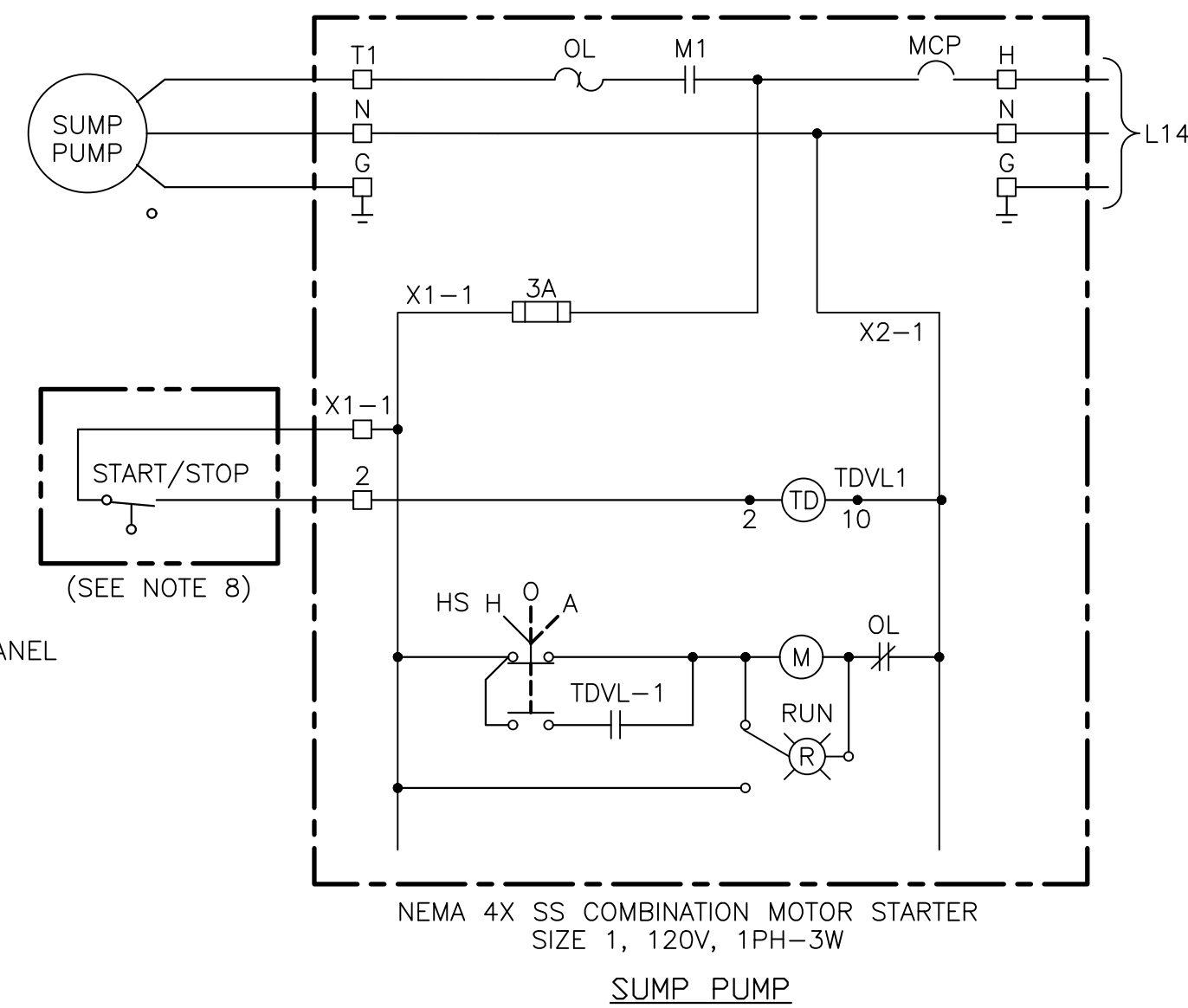


DIAGRAM B 03E01



SCHEMATIC 1 03E01



SCHEMATIC 2 03E01

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- NOTES:**
- GROUNDING SHALL BE PER N.E.C. MINIMUM REQUIREMENTS.
 - THE ELECTRICAL INSTALLATION WITHIN THE WET WELL SHALL BE EXPLOSION PROOF IN ACCORDANCE WITH ARTICLE 510 OF THE NEC FOR CLASS I, DIVISION 1, GROUP C & D.
 - WHERE JUNCTION BOXES ARE SHOWN, THEY SHALL BE USED FOR PULLING OR TERMINATION PURPOSES ONLY. SPLICES WILL NOT BE ALLOWED EXCEPT AS PROVIDED BY NOTE 4 AND AT LIGHTING AND RECEPTACLE TERMINATIONS.
 - FOR MOTOR FEEDER AND CONTROL CABLES, INSTALL TYPE CSBE CABLE SEALING FITTING AT JUNCTION BOX ENTRANCE AND EXPLOSION PROOF SEAL IN CONDUITS TO CONTROL BUILDING OR PANEL.
 - TERMINATE PUMP POWER & CONTROL CONDUITS WITH CSBE SEAL. ATTACH STAINLESS STEEL SPLIT SLEEVE CABLE SUPPORT ON EACH POWER AND CONTROL CABLE.
 - ALL PUMP POWER AND CONTROL CABLE LEADS MUST BE THE SAME LENGTH REGARDLESS OF PUMP LOCATION FROM TERMINAL/JUNCTION BOX.
 - LEVEL TRANSMITTERS SHOWN IN APPROXIMATE LOCATION. ACTUAL LOCATION SHALL BE OPPOSITE SIDE OF INLET PIPE.
 - FLOAT SWITCH WITH CABLE LENGTH SHALL BE AS REQUIRED TO PROVIDE CONTINUOUS RUN TO MOTOR STARTER.
 - MOTOR RATED SWITCH SIZE SHALL BE PER NAMEPLATE RATING OF MOTOR.

CONDUIT LAYOUT FOR LIFT STATION
6 PUMP VFD
ALTERNATE LOW PROFILE CONFIGURATION

PROJECT NO. R-000265-0XXX-X

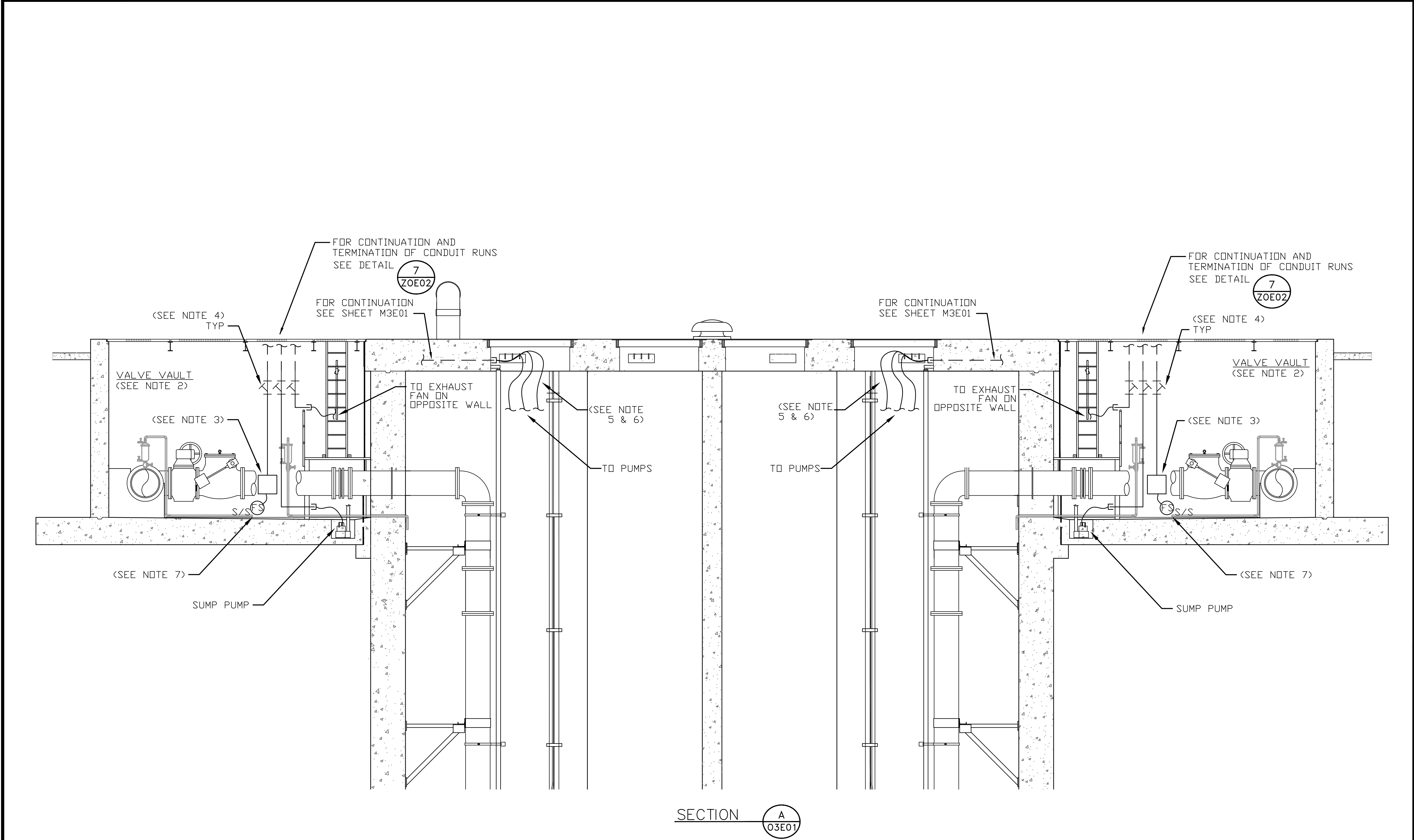
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DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET ZOC0X

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C. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

- NOTES:**
1. GROUNDING SHALL BE PER N.E.C. MINIMUM REQUIREMENTS.
 2. THE ELECTRICAL INSTALLATION WITHIN THE WET WELL SHALL BE EXPLOSION PROOF IN ACCORDANCE WITH ARTICLE 510 OF THE NEC FOR CLASS I, DIVISION 1, GROUP C & D.
 3. WHERE JUNCTION BOXES ARE SHOWN, THEY SHALL BE USED FOR PULLING PURPOSES ONLY. SPLICES WILL NOT BE ALLOWED EXCEPT AS
 4. FOR MOTOR FEEDER AND CONTROL CABLES, INSTALL TYPE CSBE CABLE SEALING FITTING AT JUNCTION BOX ENTRANCE AND EXPLOSION PROOF SEAL IN CONDUITS TO CONTROL BUILDING OR PANEL.
 5. TERMINATE PUMP POWER & CONTROL CONDUITS WITH CSBE SEAL. ATTACH STAINLESS STEEL SPLIT SLEEVE CABLE SUPPORT ON EACH POWER AND CONTROL CABLE.
 6. ALL PUMP POWER AND CONTROL CABLE LEADS MUST BE THE SAME LENGTH REGARDLESS OF PUMP LOCATION FROM TERMINAL/JUNCTION BOX.
 7. LEVEL TRANSMITTERS SHOWN IN APPROXIMATE LOCATION ACTUAL LOCATION SHALL BE OPPOSITE SIDE OF INLET PIPE
 8. FLOAT SWITCH WITH CABLE LENGTH SHALL BE AS REQUIRED TO PROVIDE CONTINUOUS RUN TO MOTOR STARTER.
 9. MOTOR RATED SWITCH SIZE SHALL BE PER NAMEPLATE RATING OF MOTOR.

ELEVATION SECTION
6 PUMP VFD CONDUIT ROUTING
ALTERNATE LOW PROFILE CONFIGURATION

PROJECT NO. R-000265-0XXX-X

TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET ZOC0X

CADD DWG. FILE NO. :
03E02-6VFD.DWG

COHSTD.BDR 0 1 2 3

ORIGINAL SCALE IN INCHES
FOR REDUCED PLANS

REV. NO.	DESCRIPTION	APP'D	DATE

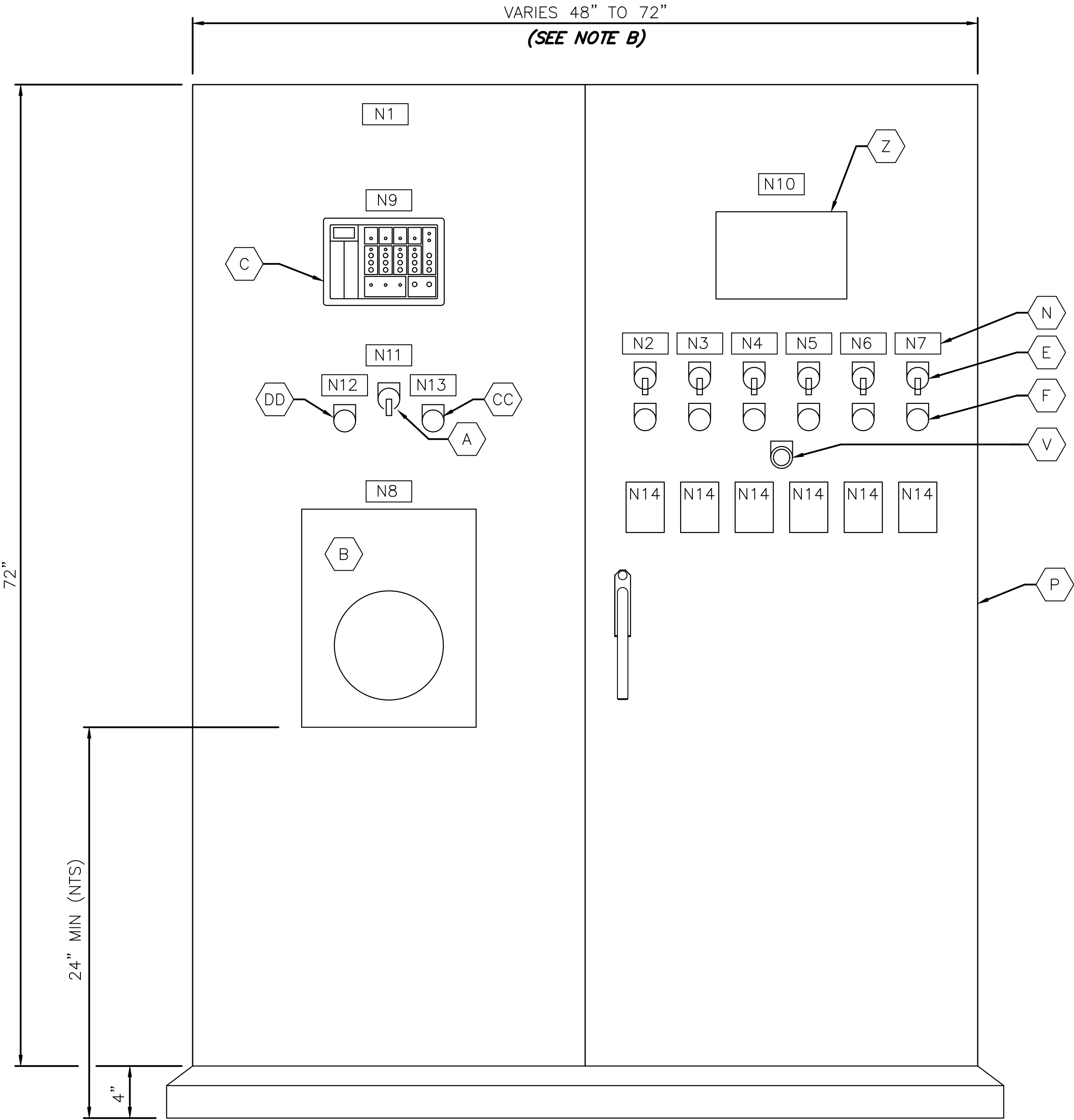
SCALE: XX" = 1'-0" DESIGNED BY:
SUBMITTED: DRAWN BY:
DATE: SHEET NO. OF SHEETS
SURVEY BY: DWG. NO.
FIELD BOOK NO. 03E02-0516

EQUIPMENT & DEVICE SCHEDULE		
ITEM	QUANTITY	DESCRIPTION
A	1	PRIMARY – BACKUP PLC MODE SECTOR SWITCH
B	1	WELL LEVEL RECORDER – 4–20mA INPUT, FOXBORO DUAL CHANNEL
C	1	PUMP CONTROLLER – DIGITAL CONTROL CORP. MODEL 11436 OR EQUAL
D	*	NOT USED
E	6	HAND–OFF–AUTO SWITCH, 3 POSITION, HEAVY DUTY, OILTIGHT WITH 2 SETS OF CONTACT BLOCKS (PUMP CONTROL)
F	6	INDICATING LIGHT, HEAVY DUTY, OILTIGHT, RED, 24 VDC, LED, WITH "RUN" LEGEND
G	*	NOT USED
H	1	SWITCH FOR CABINET LIGHT, 120V, 20A, SPST
I	1	DUPLEX RECEPTACLE, 120V, 20A, 2 WIRE, GROUNDED, GFCI TYPE
J	1	24" LED STRIP LIGHT 120V SUITABLE FOR ZERO DEGREE OPERATION (SEE FIXTURE "B" ON ZOE01)
K	6	TIME DELAY RELAY WITH THREE FORM C CONTACTS, 24 VDC COIL AND 11 PIN SOCKET BASE
L	1	PROGRAMMABLE LOGIC CONTROLLER WITH EXPANSION UNIT
M	*	CONTROL RELAY, 24 VDC RELAY WITH THREE FORM C CONTACTS AND 11 PIN SOCKET BASE
N	*	NAMEPLATES, SEE SPECIFICATIONS (SEE NAMEPLATE SCHEDULE) (SEE NOTE 1)
O	1	NOT USED
P	1	NEMA 12 GASKETED STEEL ENCLOSURE WITHOUT VENTS 72"H x 20"D x WIDTH AS REQUIRED
Q	*	TERMINAL BLOCK
R	1	WIRE DUCT 2" WIDE X 2" DEEP MINIMUM
S	1	GROUND BUS
T	1	WiMAX ETHERNET SWITCH
U	9	CARTRIDGE FUSES AND FUSEHOLDER
V	1	PUSHBUTTON, BLACK WITH "RESET" LEGEND
W	–	NOT USED.
X	*	FUSED TERMINAL BLOCKS
Y	1	POWER SURGE PROTECTOR – CONTROL POWER
Z	1	PROGRAMMING SCREEN (HMI)
AA	*	120VAC SYSTEM FUSES
BB	1	120 VAC – 24 VDC POWER SUPPLY, 5A
CC	1	INDICATING LIGHT, HEAVY DUTY, OILTIGHT, RED, 24 VDC, LED WITH "BACKUP" LEGEND
DD	1	INDICATING LIGHT, HEAVY DUTY, OILTIGHT, GREEN, 24 VDC, LED WITH "PLC" LEGEND
EE	2	ANALOG I/O SURGE SUPPRESSOR
FF	1	FLASHER MODULE

* – AS SCHEDULED

NAMEPLATE SCHEDULE

DESIGNATION	ENGRAVED	DESIGNATION	ENGRAVED
N1	PUMP STATION DESIGNATION	N8	LEVEL RECORDER
N2	PUMP NO. 101	N9	PUMP CONTROLLER
N3	PUMP NO. 102	N10	PROGRAMMING SCREEN
N4	PUMP NO. 103	N11	CONTROL MODE
N5	PUMP NO. 104	N12	PRIMARY
N6	PUMP NO. 105	N13	BACKUP
N7	PUMP NO. 106	N14	MOTOR DATA
			HORSEPOWER (OUTPUT) _____
			RPM AT FULL LOAD _____
			TIME RATING _____
			FREQUENCY _____
			NUMBER OF PHASES _____
			MODEL NUMBER _____
			RATED VOLTAGE _____
			SERVICE FACTOR _____
			FULL LOAD AMPS _____
			INSULATION CLASS _____
			NEMA DESIGN LETTER _____
			TEMPERATURE RISE _____
			NEMA FRAME SIZE _____
			DATE OF MANUFACTURE _____
			THERMO PROTECTION (IF REQUIRED) _____
			MOISTURE DETECTION (IF REQUIRED) _____



CONTROL CABINET
FRONT DOOR ELEVATION

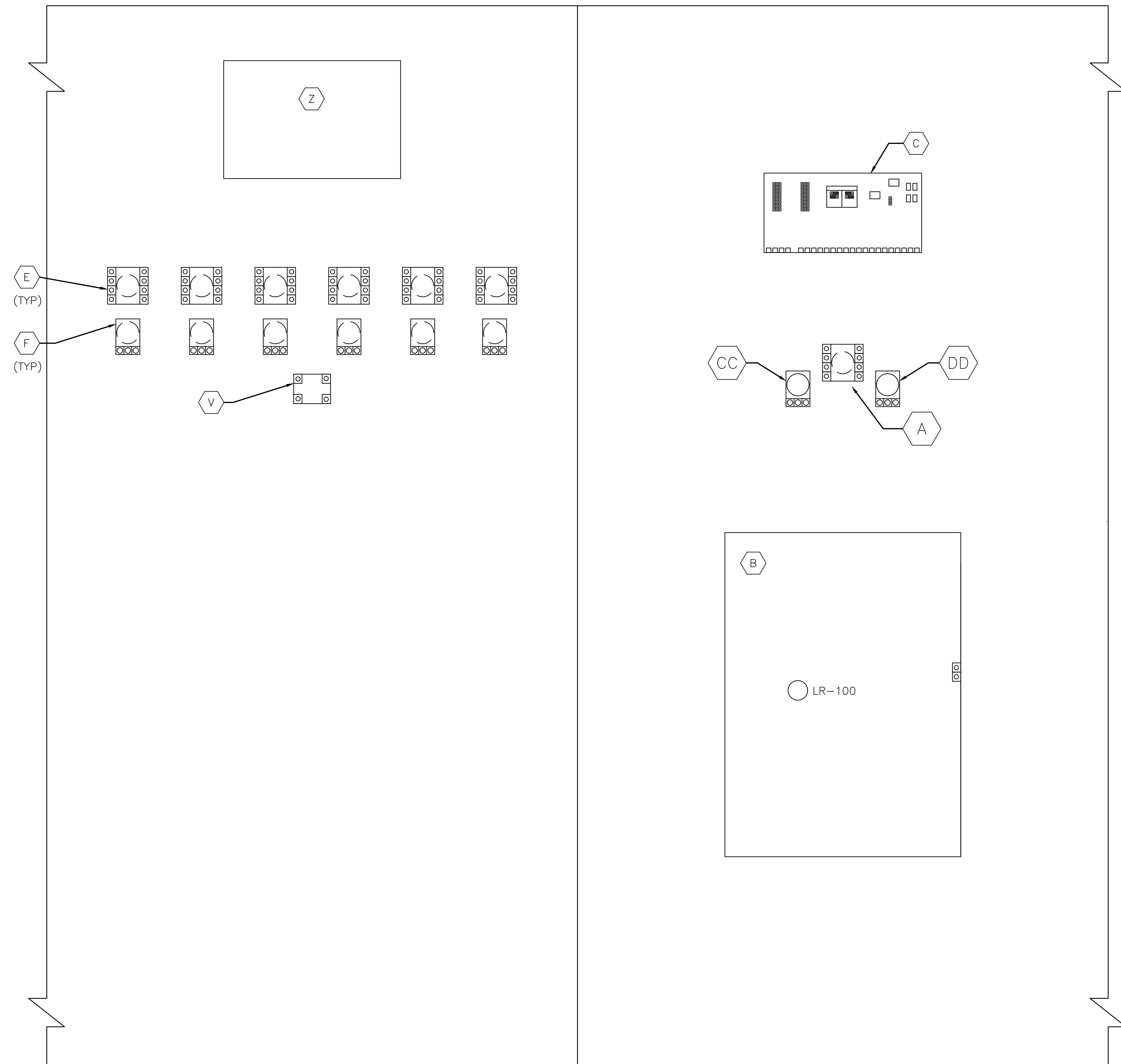
NOTES TO DESIGN ENGINEER:
A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.
B. DESIGN ENGINEER SHALL SELECT THE APPROPRIATE CONTROL PANEL WIDTH (SEE DEVICE RATINGS SCHEDULE ON SHEET ZOE42).
C. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
D. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
E. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:
1. NAMEPLATES SHALL BE MOUNTED TO PANELS USING STAINLESS STEEL HARDWARE.

6 PUMP VFD INDOOR CONTROL CABINET EQUIPMENT LAYOUT & SCHEDULE	
PROJECT NO.	R-000265-0XXX-X
TITLE	CITY OF HOUSTON DESIGN GUIDELINE DRAWINGS FOR SUBMERSIBLE LIFT STATIONS
CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING AND CONSTRUCTION	

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET ZOC0X

SCALE: 1 1/2" = 1'-0"	DESIGNED BY:
SUBMITTED:	DRAWN BY:
DATE:	SHEET NO. OF SHEETS
SURVEY BY:	DWG. NO. YOE21-0516
FIELD BOOK NO.	



CONTROL CABINET
BACK DOOR ELEVATION

REV. NO.	DESCRIPTION	APP'D	DATE

NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS.

IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

C. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATION AND STANDARD INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

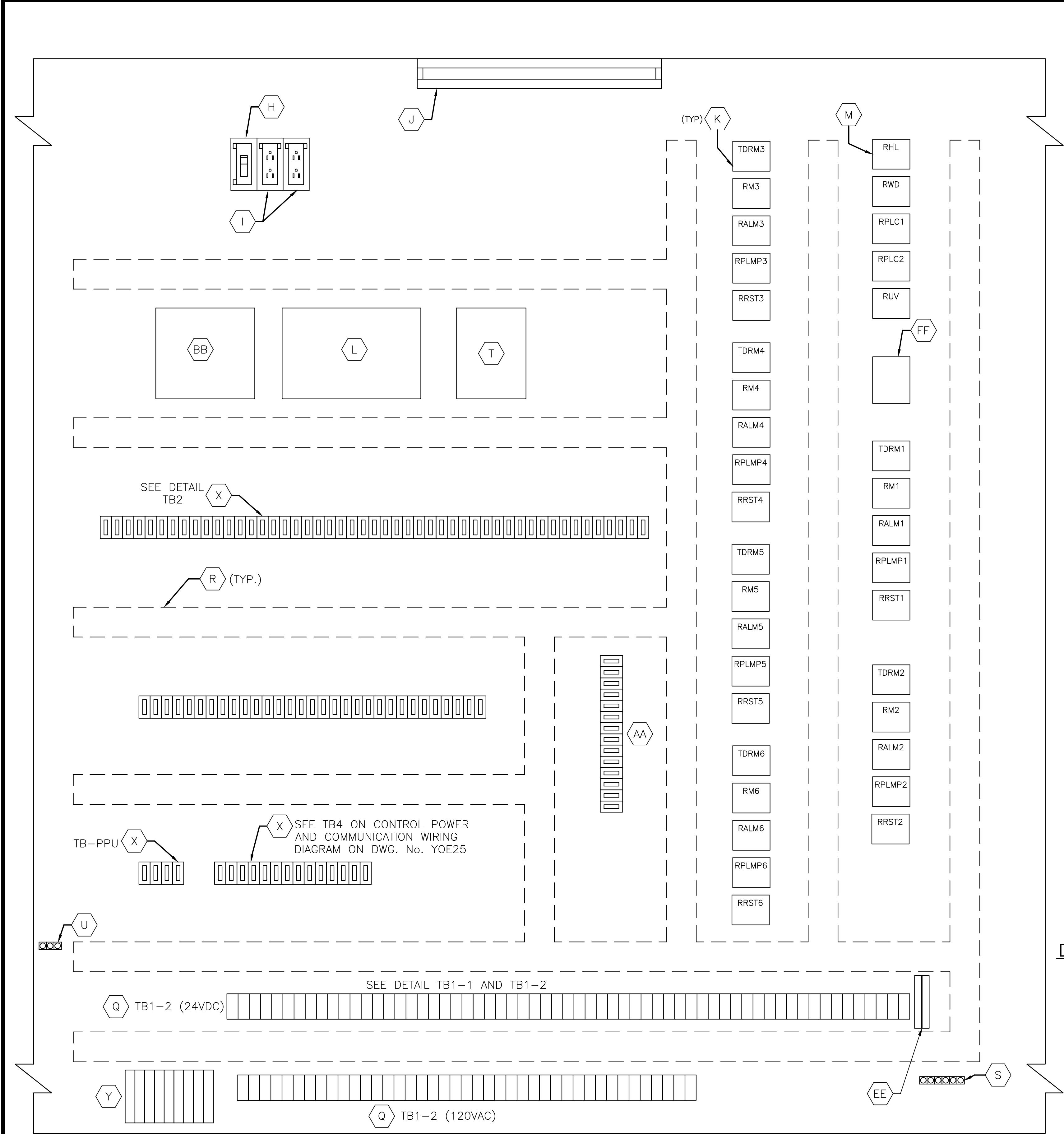
D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ADD REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:
1. SEE SHEET Y0E21 FOR EQUIPMENT SCHEDULE.

6 PUMP VFD INDOOR CONTROL CABINET BACK DOOR ELEVATION	
PROJECT NO.	R-000265-0XXX-X
TITLE	CITY OF HOUSTON DESIGN GUIDELINE DRAWINGS FOR SUBMERSIBLE LIFT STATIONS
CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING AND CONSTRUCTION	

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET ZOC0X

SCALE:	3" = 1'-0"	DESIGNED BY:	
SUBMITTED:		DRAWN BY:	
DATE:		SHEET NO.	OF SHEETS
SURVEY BY:		DWG. NO.	
FIELD BOOK NO.		YOE22-0516	



CONTROL PANEL ELEVATION

L1A
L1N
27
28
31
32
34
38
48
48N
49
50
51
52
53
54
L
N
SPARE
109
110
X1-1
111
X2-1
SPARE
209
210
X1-2
211
X2-2
SPARE
309
310
X1-3
311
X2-3
SPARE
409
410
X1-4
411
X2-4
SPARE
509
510
X1-5
511
X2-5
SPARE
609
610
X1-6
611
X2-6
SPARE

DETAIL TB1-1

1
24V-
24V-
2
11
1001

TB1-2 CONT'D

DETAIL TB1-2

TB1-2 CONT'D
1001A
12
1003
102
103
3P1
112
116
SPARE
SPARE
117
124
125
126
127
SPARE
202
203
3P2
212
216
SPARE
SPARE
217
224
225
226
227
SPARE
302
303
3P3
312
316
SPARE
SPARE
317
324
325
326
327
SPARE
402
403
3P4
412
416
SPARE
SPARE
417
424
425
426
427
SPARE
502
503
3P5
512
516

TB1-2 CONT'D

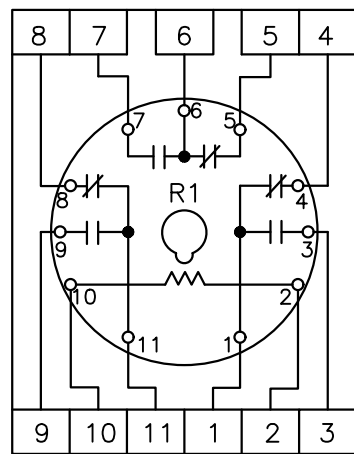
TB1-2 CONT'D
SPARE
SPARE
517
524
525
526
527
SPARE
602
603
3P6
612
616
C6B-1
C6B-2
617
624
625
626
627
3
3N
13
13A
13G
14
14A
14G
27
28
29
30
31
32
33
34
35
36
37
38
41
45
47
50
52
53
54
SPARE
SPARE
100
108
113
117
118
119
SPARE
SPARE
200
208
213
217
218

TB2 CONT'D

DETAIL TB2

TB2 CONT'D
219
SPARE
300
308
313
317
318
319
SPARE
SPARE
400
408
413
417
418
419
SPARE
500
508
513
517
518
SPARE
519
SPARE
600
608
613
617
618
619
SPARE

LEGEND	
TAG	DESCRIPTION
RALM	PUMP ALARM RELAY
RHLA	HIGH LEVEL RELAY ALARM
RPLMP	BACKUP SYSTEM RUN RELAY
RRST	PUMP RESET AUX RELAY
RPLC	PLC MODE AUX RELAY
RM	PUMP RUN AUX RELAY
RWD	WATCHDOG RELAY
RUV	UNDER VOLTAGE RELAY



RELAY DETAIL
ITEM K & M

NOTES TO DESIGN ENGINEER:
A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.
B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
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D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:
1. SEE SHEET YOE21 FOR EQUIPMENT SCHEDULE.

6 PUMP VFD INDOOR
CONTROL CABINET
EQUIPMENT LAYOUT

PROJECT NO. R-000265-0XXX-X

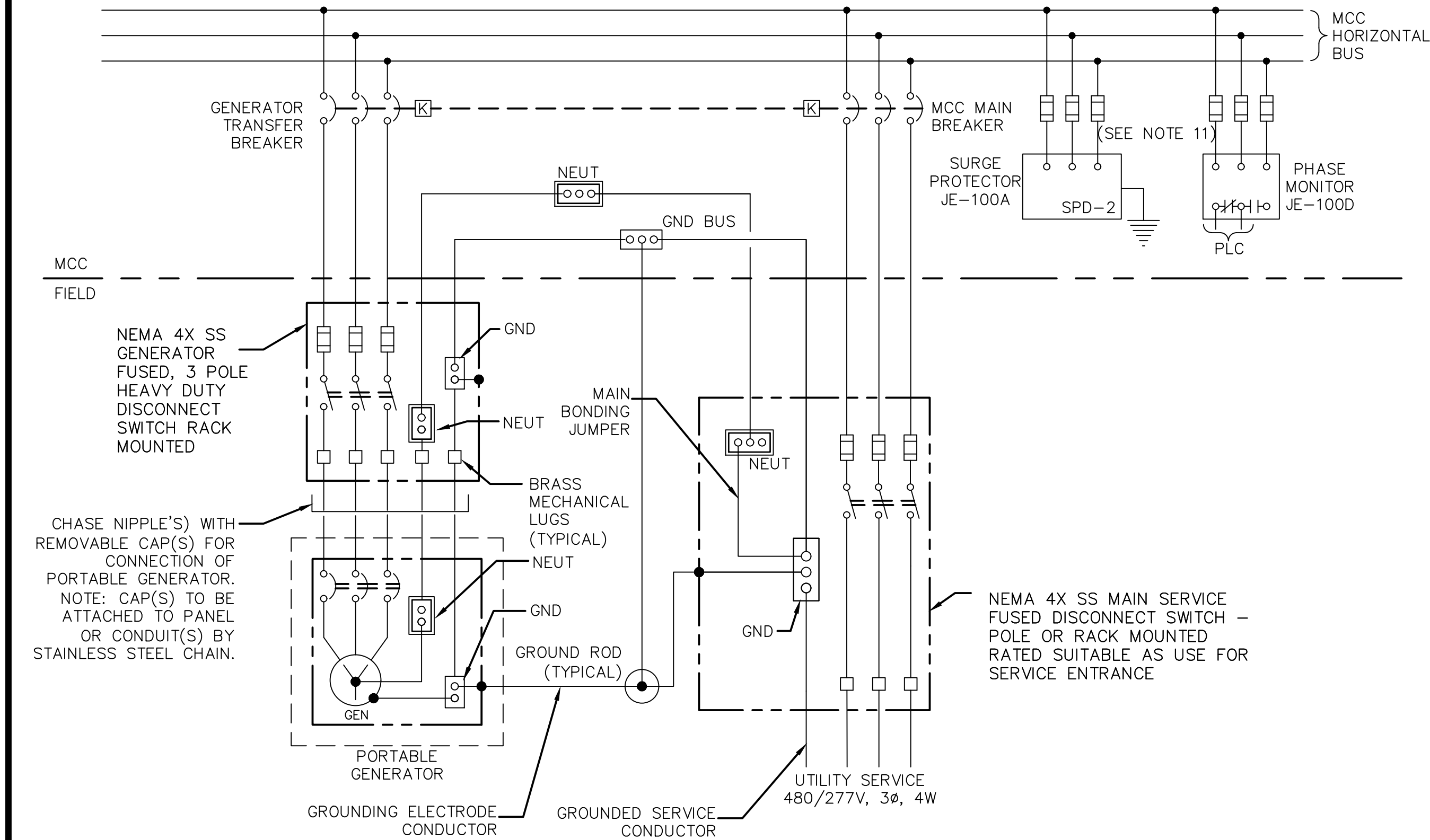
TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

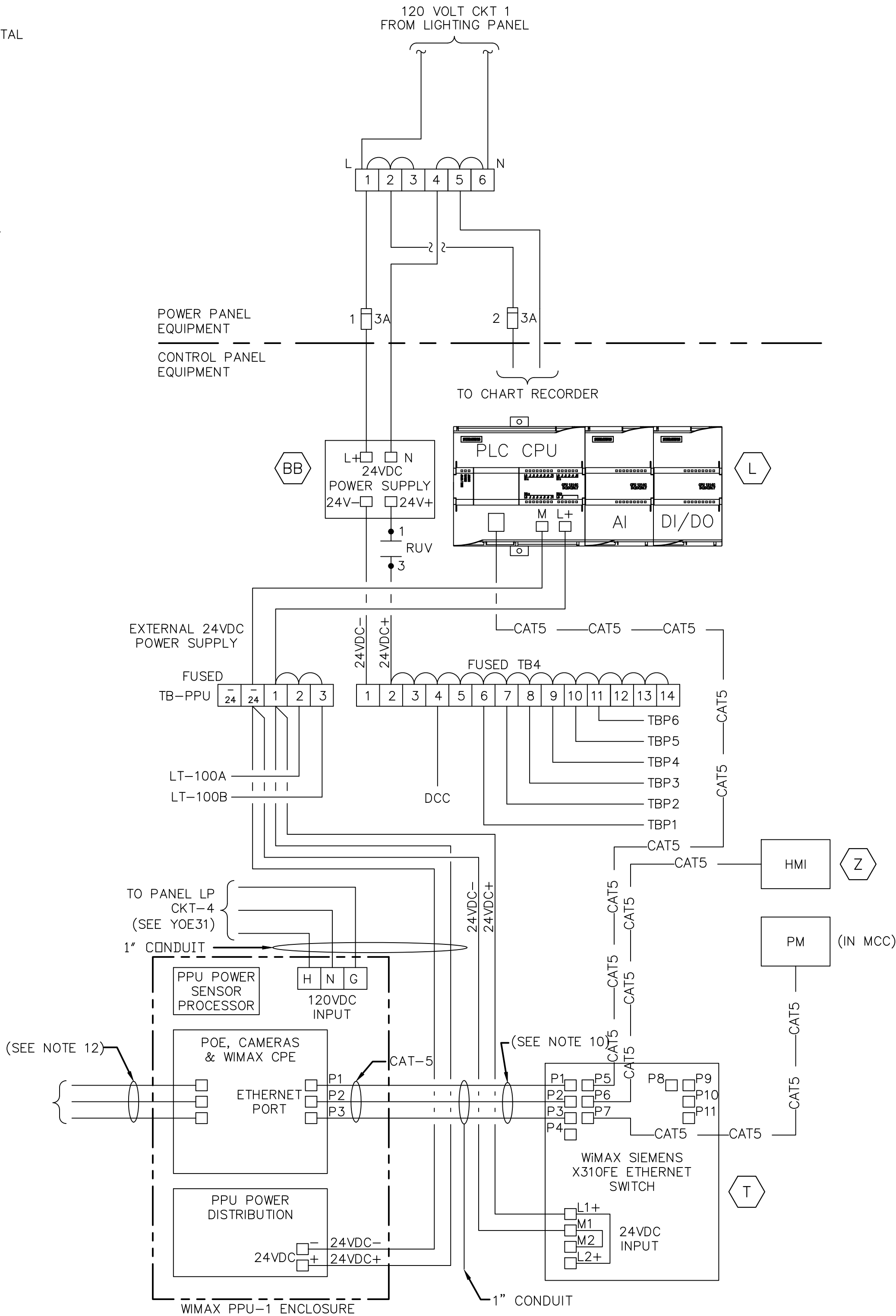
DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET Z0C0X

REV. NO.	DESCRIPTION	APP'D	DATE

SCALE: 3" = 1'-0"	DESIGNED BY:
SUBMITTED:	DRAWN BY:
DATE:	SHEET NO. OF SHEETS
SURVEY BY:	DWG. NO. YOE23-0516
FIELD BOOK NO.	



POWER WIRING DIAGRAM (SEE NOTE 7)



CONTROL POWER & COMMUNICATIONS
WIRING DIAGRAM

(SEE NOTE 9)

NOTES TO DESIGN ENGINEER:

- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.
- B. UNLESS OTHERWISE INDICATED, ALL DEVICES WITHOUT FURTHER DESIGNATION ARE LOCATED AT THE MOTOR CONTROL CENTER (MCC).
- C. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
- D. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- E. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

1. THE 'X' NOTATION IN SCHEMATIC DESIGNATIONS REPRESENTS APPLICABLE PUMP NO. 101, 102, 103, 104, 105 OR 106.
2. THE 'Y' NOTATION INDICATES MCC CIRCUIT NUMBER.
3. UNLESS OTHERWISE INDICATED, ALL DEVICES WITHOUT FURTHER DESIGNATION ARE LOCATED AT THE MOTOR CONTROL CENTER (MCC).
4. REFER TO SPEC SECTION 16120 FOR CONDUCTOR COLOR CODE.
5. THE POWER SUPPLY SHALL FEED THE 24VDC I/O.
6. NOT USED.
7. REFER TO YOE31.
8. NOT USED.
9. WIMAX PPU-1 & SCADA WILL BE PROVIDED BY CONTRACTOR TO RUN CONDUITS & WIRES.
10. THREE ETHERNET CABLES FOR RADIO (P3), CAMERA 1 (P1), CAMERA 2 (P2).
11. PROVIDE FUSE SIZE PER MANUFACTURER'S REQUIREMENTS.
12. POE CABLES TO RADIO AND CAMERAS.

6 PUMP VFD INDOOR
MCC INCOMING POWER SCHEMATIC & CONTROL
POWER & COMMUNICATIONS WIRING DIAGRAM

PROJECT NO.

R-000265-0XXX-X

CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET Z0C0X

CADD DWG. FILE NO. :
YOE25-VFD.DWG

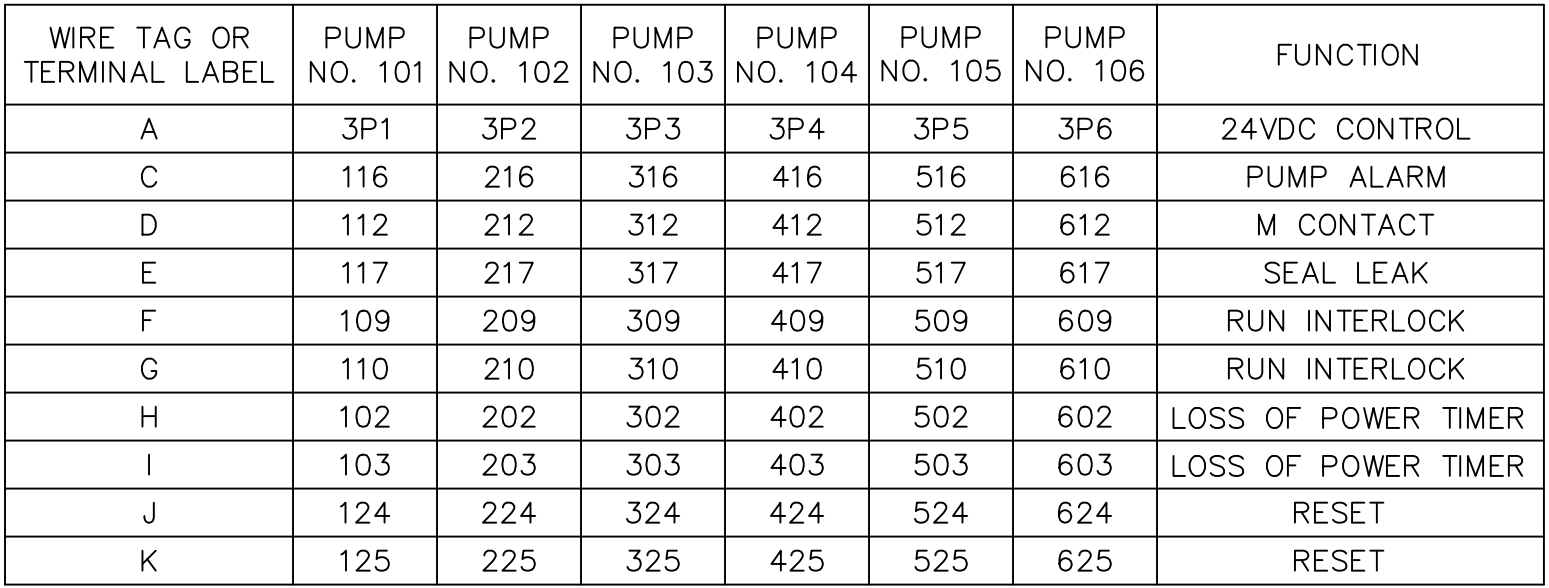
COHSTD.BDR

0 1 2 3

ORIGINAL SCALE IN INCHES
FOR REDUCED PLANS

REV. NO.	DESCRIPTION	APP'D	DATE

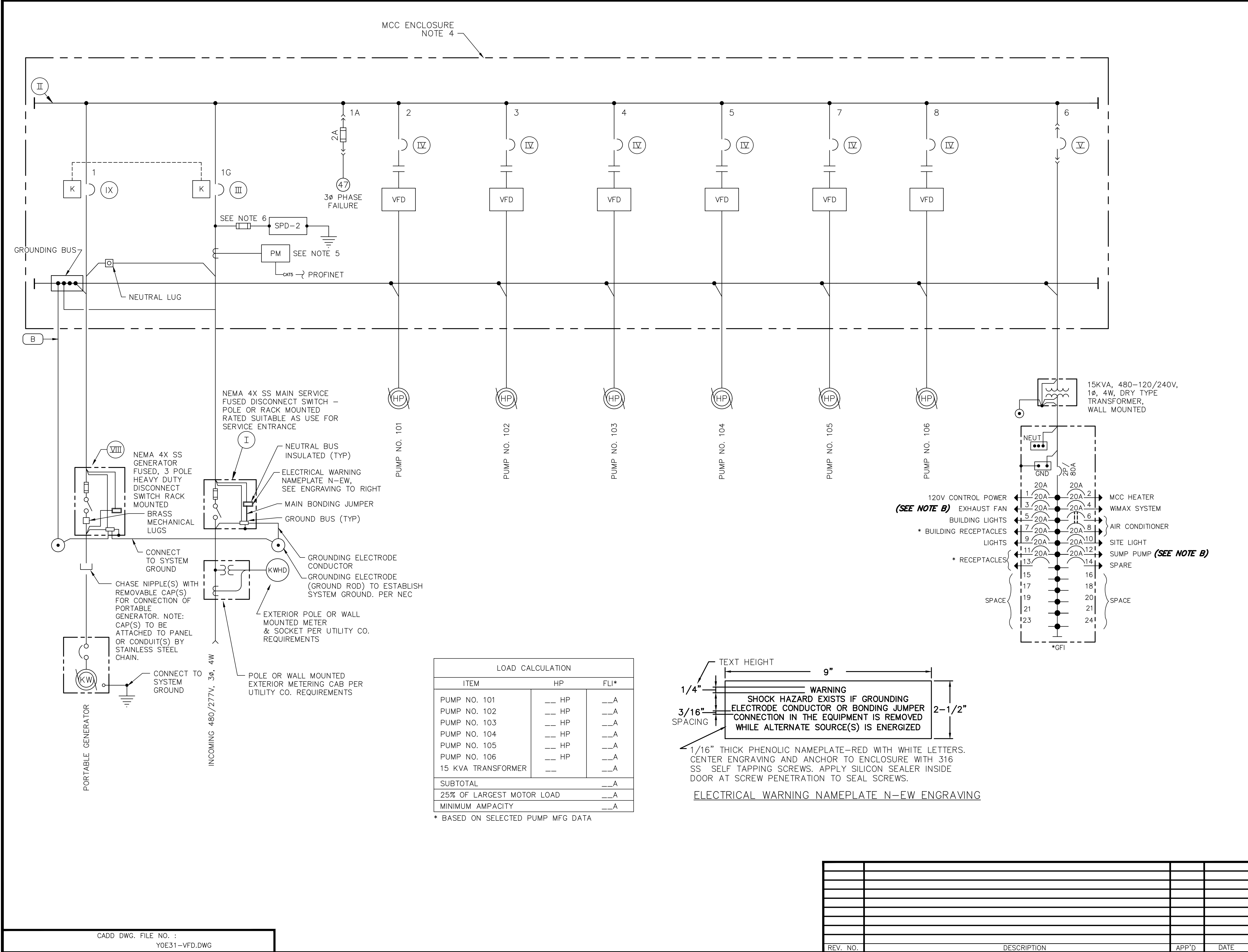
SCALE:	NONE	DESIGNED BY:
SUBMITTED:		DRAWN BY:
DATE:		SHEET NO. OF SHEETS
SURVEY BY:		DWG. NO.
FIELD BOOK NO.		YOE25-0516



ORIGINAL SCALE IN INCHES
FOR REDUCED PLANS

Y0E26-0516

REV. NO.	DESCRIPTION	APP'D	DATE



NOTES TO DESIGN ENGINEER:

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IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. PROVIDE NOTED ITEMS FOR STATIONS WITH VALVE VAULT DESIGNATED AS ALTERNATE LOW PROFILE CONFIGURATION. ONLY. PROVIDE VALVE VAULT SUMP PUMP AND EXHAUST FAN FOR CLOSED TOP VALVE VAULTS ONLY (CONCRETE TOP SLAB WITH HATCHES). DELETE THESE ITEMS FOR VALVE VAULTS WITH OPEN GRATING TOPS.

C. FOR DESCRIPTION AND RATINGS OF ITEMS INDICATED ROMAN NUMERAL FLAGS, SEE DEVICE RATINGS SCHEDULES.

D. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

E. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

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NOTES:

1. FOR DESCRIPTION AND RATINGS OF ITEMS INDICATED WITH ROMAN NUMERAL FLAGS, SEE DEVICE RATINGS SCHEDULE.

2. CONTRACTOR TO COORDINATE POWER FACTOR CORRECTION CAPACITOR SIZE WITH PUMP MANUFACTURER. MINIMUM 95% POWER FACTOR CORRECTION AT FULL LOAD.

3. CONTRACTOR SHALL VERIFY ACTUAL AMPERAGES OF MOTORS AND SIZE STARTERS, MOTOR CIRCUIT PROTECTORS, ETC. ACCORDINGLY.

4. MCC RATED SUITABLE FOR USE AS SERVICE ENTRANCE.

5. POWER MONITOR SEE SPECS. 13446.

6. PROVIDE FUSE SIZE ACCORDING TO MANUFACTURER'S REQUIREMENTS.

6 PUMP VFD INDOOR SINGLE LINE DIAGRAM

PROJECT NO. R-000265-0XXX-X

TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH STANDARD TITLE BLOCK ON ALL DRAWINGS, SEE STANDARD TITLE BLOCK DETAIL ON SHEET Z0C0X

SCALE:	NONE	DESIGNED BY:
SUBMITTED:		DRAWN BY:
DATE:		SHEET NO. OF SHEETS
SURVEY BY:		DWG. NO.
FIELD BOOK NO.		YOE31-0516

REV. NO.	DESCRIPTION	APP'D	DATE

LOAD CALCULATION		
ITEM	HP	FLI*
PUMP NO. 101	___ HP	___A
PUMP NO. 102	___ HP	___A
PUMP NO. 103	___ HP	___A
PUMP NO. 104	___ HP	___A
PUMP NO. 105	___ HP	___A
PUMP NO. 106	___ HP	___A
15 KVA TRANSFORMER	___	___A
SUBTOTAL		___A
25% OF LARGEST MOTOR LOAD		___A
MINIMUM AMPACITY		___A

* BASED ON SELECTED PUMP MFG DATA

TEXT HEIGHT 9"

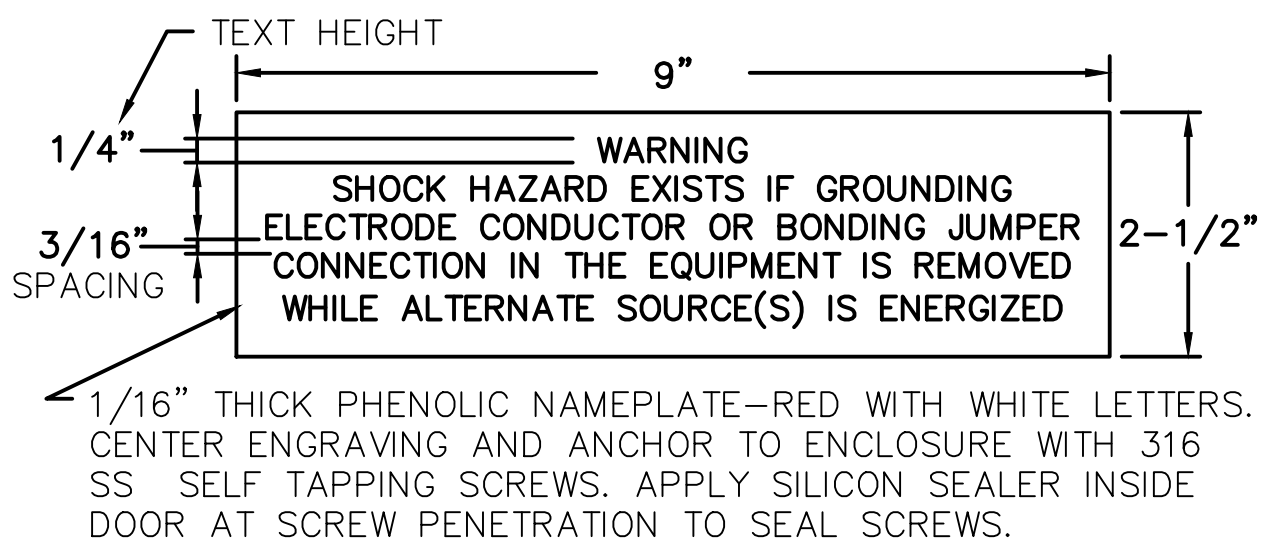
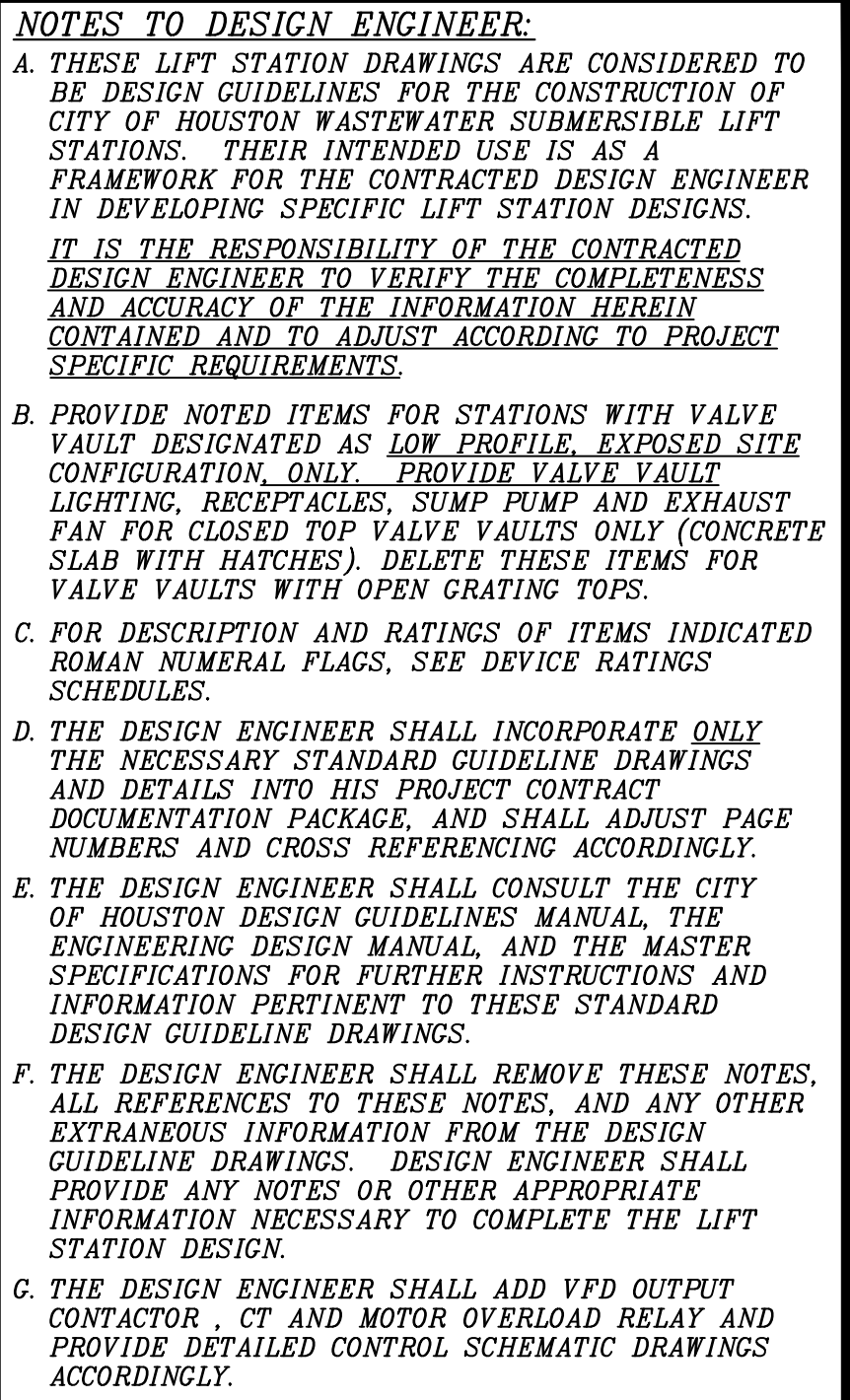
1/4" 3/16" SPACING

WARNING
SHOCK HAZARD EXISTS IF GROUNDING ELECTRODE CONDUCTOR OR BONDING JUMPER CONNECTION IN THE EQUIPMENT IS REMOVED WHILE ALTERNATE SOURCE(S) IS ENERGIZED

2-1/2"

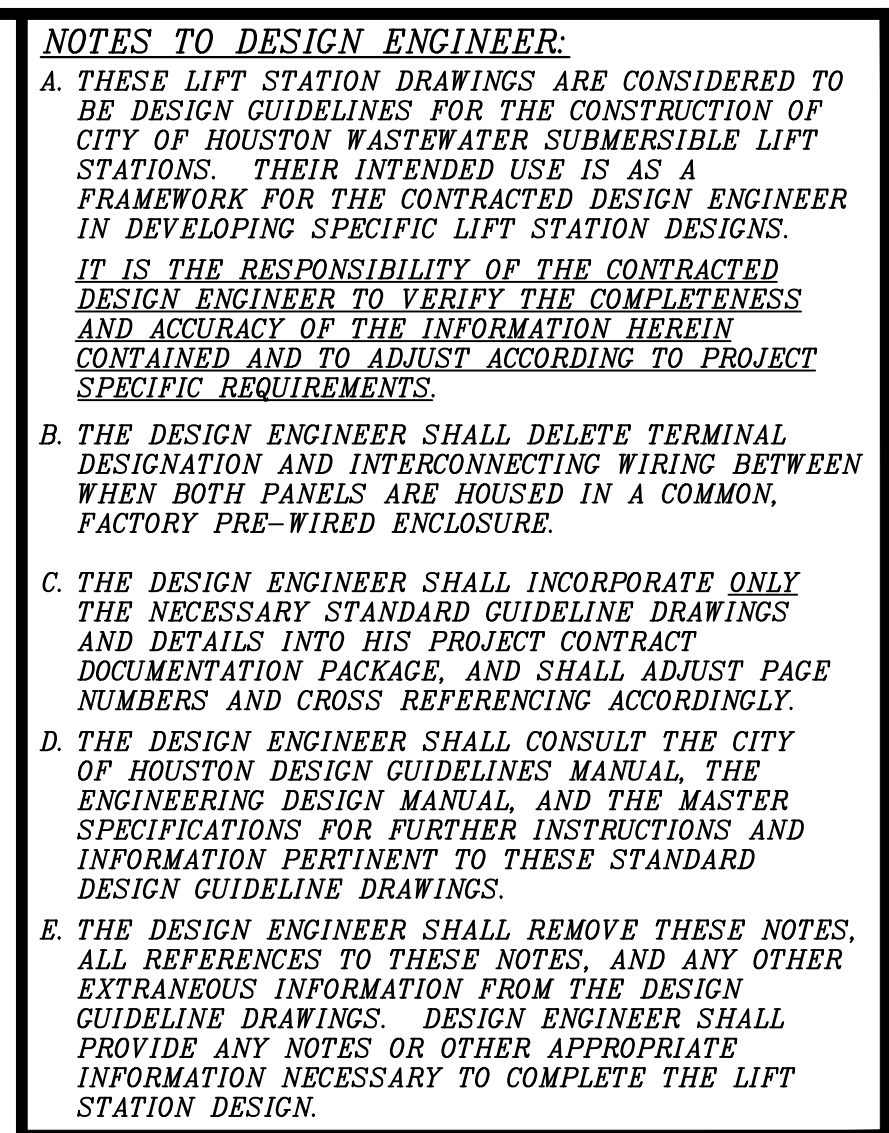
1/16" THICK PHENOLIC NAMEPLATE-RED WITH WHITE LETTERS. CENTER ENGRAVING AND ANCHOR TO ENCLOSURE WITH 316 SS SELF TAPPING SCREWS. APPLY SILICON SEALER INSIDE DOOR AT SCREW PENETRATION TO SEAL SCREWS.

ELECTRICAL WARNING NAMEPLATE N-EW ENGRAVING

ELECTRICAL WARNING NAMEPLATE N-EW ENGRAVING

REV. NO.	DESCRIPTION	APP'D	DATE

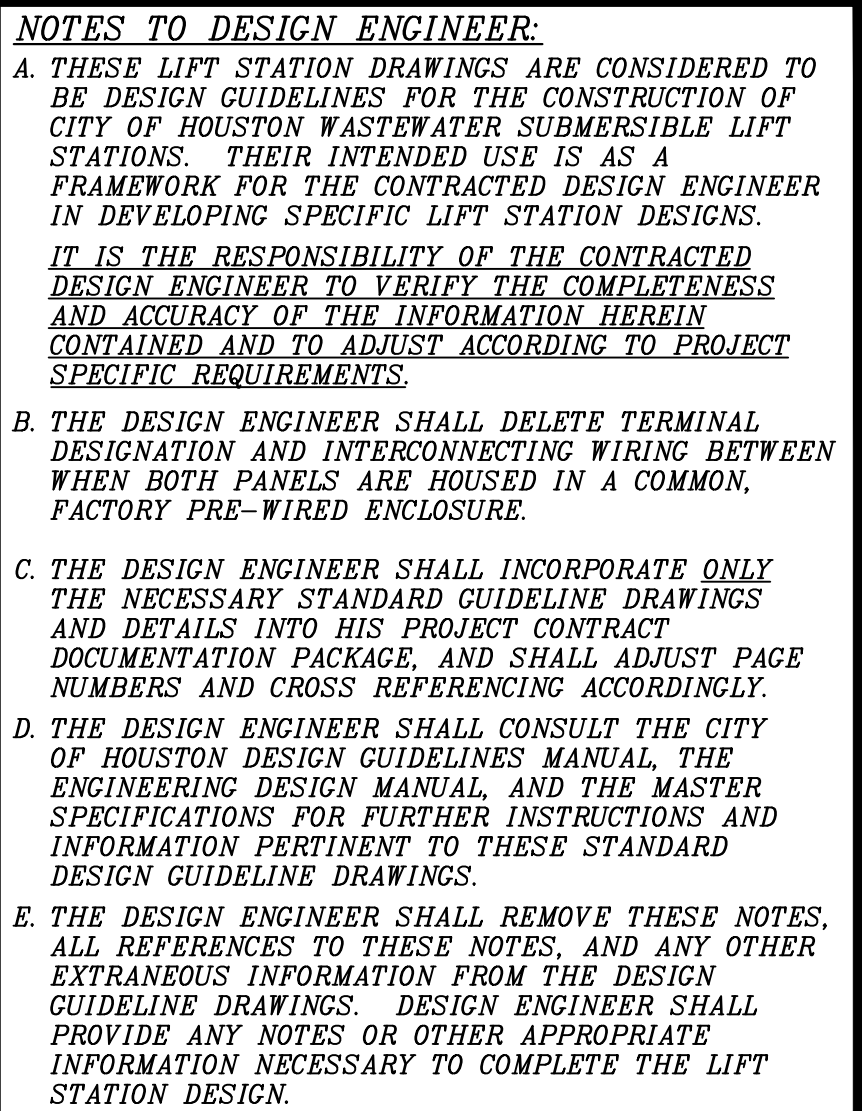
SCALE: NONE	DESIGNED BY:
SUBMITTED:	DRAWN BY:
DATE:	SHEET NO. OF SHEETS
SURVEY BY:	DWG. NO.
FIELD BOOK NO.	YOE32-0516



PROJECT NO.	R-000265-0XXX-X
TITLE	CITY OF HOUSTON DESIGN GUIDELINE DRAWINGS FOR SUBMERSIBLE LIFT STATIONS
CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING AND CONSTRUCTION	

SCALE:	NONE	DESIGNED BY:
SUBMITTED:		DRAWN BY:
DATE:		SHEET NO. OF SHEETS
SURVEY BY:		DWG. NO.
FIELD BOOK NO.		YOE40-0516

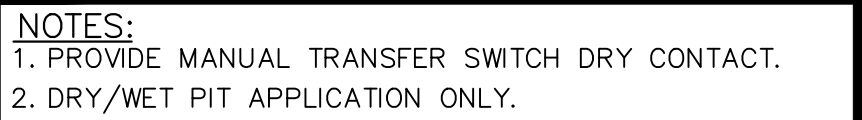
REV. NO.	DESCRIPTION	APP'D	DATE



6 PUMP VFD INDOOR PROCESS & INSTRUMENTATION DIAGRAM	
PROJECT NO.	R-000265-0XXX-X
TITLE	CITY OF HOUSTON DESIGN GUIDELINE DRAWINGS FOR SUBMERSIBLE LIFT STATIONS
CITY OF HOUSTON DEPARTMENT OF PUBLIC WORKS AND ENGINEERING ENGINEERING AND CONSTRUCTION	

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET ZOC0X

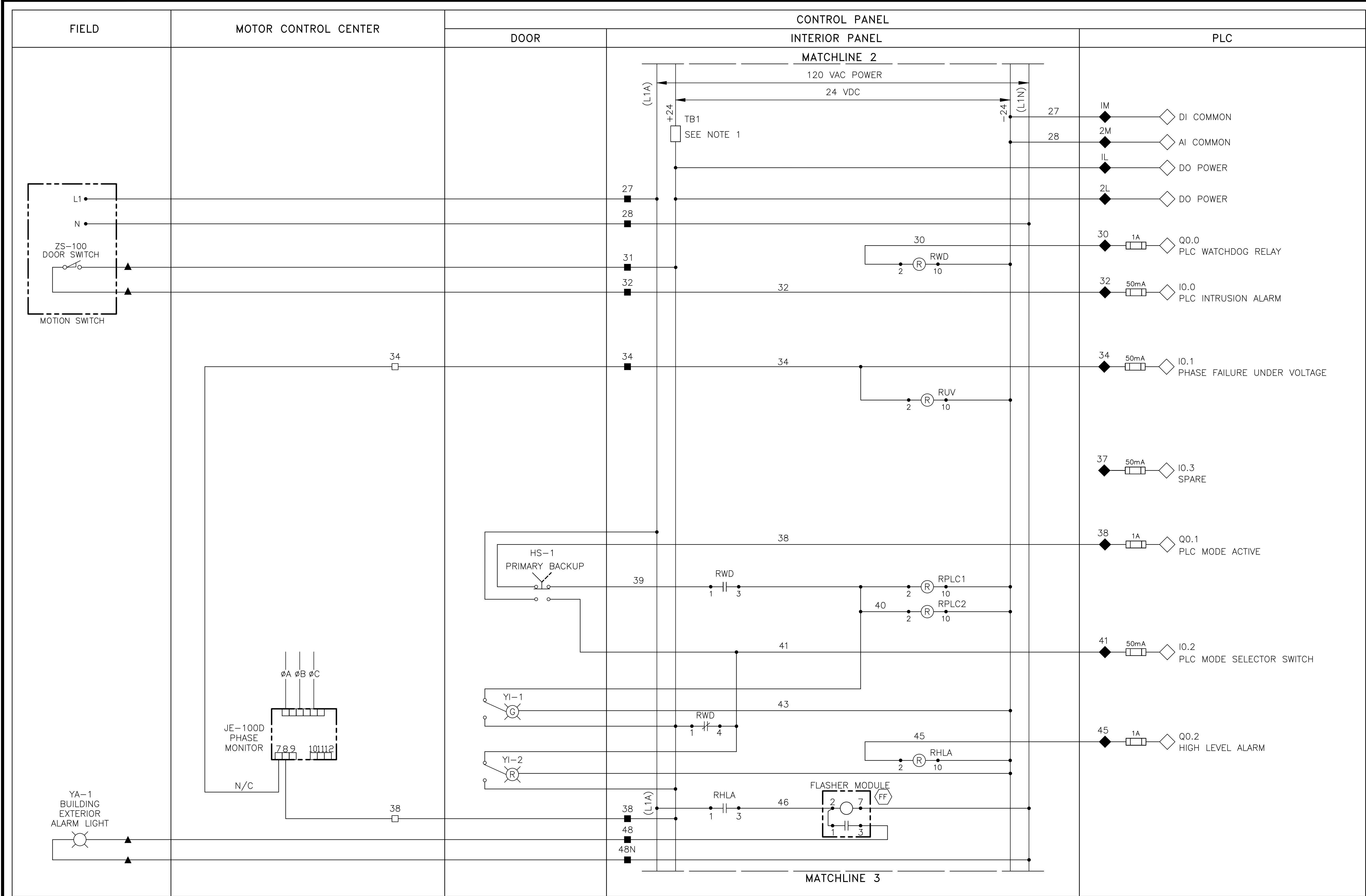
SCALE:	NONE	DESIGNED BY:
SUBMITTED:		DRAWN BY:
DATE:		SHEET NO. OF SHEETS
SURVEY BY:		DWG. NO.
FIELD BOOK NO.		YOE41-0516



SCALE: NONE	DESIGNED BY:
SUBMITTED:	DRAWN BY:
DATE:	SHEET NO. OF SHEETS
SURVEY BY:	DWG. NO.
FIELD BOOK NO.	Y0E50-0516

REV. NO.	DESCRIPTION	APP'D	DATE

LEGEND



NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. THE DESIGN ENGINEER SHALL DELETE TERMINAL DESIGNATION AND INTERCONNECTING WIRING BETWEEN WHEN BOTH PANELS ARE HOUSED IN A COMMON, FACTORY PRE-WIRED ENCLOSURE.

C. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

D. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

E. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

1. FUSED TERMINAL ON TERMINAL BLOCK TB4. SEE CONTROL POWER AND COMMUNICATION WIRING DIAGRAM.

6 PUMP VFD INDOOR CONTROL PANEL CONTROL WIRING DIAGRAM

PROJECT NO. R-000265-0XXX-X

TITLE CITY OF HOUSTON DESIGN GUIDELINE DRAWINGS FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH STANDARD TITLE BLOCK ON ALL DRAWINGS, SEE STANDARD TITLE BLOCK DETAIL ON SHEET Z0C0X

LEGEND

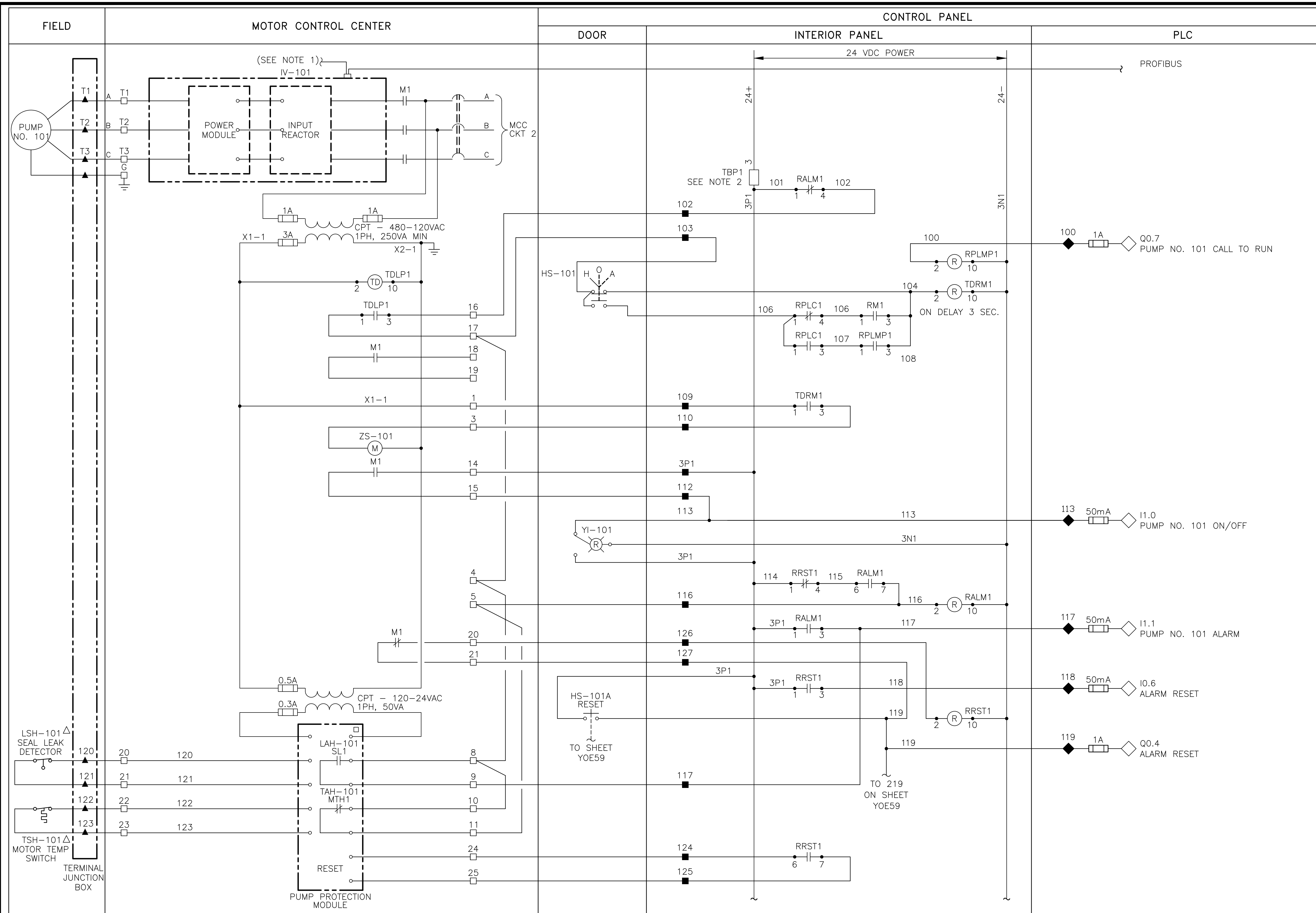
- △ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR
- * DEVICE OR FIELD TERMINAL LOCATED REMOTE
- DEVICE OR FIELD TERMINAL LOCATED AT MCC
- FIELD TERMINAL LOCATED AT CONTROL PANEL
- ▲ REMOTE TERMINAL
- DEVICE TERMINAL NO.
- ◆ PLC INTERFACE TERMINAL

CADD DWG. FILE NO. : YOE52-VFD.DWG

COHSTD.BDR 0 1 2 3 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

REV. NO.	DESCRIPTION	APP'D	DATE

SCALE: NONE DESIGNED BY: SUBMITTED: DRAWN BY: DATE: SHEET NO. OF SHEETS SURVEY BY: DWG. NO. YOE52-0516 FIELD BOOK NO.



NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO BRIEFLY COMPREHEND THE ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. THE DESIGN ENGINEER SHALL DELETE TERMINAL DESIGNATION AND INTERCONNECTING WIRING BETWEEN WHEN BOTH PANELS ARE HOUSED IN A COMMON, FACTORY PRE-WIRED ENCLOSURE.

C. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

D. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

E. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

1. PROFIBUS CABLE EXTENSION TO/FROM ADDITIONAL VFD UNIT.
2. FUSED TERMINAL ON TERMINAL BLOCK TB4 SEE CONTROL POWER AND COMMUNICATION WIRING DIAGRAM.

6 PUMP VFD INDOOR PUMP 101 CONTROL WIRING DIAGRAM

PROJECT NO.

R-000265-0XXX-X

TITLE

CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

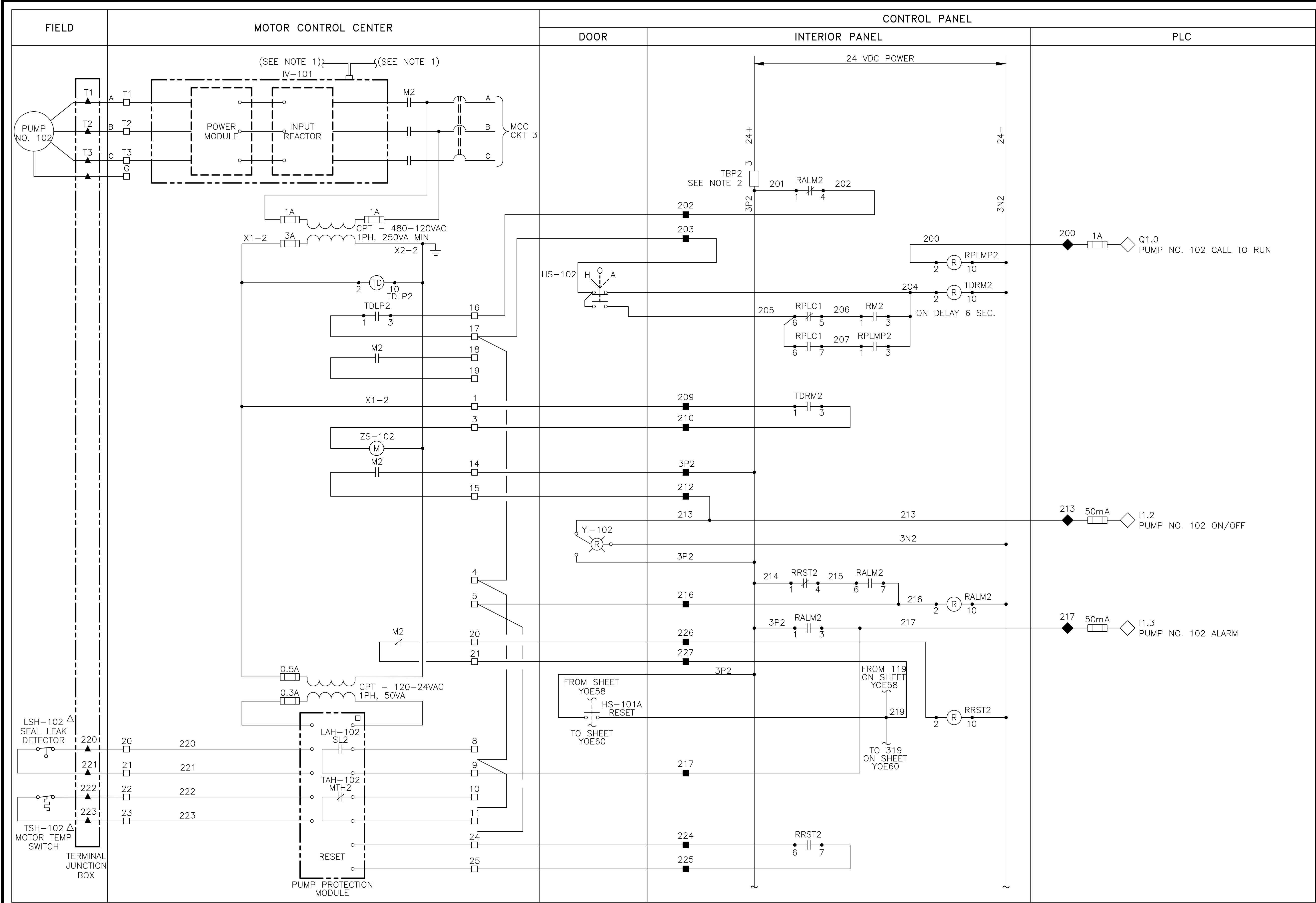
CITY OF HOUSTON

DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET ZOC0X

SCALE:	NONE	DESIGNED BY:
SUBMITTED:		DRAWN BY:
DATE:		SHEET NO. OF SHEETS
SURVEY BY:		DWG. NO.
FIELD BOOK NO.		Y0E58-0516

[illegible]



NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. THE DESIGN ENGINEER SHALL DELETE TERMINAL DESIGNATION AND INTERCONNECTING WIRING BETWEEN WHEN BOTH PANELS ARE HOUSED IN A COMMON, FACTORY PRE-WIRED ENCLOSURE.

C. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

D. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

E. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

1. PROFIBUS CABLE EXTENSION TO/FROM ADDITIONAL VFD UNIT.

2. FUSED TERMINAL ON TERMINAL BLOCK TB4 SEE CONTROL POWER AND COMMUNICATION WIRING DIAGRAM.

6 PUMP VFD INDOOR
PUMP 102
CONTROL WIRING DIAGRAM

PROJECT NO. R-000265-0XXX-X

TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET Z0C0X

LEGEND

△ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR

* DEVICE OR FIELD TERMINAL LOCATED REMOTE

□ DEVICE OR FIELD TERMINAL LOCATED AT MCC

■ FIELD TERMINAL LOCATED AT CONTROL PANEL

▲ REMOTE TERMINAL

● DEVICE TERMINAL NO.

◆ PLC INTERFACE TERMINAL

CADD DWG. FILE NO. : YOE59-6WP.DWG

COHSTD.BDR ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

REV. NO.	DESCRIPTION	APP'D	DATE

SCALE: NONE

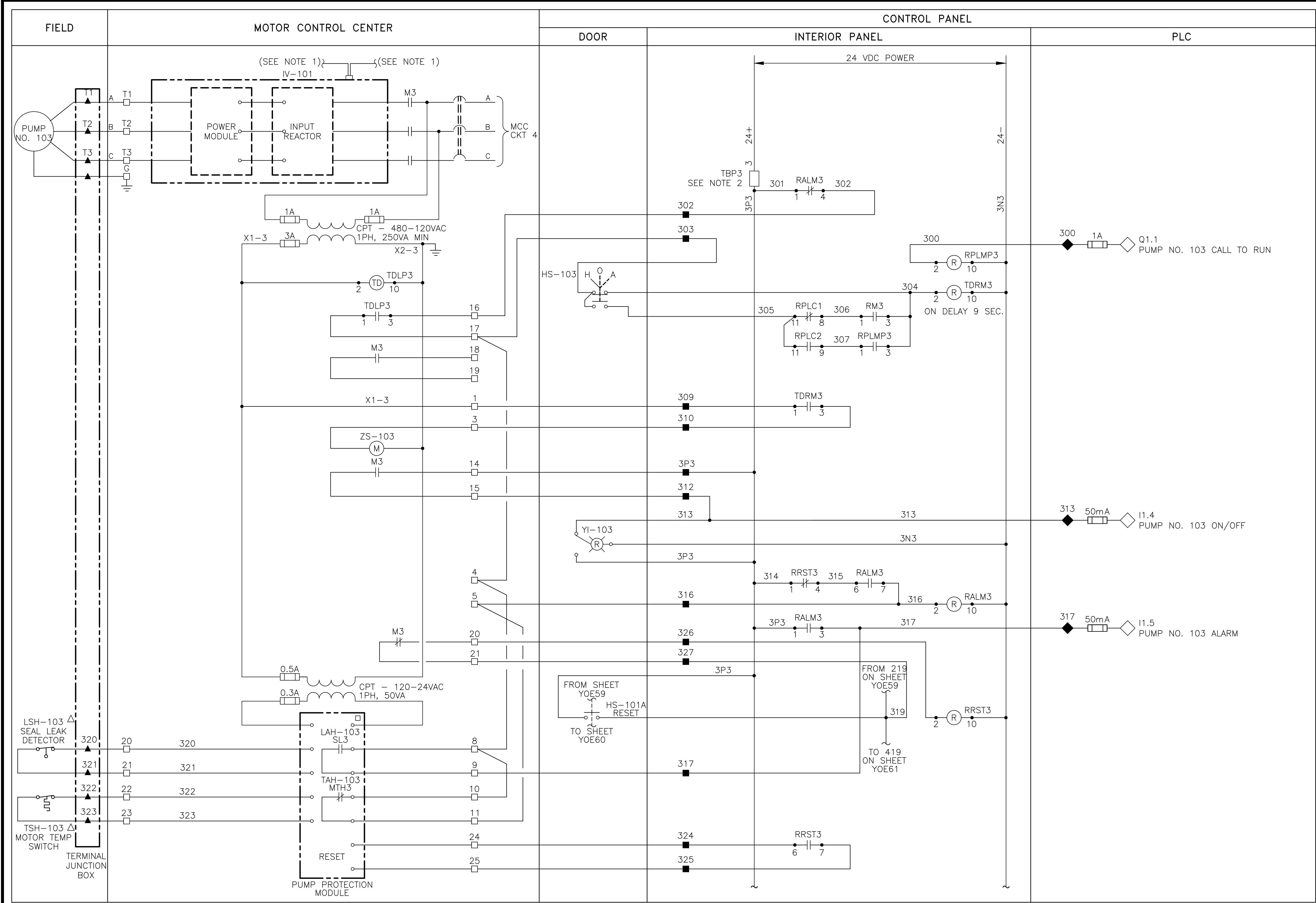
DESIGNED BY:

SUBMITTED: DRAWN BY:

DATE: SHEET NO. OF SHEETS

SURVEY BY: DWG. NO. YOE59-0516

FIELD BOOK NO.



NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. THE DESIGN ENGINEER SHALL DELETE TERMINAL DESIGNATION AND INTERCONNECTING WIRING BETWEEN WHEN BOTH PANELS ARE HOUSED IN A COMMON, FACTORY PRE-WIRED ENCLOSURE.

C. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

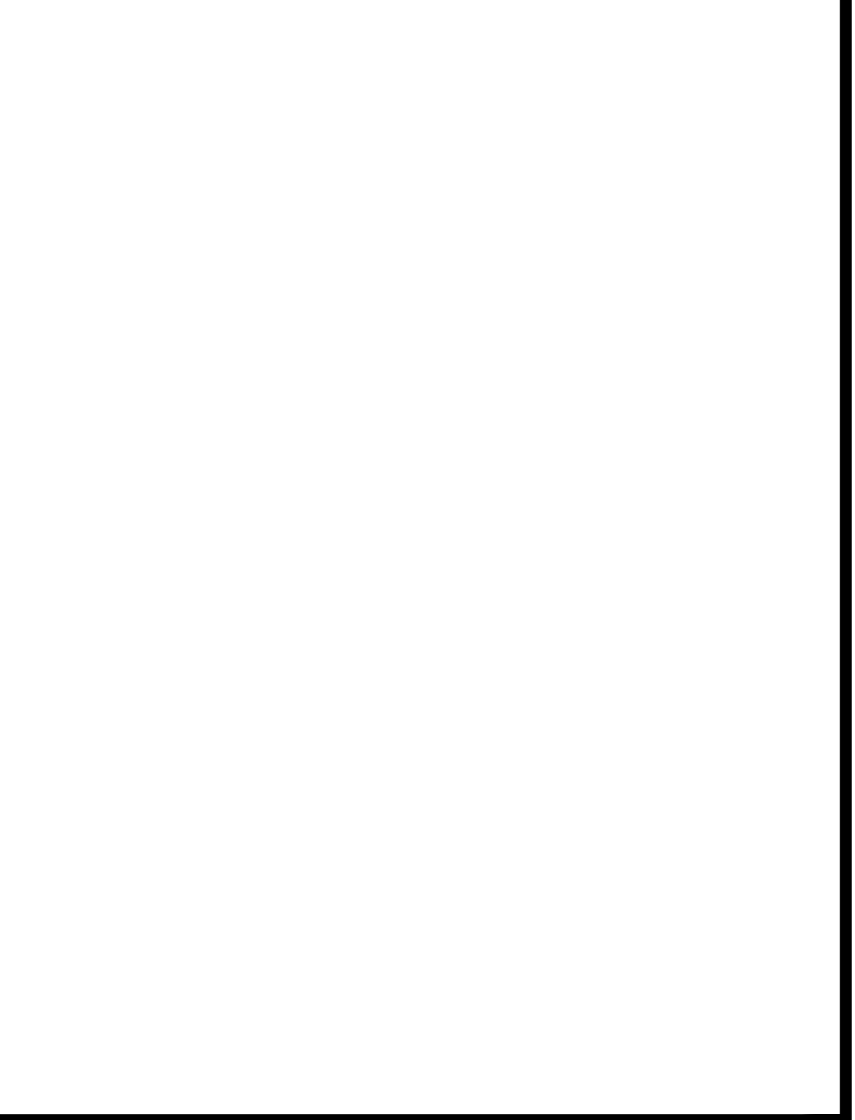
D. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

E. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

1. PROFIBUS CABLE EXTENSION TO/FROM ADDITIONAL VFD UNIT.

2. FUSED TERMINAL ON TERMINAL BLOCK TB4 SEE CONTROL POWER AND COMMUNICATION WIRING DIAGRAM.



LEGEND

△ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR

* DEVICE OR FIELD TERMINAL LOCATED REMOTE

□ DEVICE OR FIELD TERMINAL LOCATED AT MCC

■ FIELD TERMINAL LOCATED AT CONTROL PANEL

▲ REMOTE TERMINAL

● DEVICE TERMINAL NO.

◆ PLC INTERFACE TERMINAL

CADD DWG. FILE NO. : YOE60-6WP.DWG

COHSTD.BDR ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

REV. NO.	DESCRIPTION	APP'D	DATE

SCALE: NONE

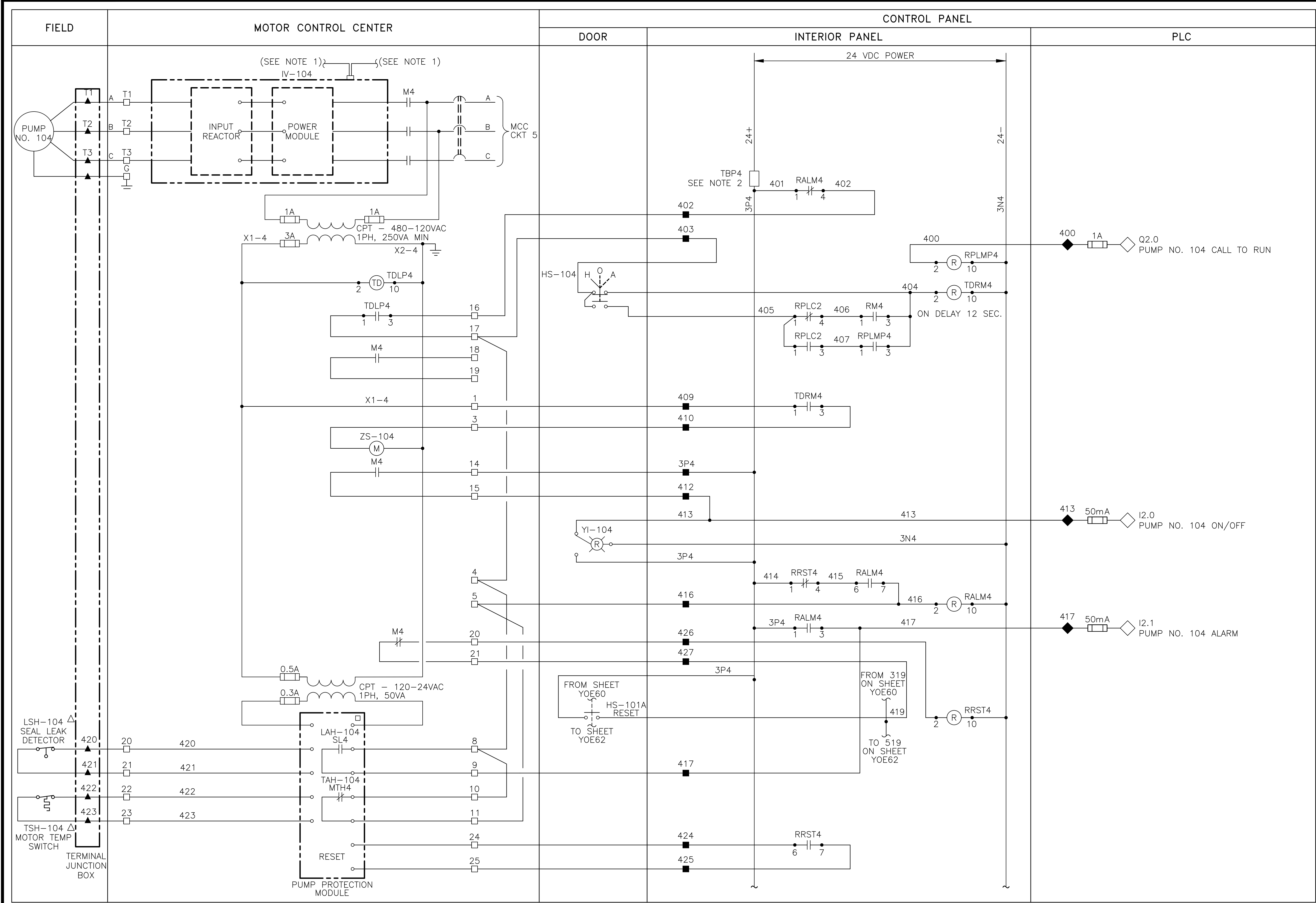
DESIGNED BY:

SUBMITTED: DRAWN BY:

DATE: SHEET NO. OF SHEETS

SURVEY BY: DWG. NO. YOE60-0516

FIELD BOOK NO.



NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. THE DESIGN ENGINEER SHALL DELETE TERMINAL DESIGNATION AND INTERCONNECTING WIRING BETWEEN WHEN BOTH PANELS ARE HOUSED IN A COMMON, FACTORY PRE-WIRED ENCLOSURE.

C. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

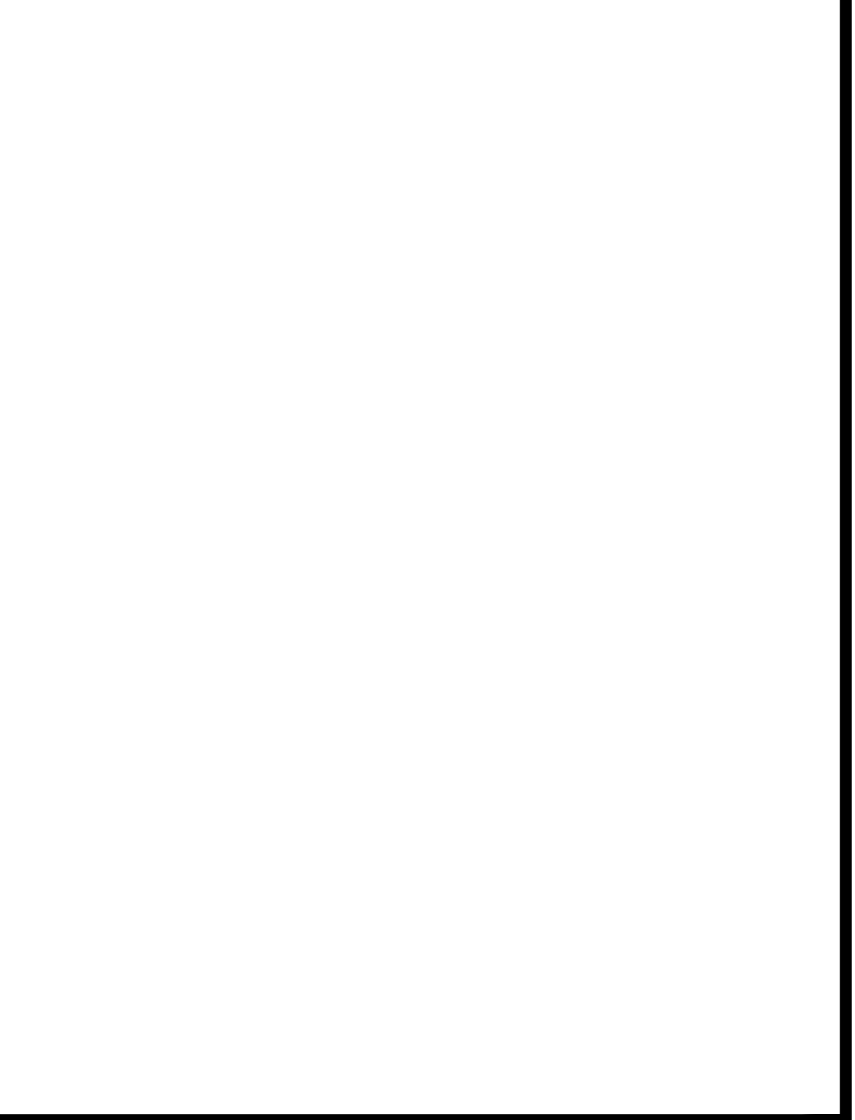
D. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

E. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

1. PROPIBUS CABLE EXTENSION TO/FROM ADDITIONAL VFD UNIT.

2. FUSED TERMINAL ON TERMINAL BLOCK TB4 SEE CONTROL POWER AND COMMUNICATION WIRING DIAGRAM.



LEGEND

△ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR

* DEVICE OR FIELD TERMINAL LOCATED REMOTE

□ DEVICE OR FIELD TERMINAL LOCATED AT MCC

■ FIELD TERMINAL LOCATED AT CONTROL PANEL

▲ REMOTE TERMINAL

● DEVICE TERMINAL NO.

◆ PLC INTERFACE TERMINAL

CADD DWG. FILE NO. : YOE61-VFD.DWG

COHSTD.BDR 0 1 2 3 ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

REV. NO.	DESCRIPTION	APP'D	DATE

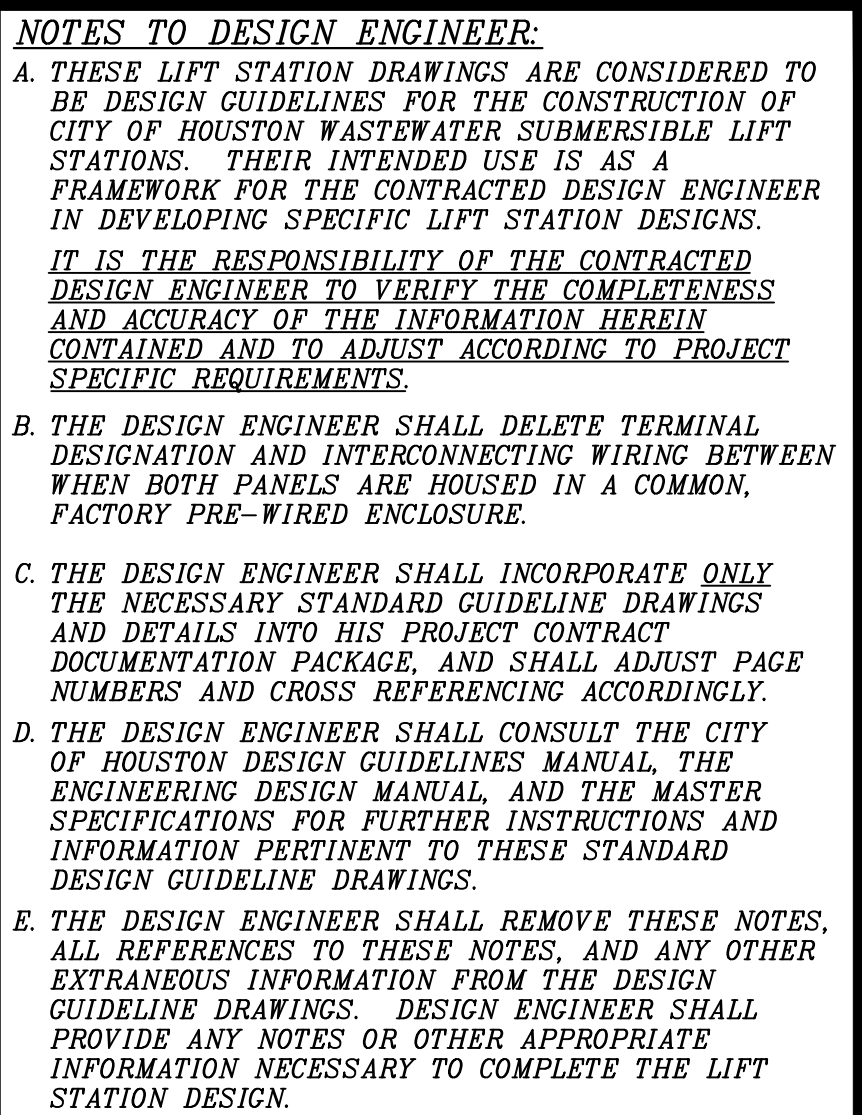
SCALE: NONE DESIGNED BY:

SUBMITTED: DRAWN BY:

DATE: SHEET NO. OF SHEETS

SURVEY BY: DWG. NO. YOE61-0516

FIELD BOOK NO.



NOTES:

1. PROFIBUS CABLE EXTENSION TO/FROM ADDITIONAL VFD UNIT.
2. FUSED TERMINAL ON TERMINAL BLOCK TB4 SEE CONTROL POWER AND COMMUNICATION WIRING DIAGRAM.

6 PUMP VFD INDOOR PUMP 105 CONTROL WIRING DIAGRAM

PROJECT NO.	R-000265-0XXX-X
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TITLE	CITY OF HOUSTON DESIGN GUIDELINE DRAWINGS FOR SUBMERSIBLE LIFT STATIONS
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CITY OF HOUSTON
 DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
 ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET ZOC0X

<u>LEGEND</u>	
△ DEVICE OR FIELD TERMINAL LOCATED AT MOTOR	▲ REMOTE TERMINAL
* DEVICE OR FIELD TERMINAL LOCATED REMOTE	● DEVICE TERMINAL NO.
□ DEVICE OR FIELD TERMINAL LOCATED AT MCC	◆ PLC INTERFACE TERMINAL
■ FIELD TERMINAL LOCATED AT CONTROL PANEL	

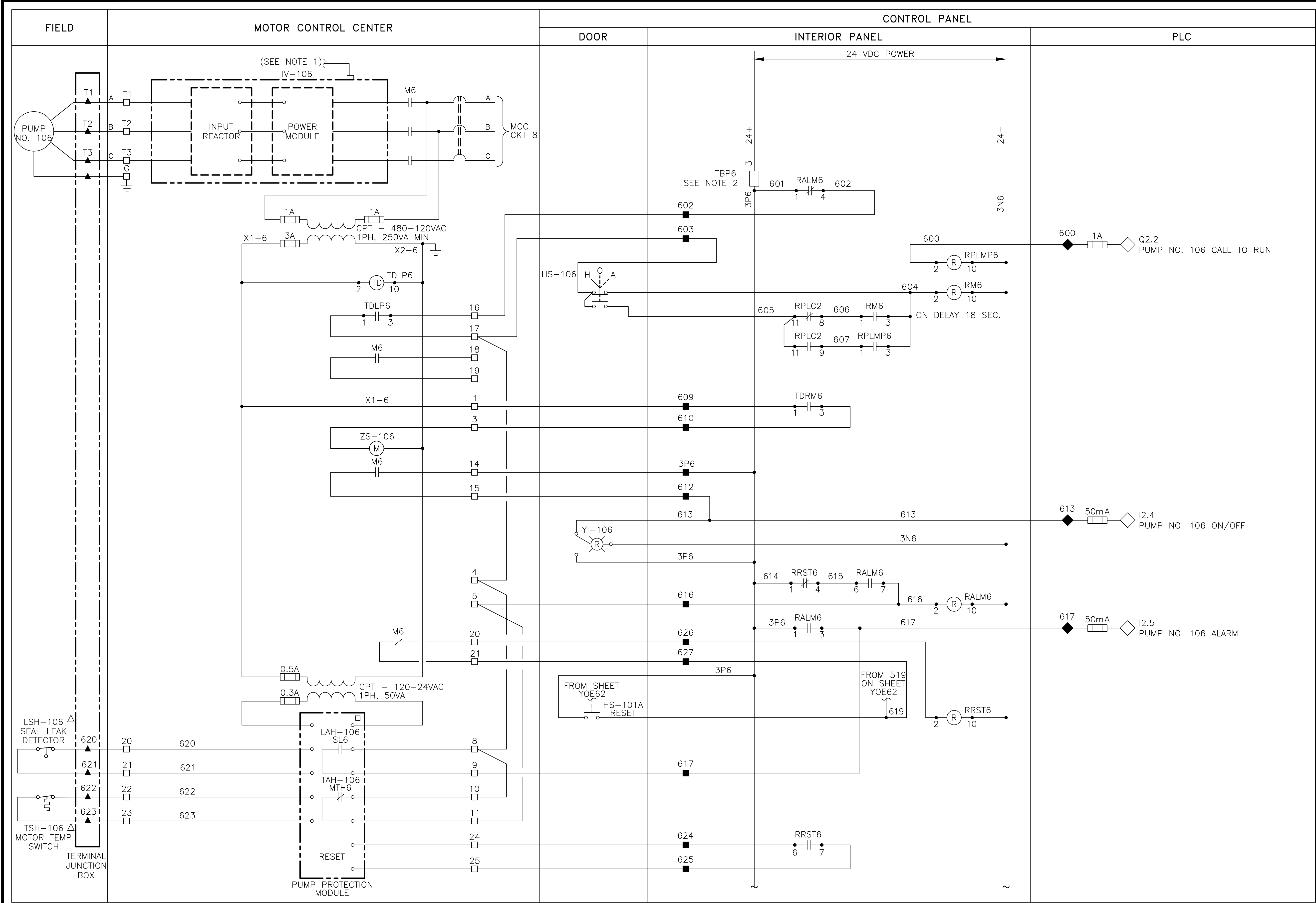
CADD DWG. FILE NO. :
YOE62-VFD.DWG

COHSTD.BDR

ORIGINAL SCALE IN INCHES
FOR REDUCED PLANS

[illegible]

SCALE: NONE	DESIGNED BY:
SUBMITTED:	DRAWN BY:
DATE:	SHEET NO. OF SHEETS
SURVEY BY:	DWG. NO.
FIELD BOOK NO.	Y0E62-0516



NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. THE DESIGN ENGINEER SHALL DELETE TERMINAL DESIGNATION AND INTERCONNECTING WIRING BETWEEN WHEN BOTH PANELS ARE HOUSED IN A COMMON, FACTORY PRE-WIRED ENCLOSURE.

C. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

D. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

E. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:

1. PROFIBUS CABLE EXTENSION TO/FROM ADDITIONAL VFD UNIT.

2. FUSED TERMINAL ON TERMINAL BLOCK TB4 SEE CONTROL POWER AND COMMUNICATION WIRING DIAGRAM.

6 PUMP VFD INDOOR
PUMP 106
CONTROL WIRING DIAGRAM

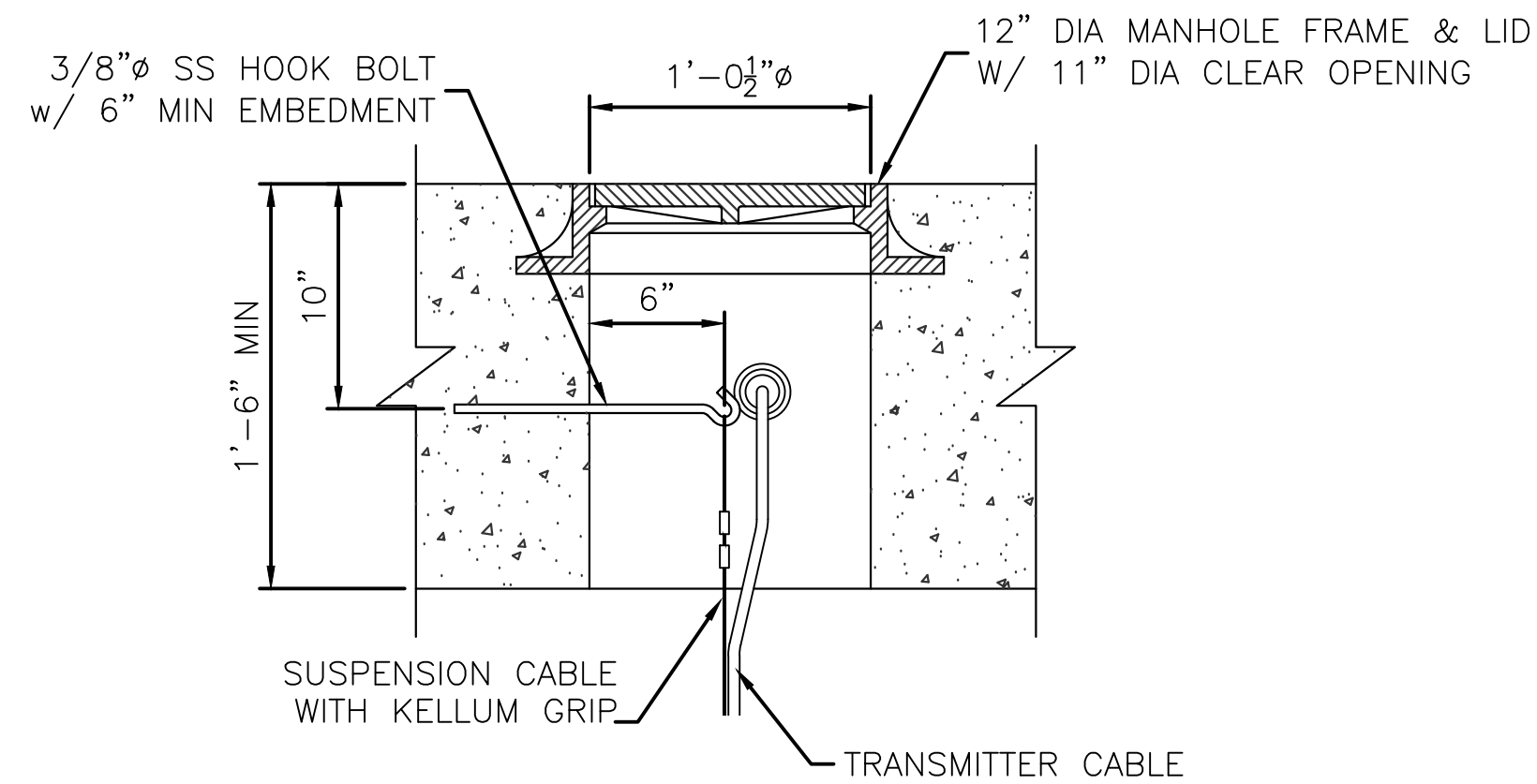
PROJECT NO. R-000265-0XXX-X

TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

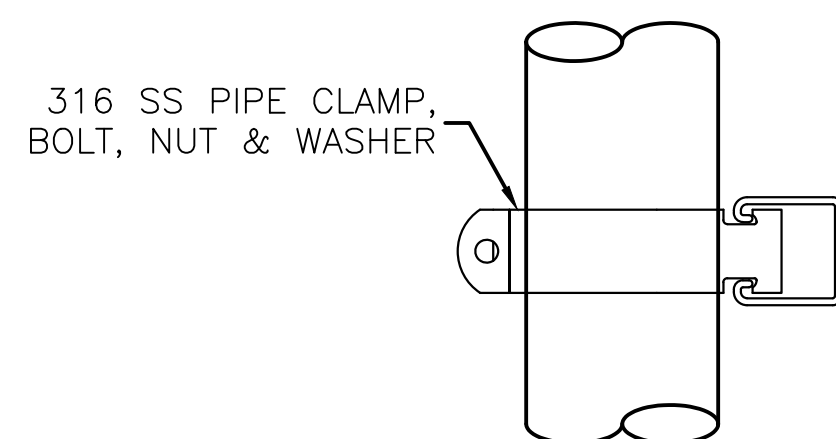
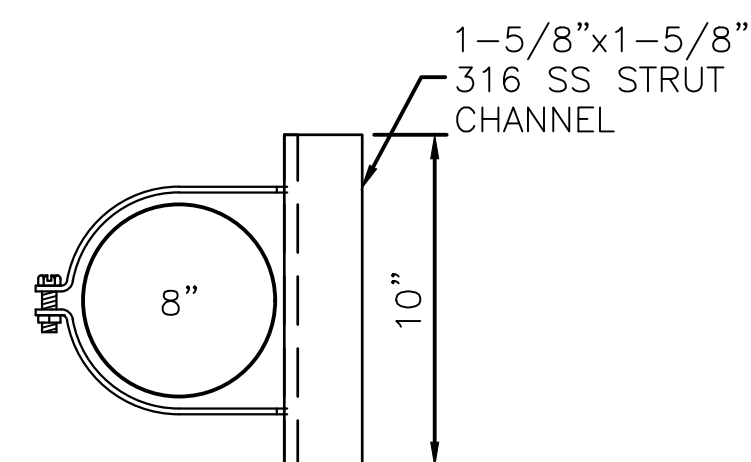
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET Z0C0X

SCALE: NONE		DESIGNED BY:	
SUBMITTED:		DRAWN BY:	
DATE:		SHEET NO. OF SHEETS	
SURVEY BY:		DWG. NO. YOE63-0516	
FIELD BOOK NO.			

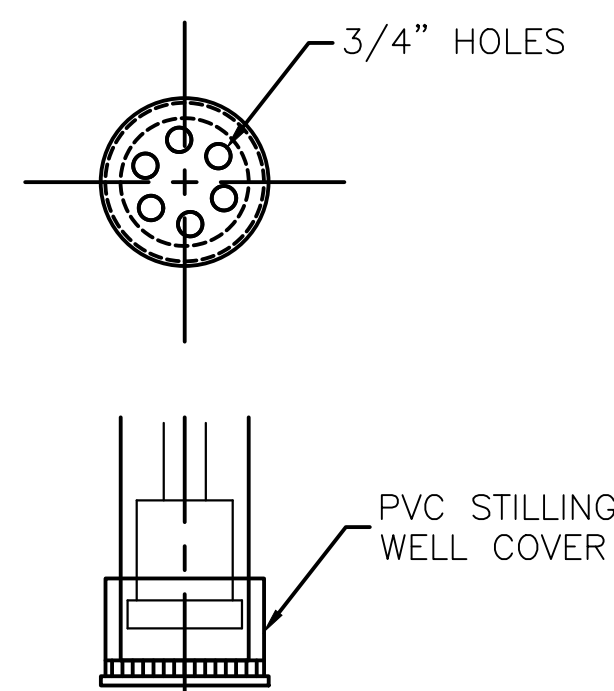


SECTION A
SCALE: 1 1/2" = 1'-0"



TRANSMITTER GUIDE CLAMP DETAIL

SCALE: NOT TO SCALE



MAXIMUM HEIGHT 9". DO NOT INSTALL
- A BLOCKOUT FOR THE TRANSDUCER IN
THE FILLET. SEE RELATED DRAWINGS.

SUBMERSIBLE TRANSDUCER WELL LEVEL GAUGING SYSTEM
TYP INSTALLATION DETAIL
SCALE: 1" = 1'-0"

REV. NO.	DESCRIPTION	APP'D	DATE

NOTES TO DESIGN ENGINEER:

- A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON POTABLE WATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS.
IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.
- B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCEING ACCORDINGLY.
- C. TRANSMITTER CABLE MUST BE THE SAME LENGTH REGARDLESS OF ITS LOCATION FROM TERMINAL/JUNCTION BOX.
- C. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.
- D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWING. THE DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

SUBMERSIBLE TRANSDUCER WELL LEVEL GAUGING SYSTEM INSTALLATION & DETAILS

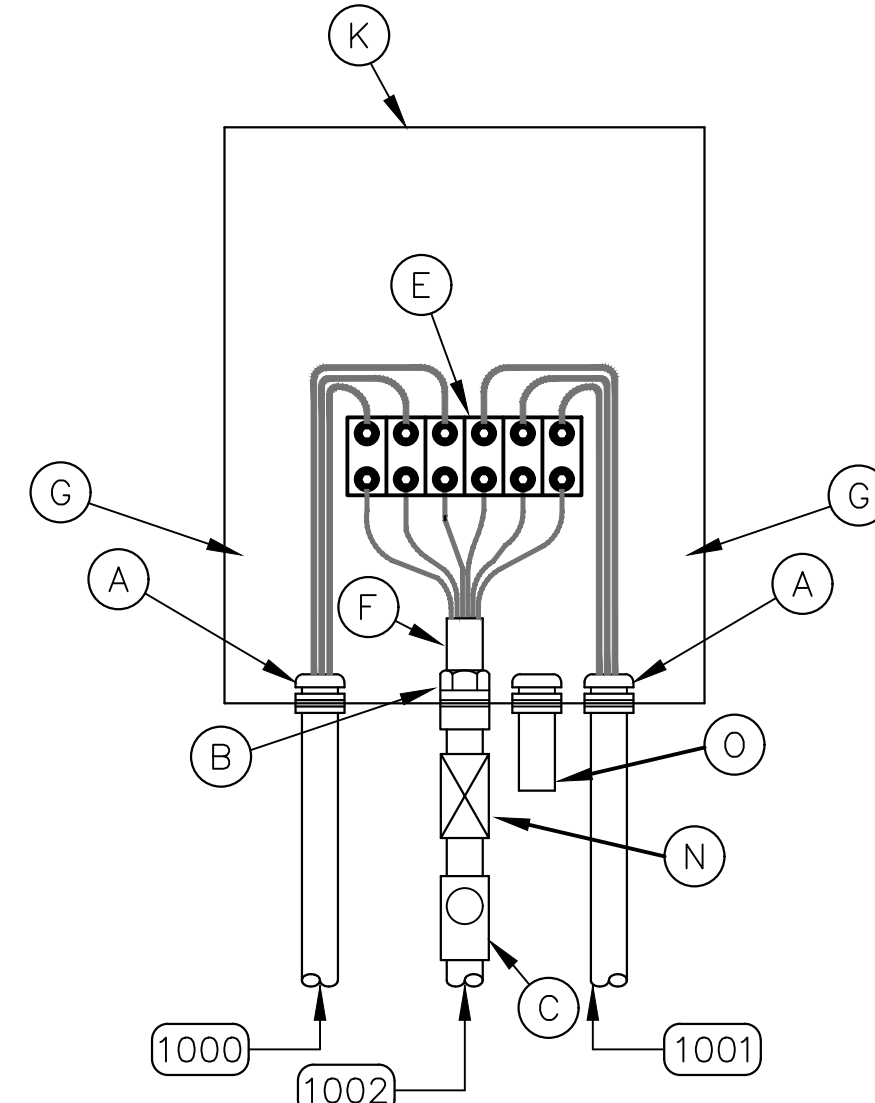
PROJECT NO. R-000265-0XXX-X

TITLE	CITY OF HOUSTON DESIGN GUIDELINE DRAWINGS FOR SUBMERSIBLE LIFT STATIONS
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CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET ZOC0X

SCALE:	AS NOTED	DESIGNED BY:
SUBMITTED:		DRAWN BY:
DATE:		SHEET NO. OF SHEETS
SURVEY BY:		DWG. NO.
FIELD BOOK NO.		ZOC01-0516



<u>'X'</u>	<u>PUMP NO.</u>
2	101
3	102
4	103
5	104
7	105
8	106

NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERGIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS.

IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD SPECIFICATIONS, DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

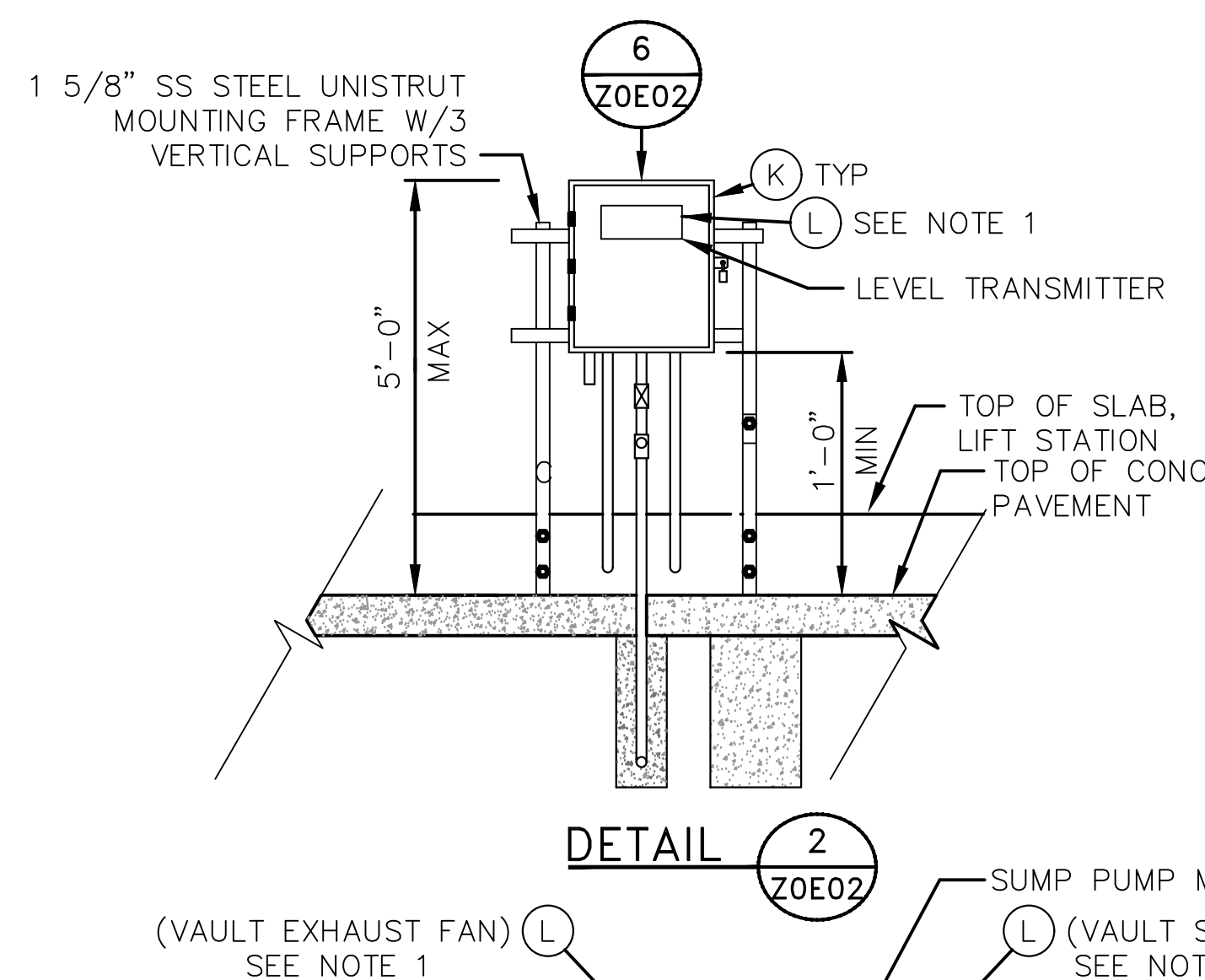
C. TRANSMITTER CABLE SHALL BE THE SAME LENGTH REGARDLESS OF ITS LOCATION FROM TERMINAL/JUNCTION BOX.

D. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS TO FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

E. FOR ALL TERMINAL/JUNCTION BOXES ABOVE VALVE VAULTS, AND WET WELLS SHOW EXPANSION AND LOOP. ENGINEERING DESIGN MANUAL, AND THE MASTER

F. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXPLANATORY INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

NOTES:	1. NAMEPLATES SHALL BE MOUNTED TO JUNCTION BOXES USING 316 STAINLESS STEEL HARDWARE. 2. MAINTAIN MINIMUM SEPARATION REQUIRED UNDER NEC ARTICLE 504, BETWEEN INTRINSICALLY SAFE CONTROL WIRING AND NONINTRINSICALLY SAFE MOTOR FEEDER WIRING. 3. UNLESS OTHERWISE NOTED, ALL EXPOSED CONDUITS SHALL BE PVC COATED RIGID GALVANIZED STEEL. 4. UNLESS OTHERWISE NOTED, ALL NUTS, BOLTS, SCREWS, WASHERS, ETC SHALL BE TYPE 316 STAINLESS STEEL. 5. ALL UNDERGROUND CONDUITS TO BE ENCASED IN REINFORCED CONCRETE DUCTBANK. 6. PROVIDE ANTI-CORROSIVE SPRAY ON ANY BARE METAL PARTS OR EXPOSED WIRE. 7. SEE WIRING SCHEMATICS FOR TERMINALS AND WIRE NUMBERS. 8. ANY CONDUIT REQUIRING A CSBE SEAL, SHALL BE A MINIMUM SIZE OF 2 1/2" PER CABLE.
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DETAIL 1A
ZOE02

1 5/8" SS STEEL UNISTRUT MOUNTING FRAME W/4 VERTICAL SUPPORTS

PUMP-104

PUMP-105

PUMP-106

3 Z0E02

4 Z0E02

5 Z0E02

J

K TYP

L TYP, SEE NOTE 1

DUPLEX RECEPTACLE

TOP OF SLAB, LIFT STATION

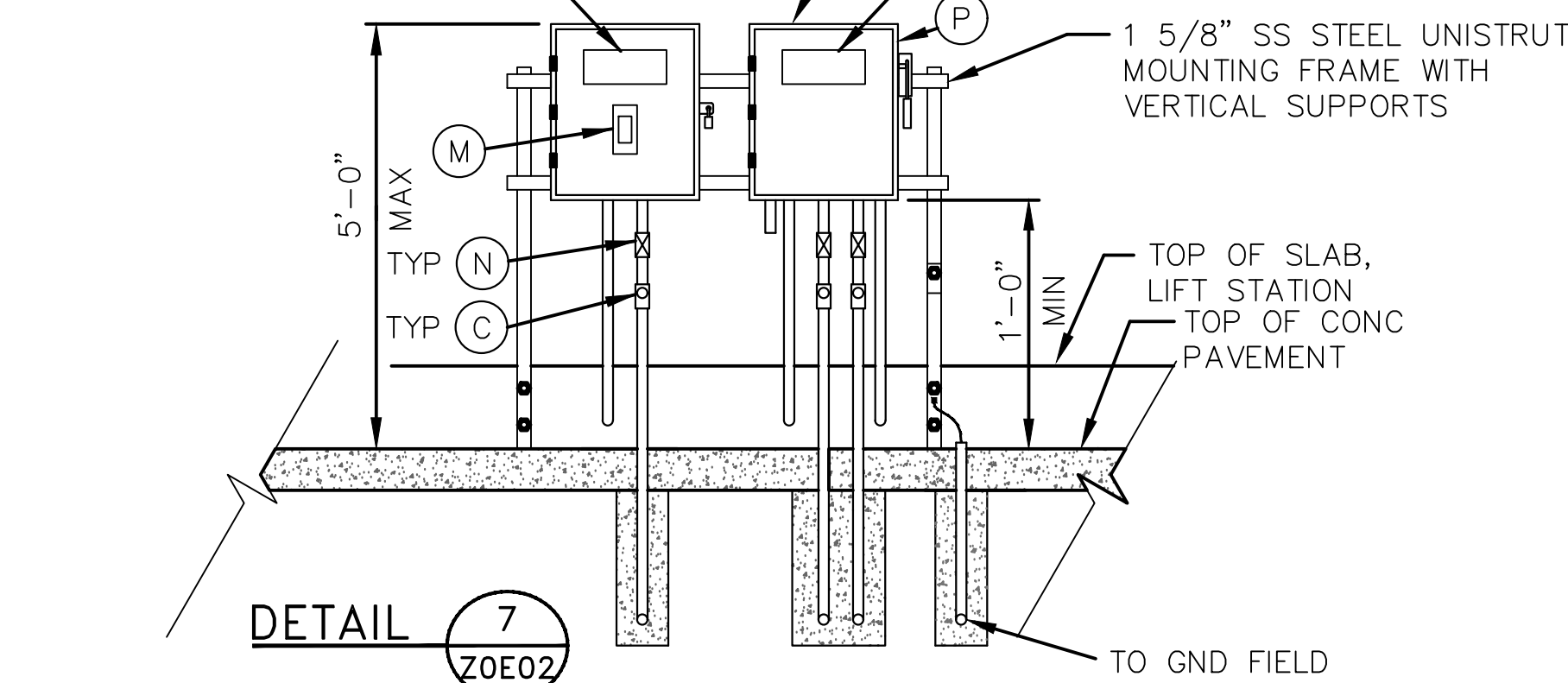
TOP OF CONCRETE PAVEMENT

1'-0"

TO GND FIELD

DETAIL 1B Z0E02

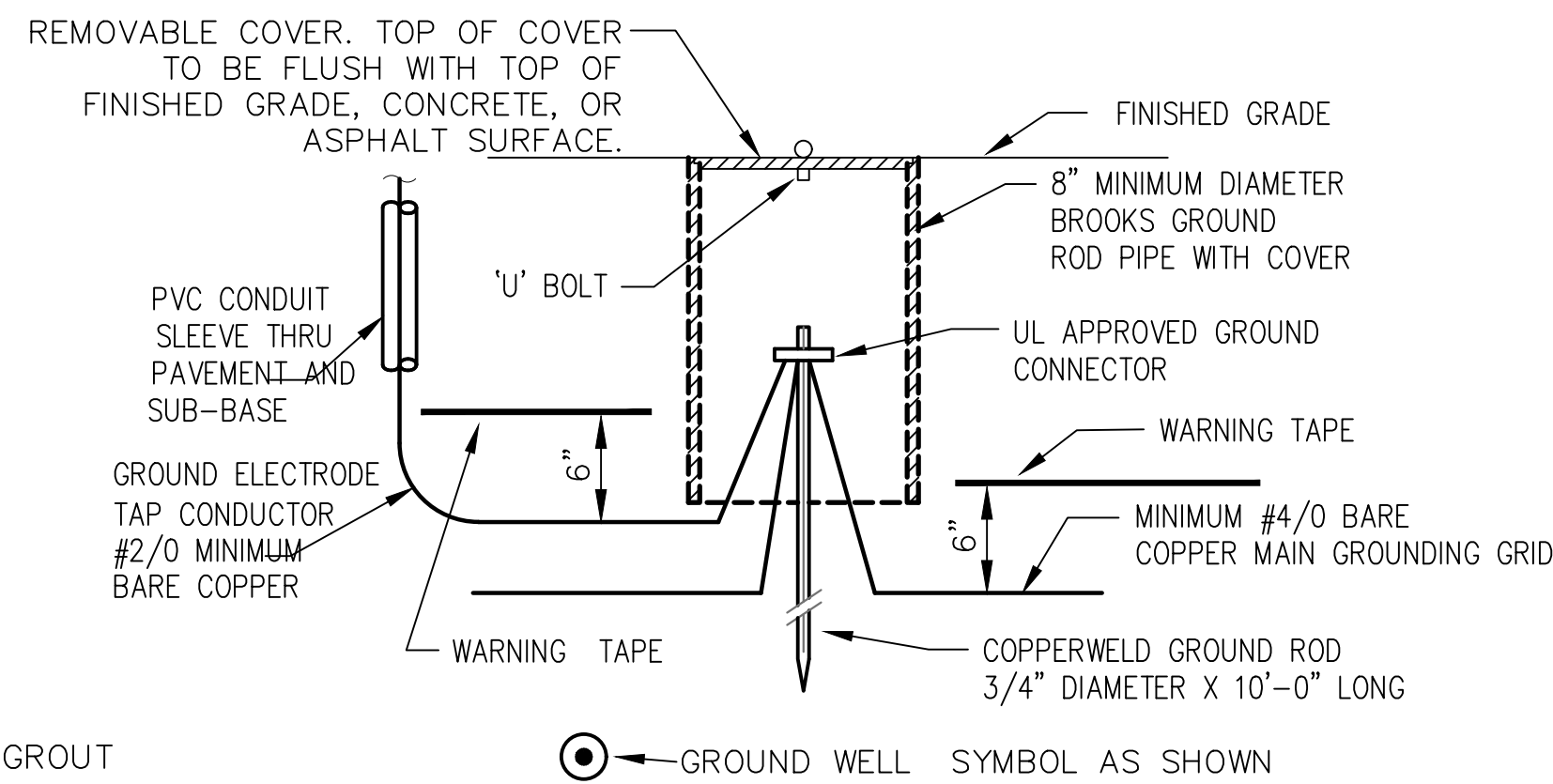
DETAIL 1B
Z0E02



DETAIL 7
Z0E02

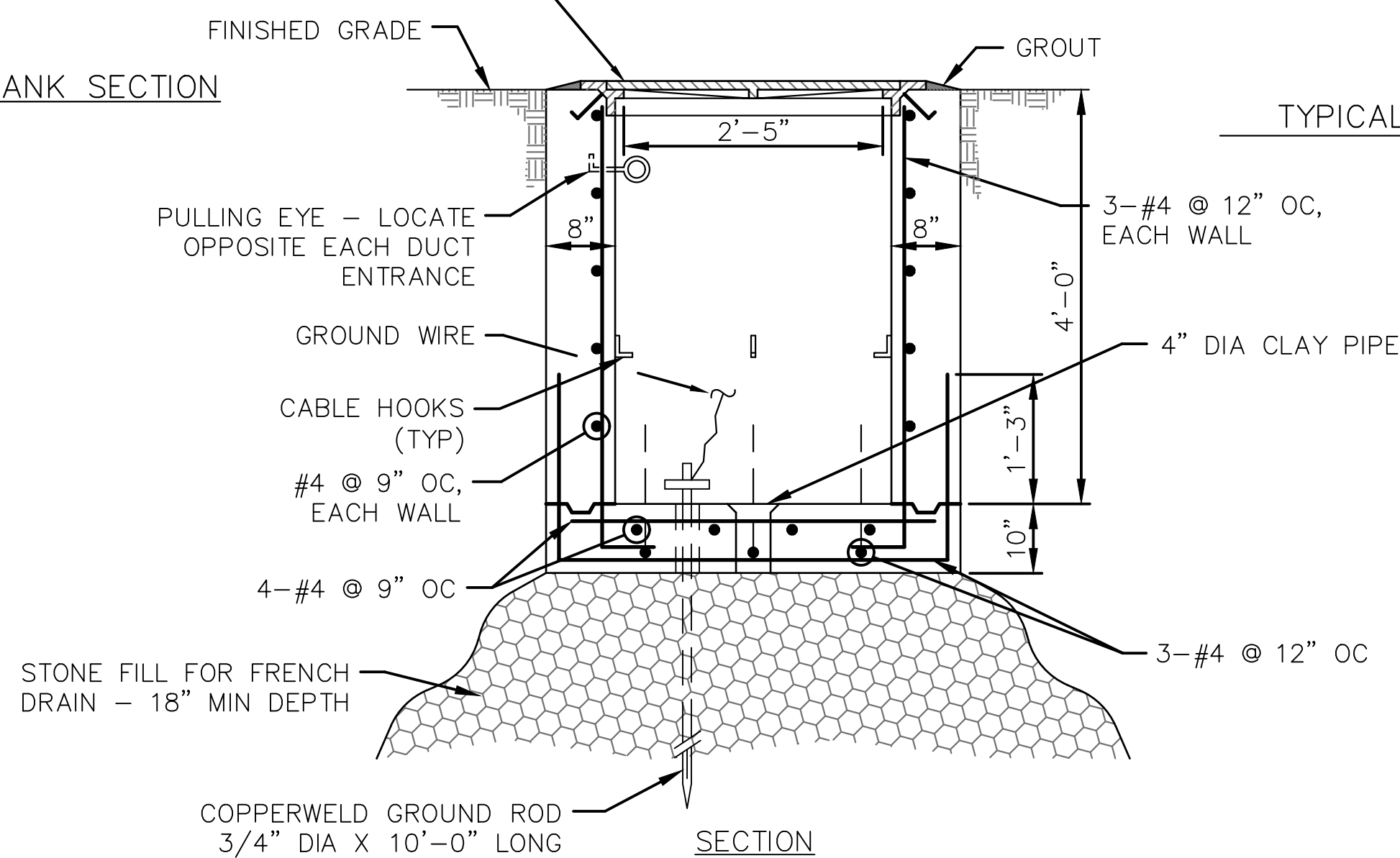
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SCALE:	NONE	DESIGNED BY:
SUBMITTED:		DRAWN BY:
DATE:		SHEET NO. OF SHEET
SURVEY BY:		DWG. NO.
FIELD BOOK NO.		Z0E02-0516



TYP SINGLE-CONDUIT DUCTBANK SECTION

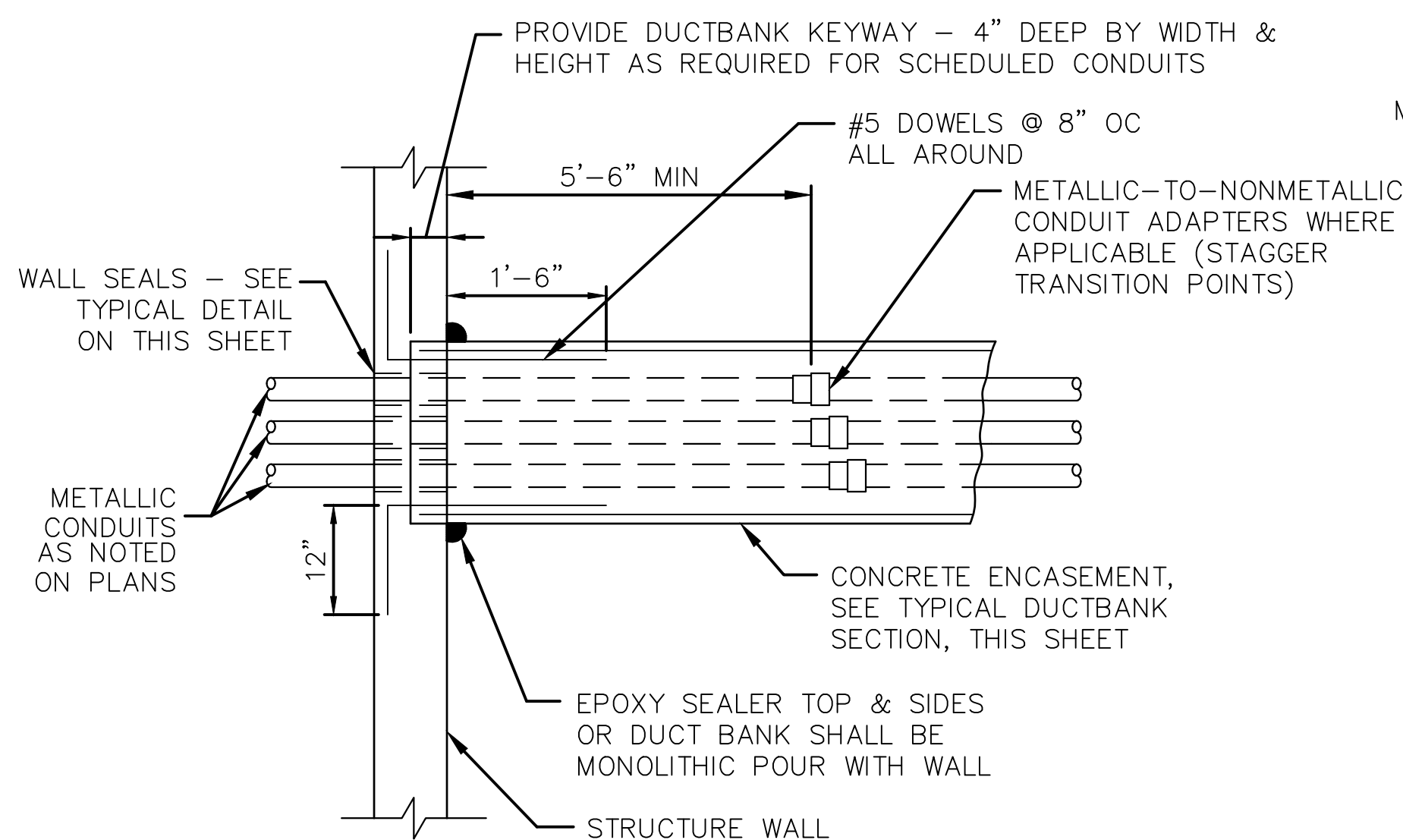
DETAIL 7
ZOE03



DETAIL 8
ZOE03

WALL SEAL SHOWN IS TYPICAL FOR EACH CONDUIT IN DUCTBANK.

**FOR USE WHERE CONDUIT OUTSIDE THE
STRUCTURE IS ENCASED IN CONCRETE**



DETAIL 11
ZOE03

Diagram illustrating the elevation view of the mounting frame. The frame is supported by two vertical posts, each with a minimum 12-inch deep concrete footing. The frame is connected to the irrigation controller. The diagram also shows the connection to the sprinklers and valves, power, and the finish grade.

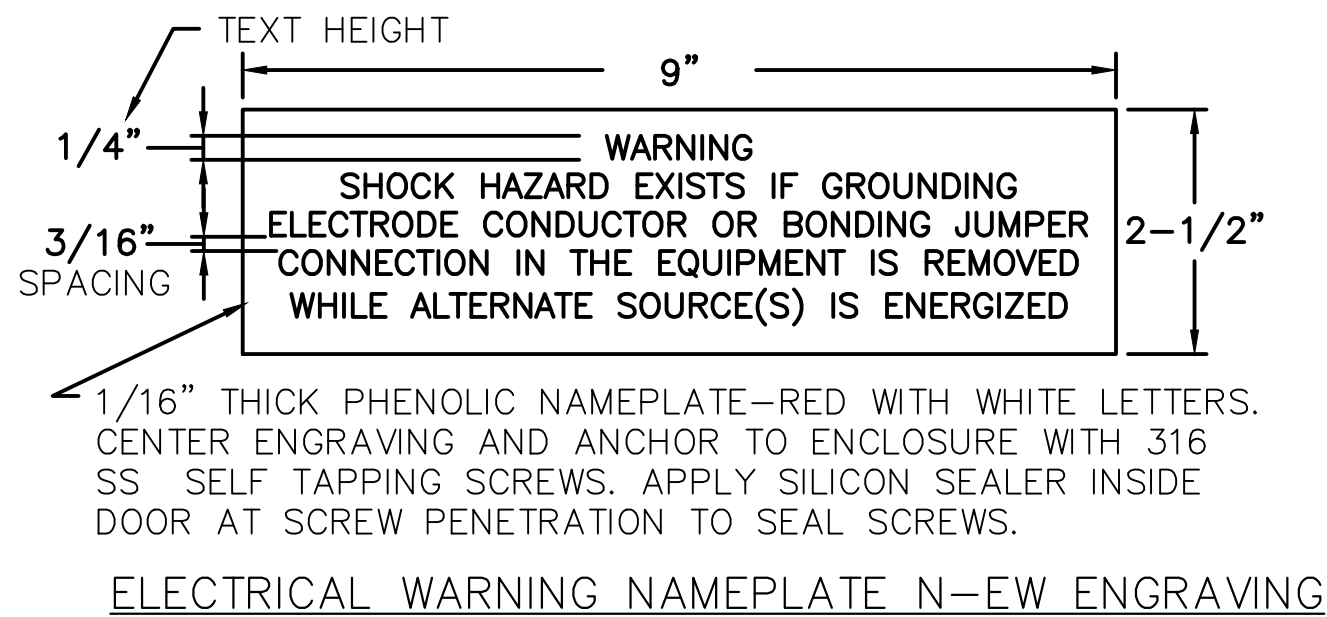
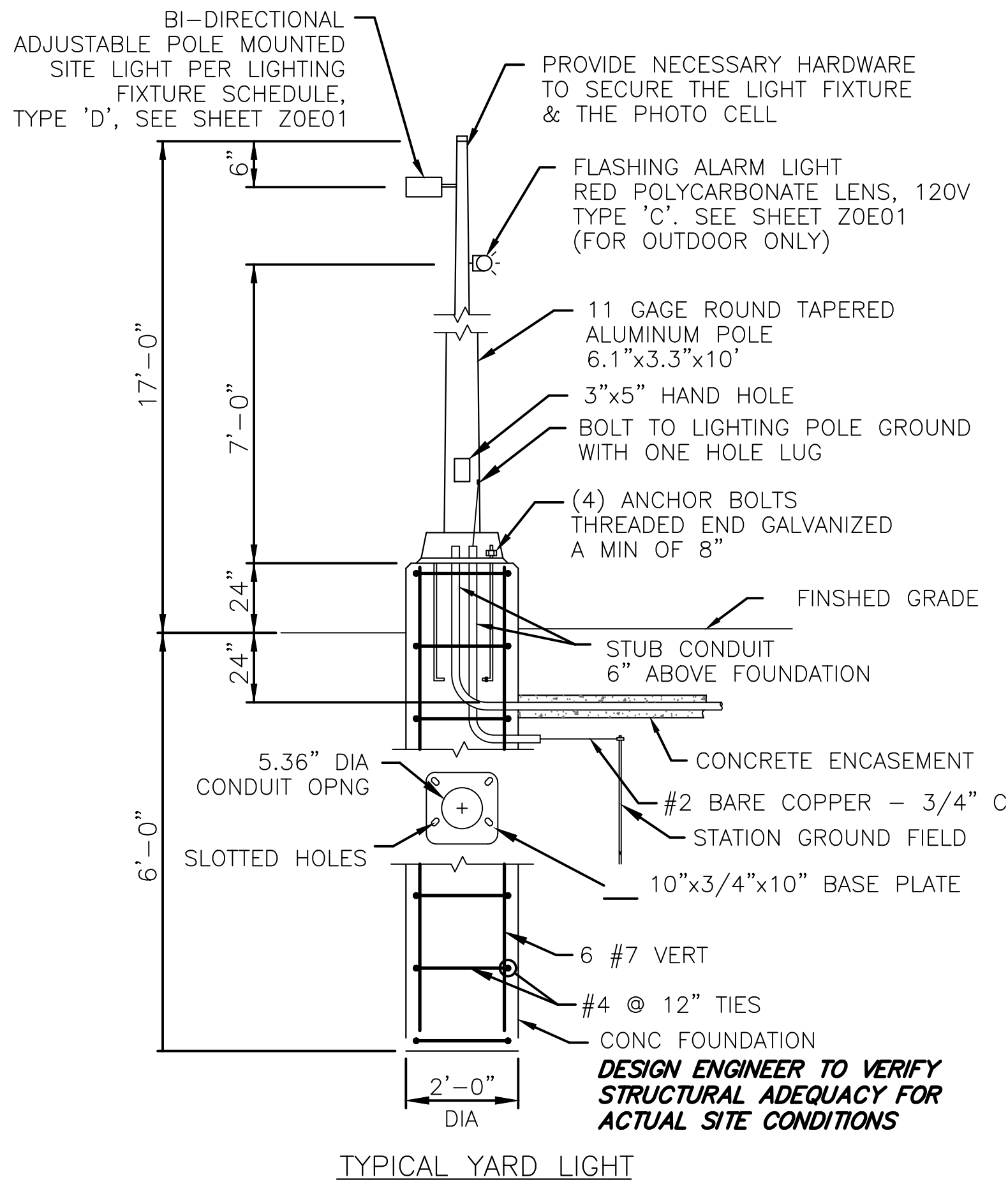
DETAIL 12
Z0E03

GROUND CONNECTOR SCHEDULE	
WIRE SIZE	BURNDY
#2 AWG	GAR 6426
#2/0 AWG	GAR 6426
#4/0 AWG	GAR 6429
500 kcmil	GAR 6434

D. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

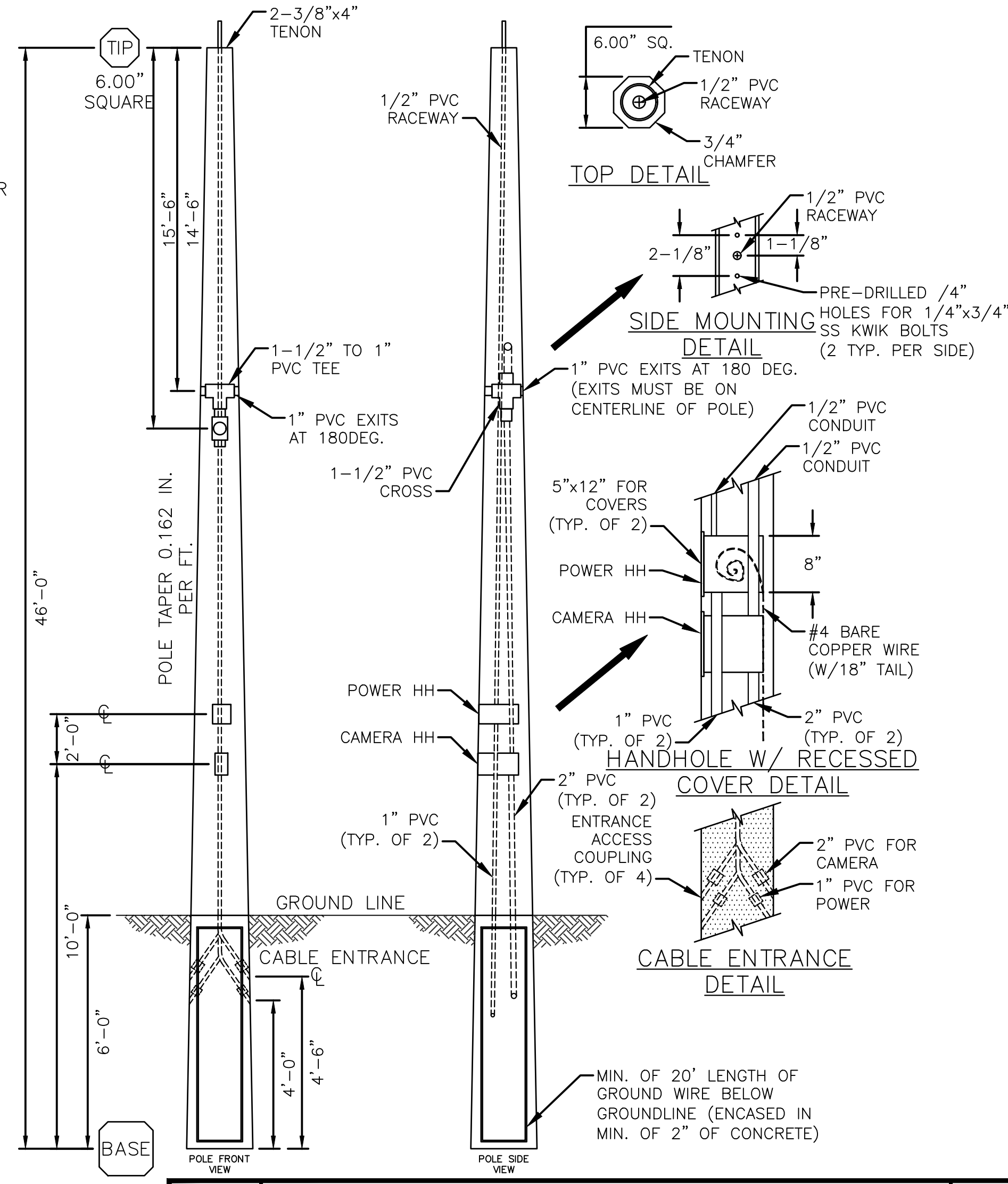
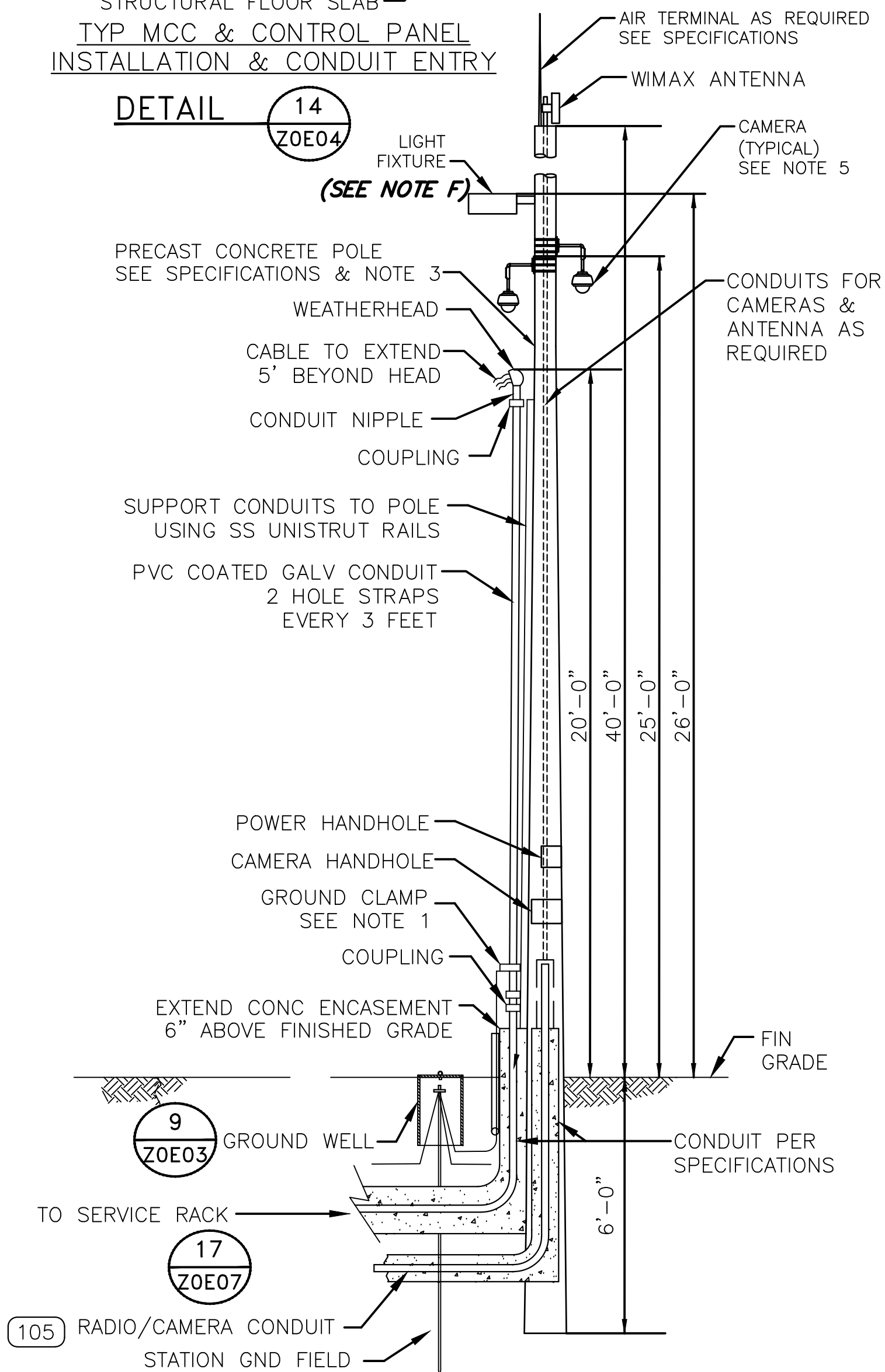
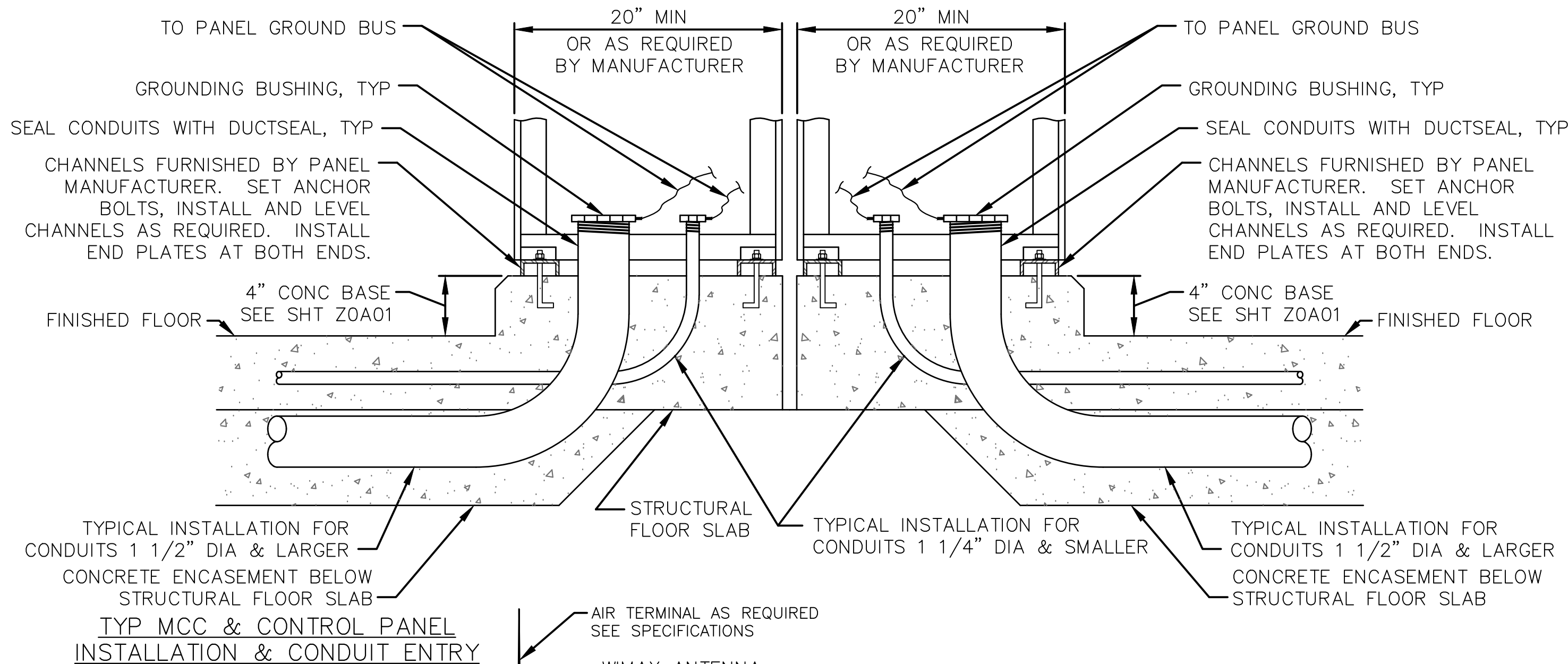
DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET ZOC0X

SCALE: NONE	DESIGNED BY:
SUBMITTED:	DRAWN BY:
DATE:	SHEET NO. OF SHEETS
SURVEY BY:	DWG. NO.
FIELD BOOK NO.	ZOE03-0516



TYP ELECTRIC & COMMUNICATION SERVICE RACK MOUNTED DETAIL (SEE NOTE B)

DETAIL 15 ZOE04



NOTES TO DESIGN ENGINEER:

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B. NOT USED

C. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

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F. THE DESIGN ENGINEER SHALL VERIFY THE APPLICATION FOR LIGHT FIXTURE WHERE NEEDED PER SITE PLAN AND USE POWER AND CONDUIT DETAILS.

NOTES:

1. DENOTES SYSTEM GROUNDING CONDUCTOR SHALL BE CONNECTED TO ALL GROUNDING ELECTRODE CONDUCTORS, GROUND MATS, GROUND LOOPS ETC., TO FORM A COMMON GROUND PLANE.

2. ON GROUND WIRE TERMINATION'S, ALL PAINTED OR COATED METAL SURFACES SHALL BE REMOVED AND CLEANED TO BARE METAL TO OBTAIN A SOUND GROUND CONNECTION. ONCE INSTALLED APPLY PROTECTIVE COATING ON BARE METAL AREAS PER MANUFACTURER REQUIREMENTS.

3. PRECAST CONCRETE POLE TO MOUNT THE RADIO RECEIVER AND CAMERAS.

4. 1" CONDUIT TO EXTEND TO THE TOP OF POLE FOR FOR ETHERNET CABLES FOR RADIO AND CAMERAS.

5. CAMERA LOCATIONS AS SPECIFIED PER WASTEWATER INSTRUCTIONS.

6 PUMP VFD INDOOR
TYPICAL ELECTRICAL DETAILS

PROJECT NO. R-000265-0XXX-X

TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
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BLOCK DETAIL ON SHEET ZOC0X

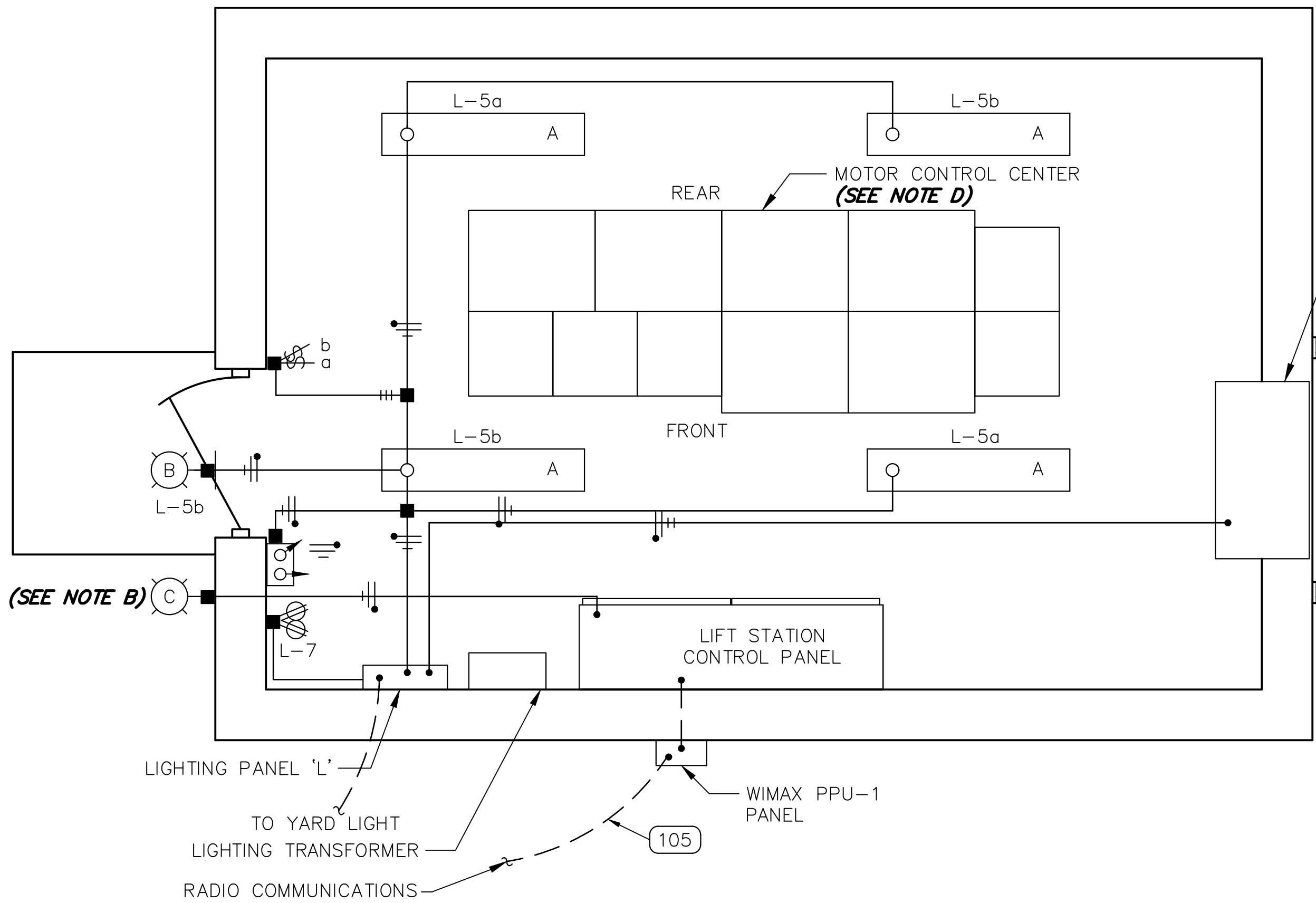
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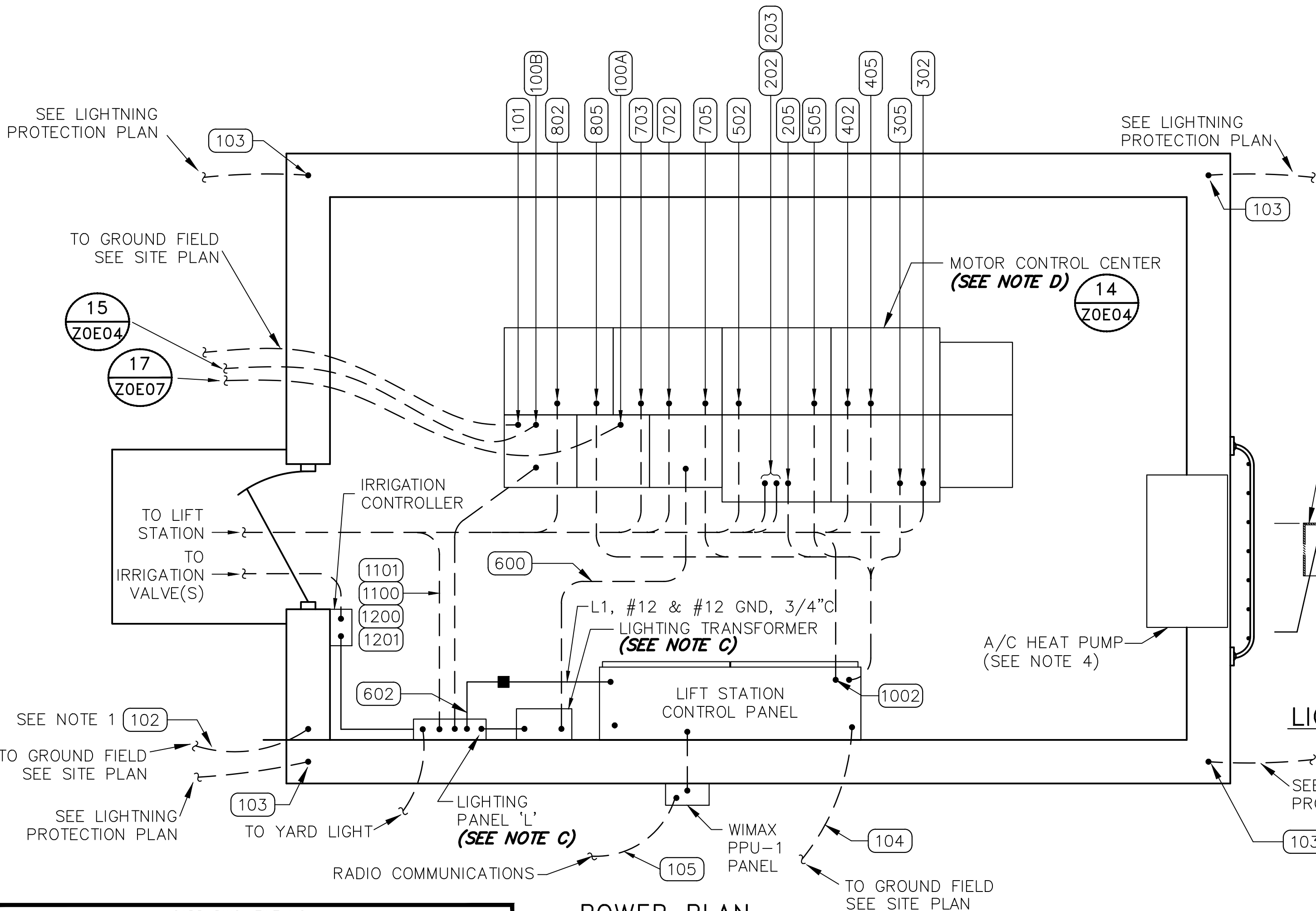
DATE: SHEET NO. OF SHEETS

SURVEY BY: DWG. NO. ZOE04-0516

FIELD BOOK NO.



LIGHTING & WIMAX SYSTEM PLAN



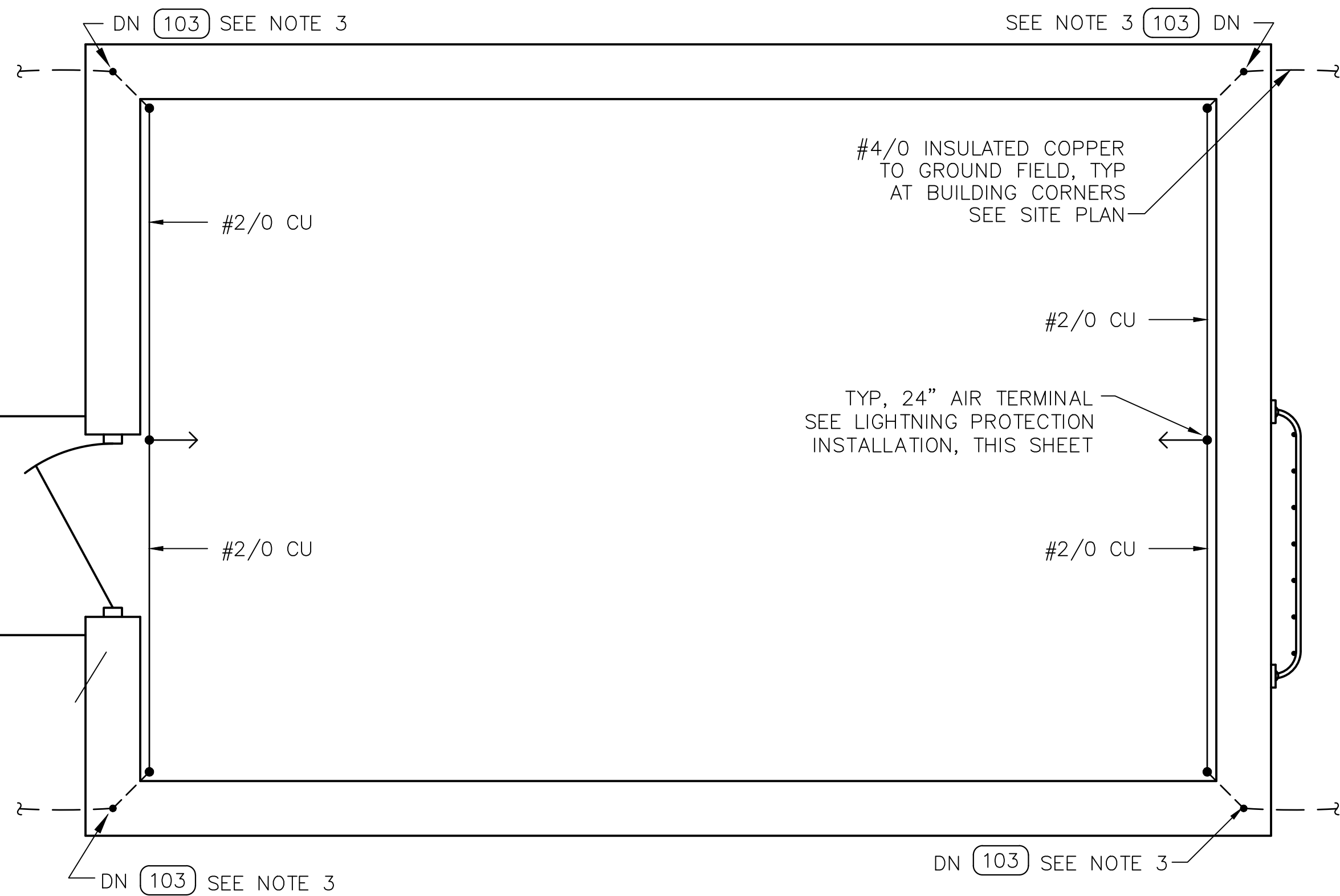
POWER PLAN

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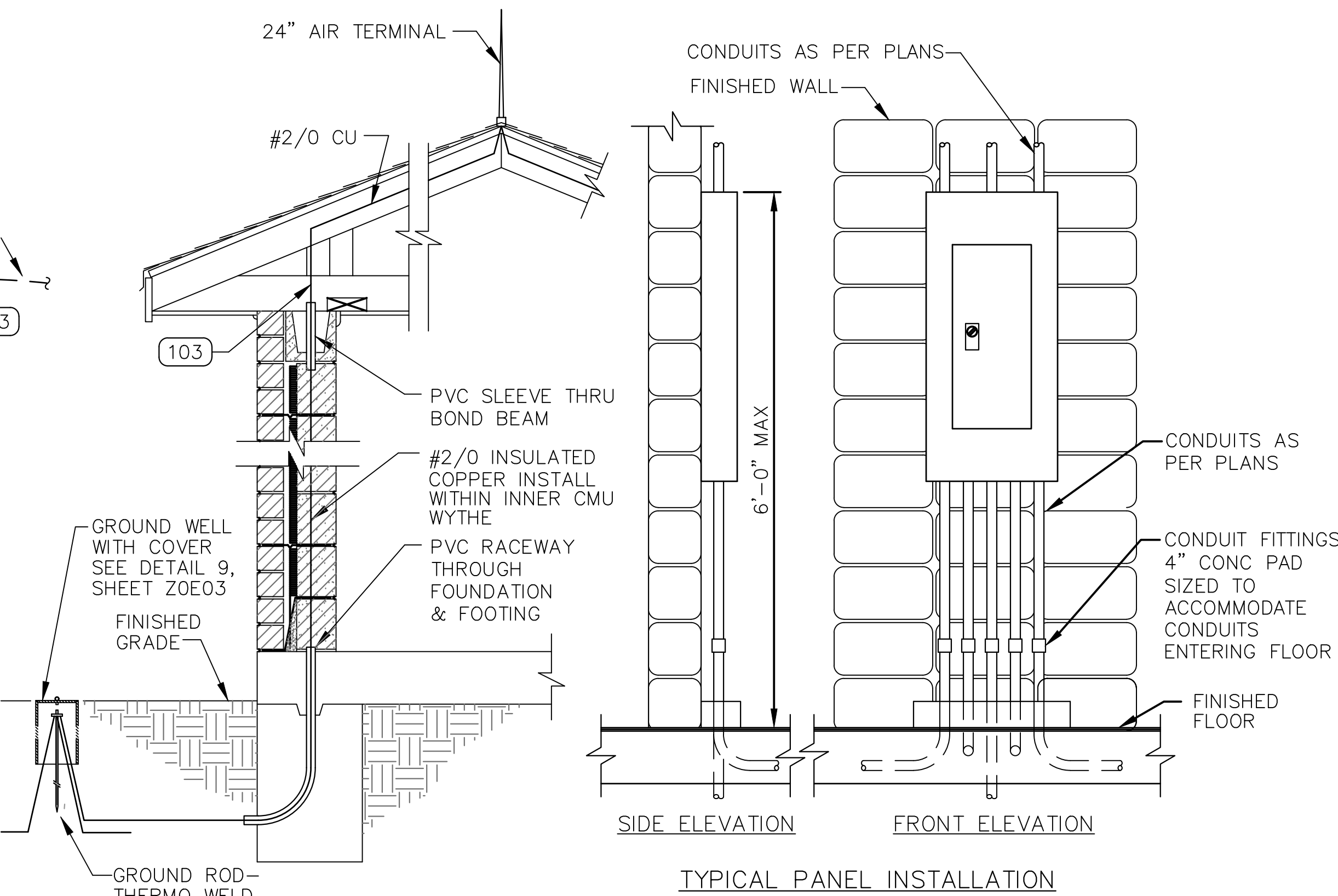
COHSTD.BDR

0 1 2 3

ORIGINAL SCALE IN INCHES
FOR REDUCED PLANS



LIGHTNING PROTECTION PLAN



LIGHTNING PROTECTION INSTALLATION

DETAIL

REV. NO.	DESCRIPTION	APP'D	DATE

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B. STEM MOUNT ALARM LIGHT 1'-6" BELOW LEAVE LINE.

C. THE TRANSFORMER AND LIGHTING PANEL IS MOUNTED ADJACENT TO THE CONTROL PANEL PER VIEW A.

D. MOTOR CONTROL CENTER FOOTPRINT IS SHOWN FOR THE MAXIMUM MCC LINEUP LENGTH ANTICIPATED. INDIVIDUAL LIFT STATION CONTROL BUILDING SHALL BE ADJUSTED BASED ON THE ACTUAL FOOTPRINT USED AND THE CONDUITS REQUIRED. SEE DEVICE SCHEDULES AND CONTROL BUILDING ARCHITECTURAL DRAWING FOR ADDITIONAL INFORMATION.

E. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

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- NOTES:**
1. THERMO WELD BUILDING GROUND CONDUCTOR TO BUILDING REINFORCING STEEL.
 2. ALL CONDUITS DESIGNATED AS UP ARE CONTINUED ON THE ROOF PLAN. ALL CONDUITS DESIGNATED AS DOWN (DN) ARE CONTINUED ON THE FLOOR PLAN.
 3. INSTALL LIGHTNING DOWN LEADS WITHIN MASONRY BLOCK WALL. PROVIDE PVC SLEEVE AND ELBOW THROUGH SLAB AND FOUNDATION. SEE LIGHTNING PROTECTION INSTALLATION DETAIL, THIS SHEET.
 4. ANOTHER ENTRANCE DOOR SHALL BE REQUIRED PER NEC CODE IF MCC RATING IS 1200A OR ABOVE ACCORDINGLY A/C UNIT SHALL BE RELOCATED.

6 PUMP VFD INDOOR
CONTROL BUILDING - ELECTRICAL

PROJECT NO. R-000265-0XXX-X

TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
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BLOCK DETAIL ON SHEET ZOC0X

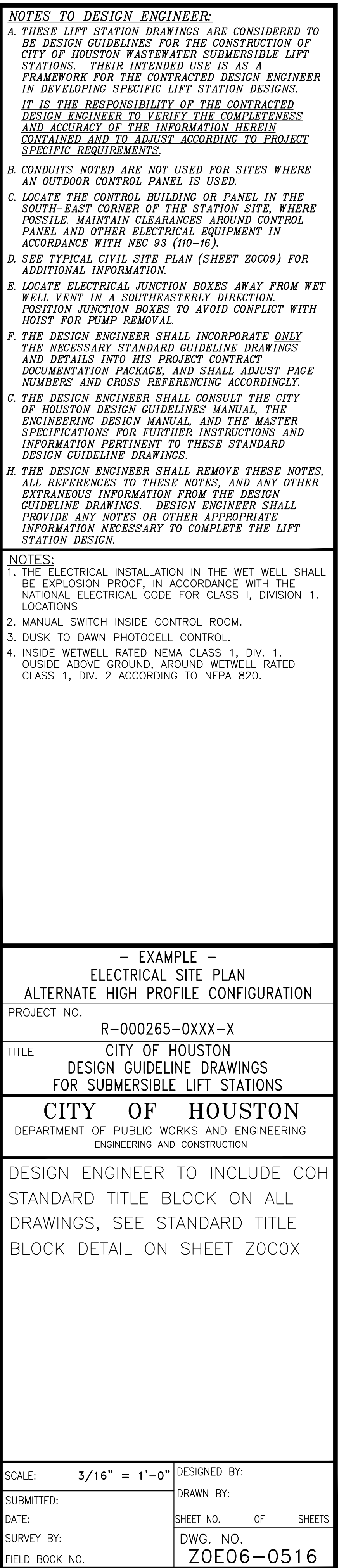
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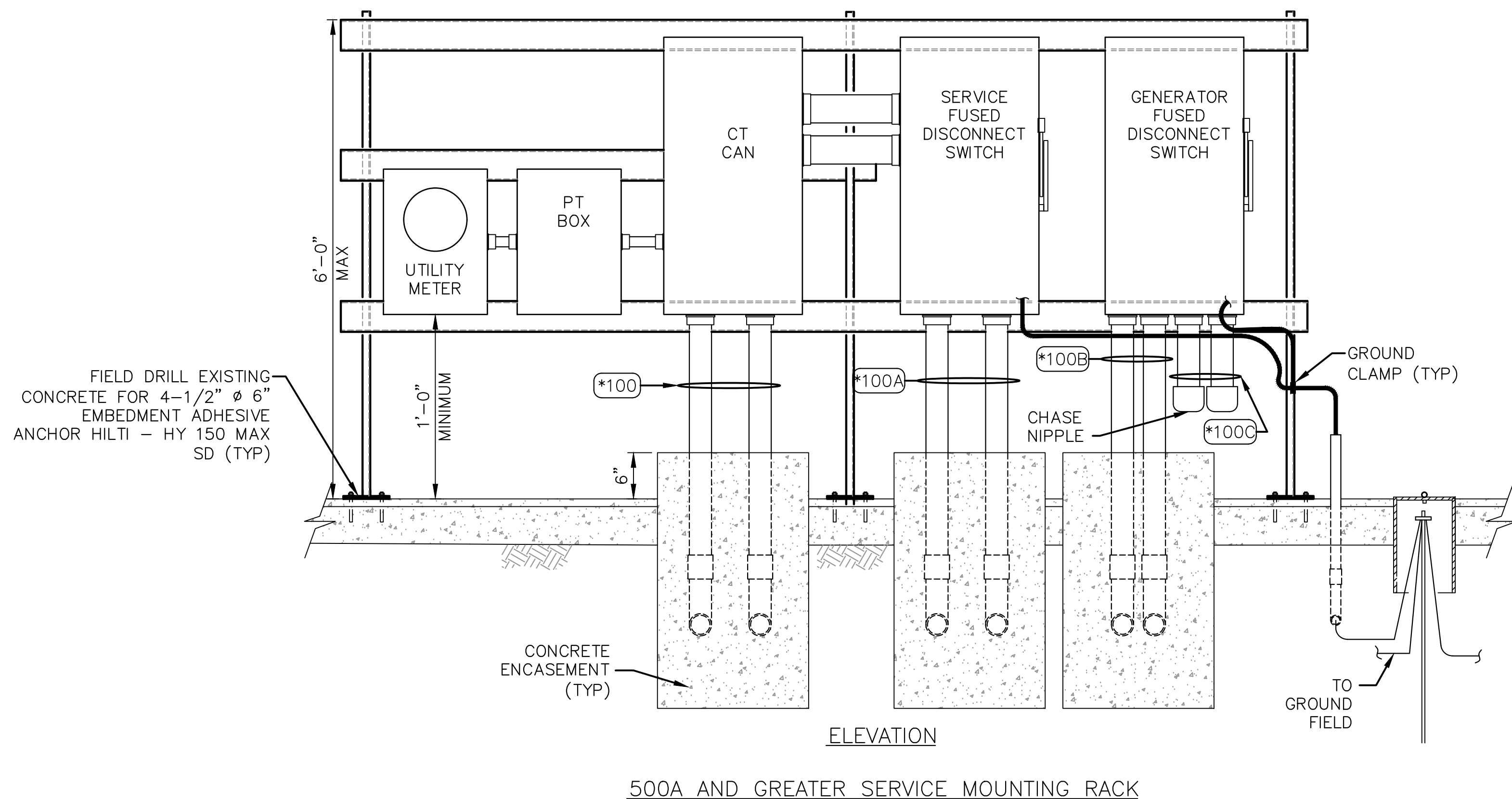
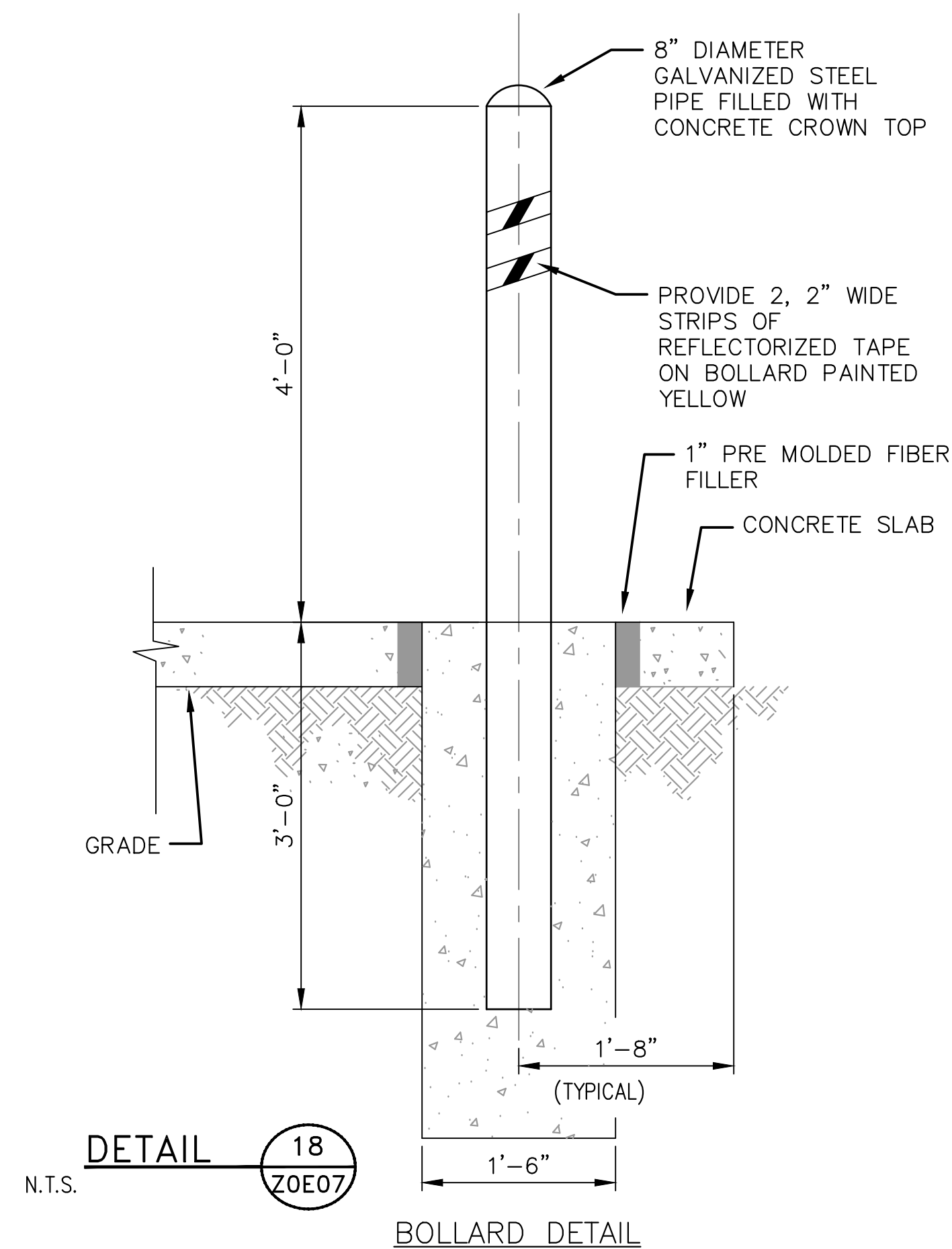
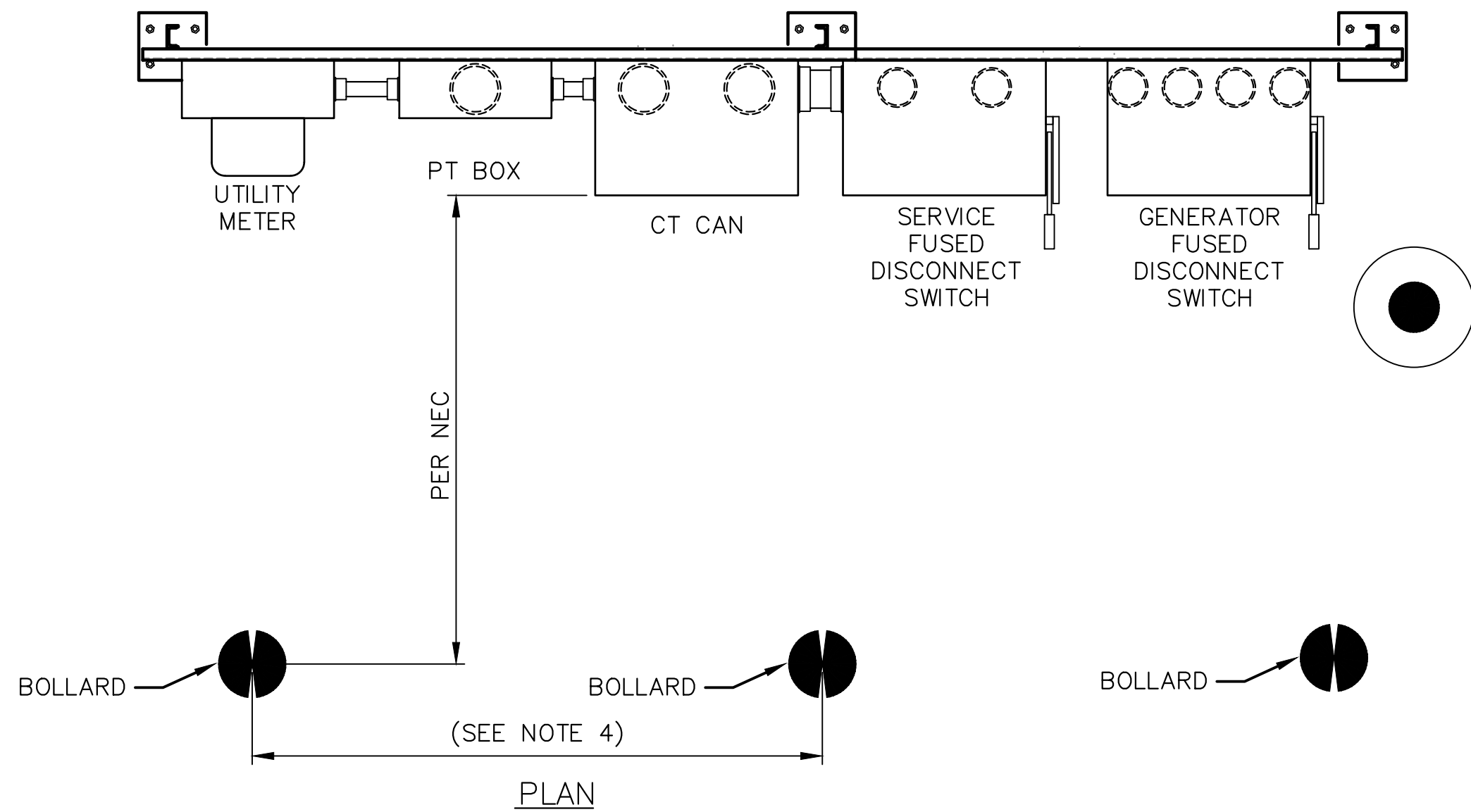
SUBMITTED: DRAWN BY:

DATE: SHEET NO. OF SHEETS

SURVEY BY: DWG. NO. ZOE05-0516

FIELD BOOK NO.





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B. DESIGN ENGINEER TO PROVIDE NOT LESS THAN 1'-0" FROM TOP OF FINISHED GRADE TO TOP OF CONCRETE PEDESTAL. FINAL DIMENSION SHALL LOCATE TOP OF CONCRETE PEDESTAL AT NOT LESS THAN 1'-0" ABOVE 100 YEAR FLOOD PLAIN ELEVATION. WHEN THE TOP OF THE CONCRETE PEDESTAL IS GREATER THAN 1'-0" ABOVE FINISHED GRADE, THE DESIGN ENGINEER SHALL PROVIDE A WORK PLATFORM.

C. SERVICE SHOULD BE CONSTRUCTED ACCORDING TO UTILITY SERVICE STANDARDS BOOK 200A, 3 PHASE, 480V AND ALL 400A AND ABOVE SERVICE SHOULD BE CONSTRUCTED USING THE STUB POLE AND UNISTRUT RACK ASSEMBLY DETAIL.

D. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

E. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

F. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

- NOTES:**
- CHASE NIPPLE(S) WITH REMOVABLE CAP(S) FOR CONNECTION OF PORTABLE GENERATOR. NOTE: CAP(S) TO BE ATTACHED TO PANEL OR CONDUIT(S) BY STAINLESS STEEL CHAIN.
 - T.O.C DEFINED AS TOP OF PAVEMENT OR TOP OF PANEL ENCLOSURE PEDESTAL WHICHEVER IS HIGHER. (SEE NOTE B)
 - CONTRACTOR SHALL COIL A MINIMUM OF 2 FT. AND TAPE THE END OF THE CONDUCTOR.
 - "*" CONDUIT QUANTITY SHALL BE DEPENDANT ON THE SERVICE SIZE.

6 PUMP VFD INDOOR
TYPICAL ELECTRICAL DETAILS

PROJECT NO. R-000265-0XXX-X

TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET Z0C0X

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SUBMITTED: DRAWN BY:

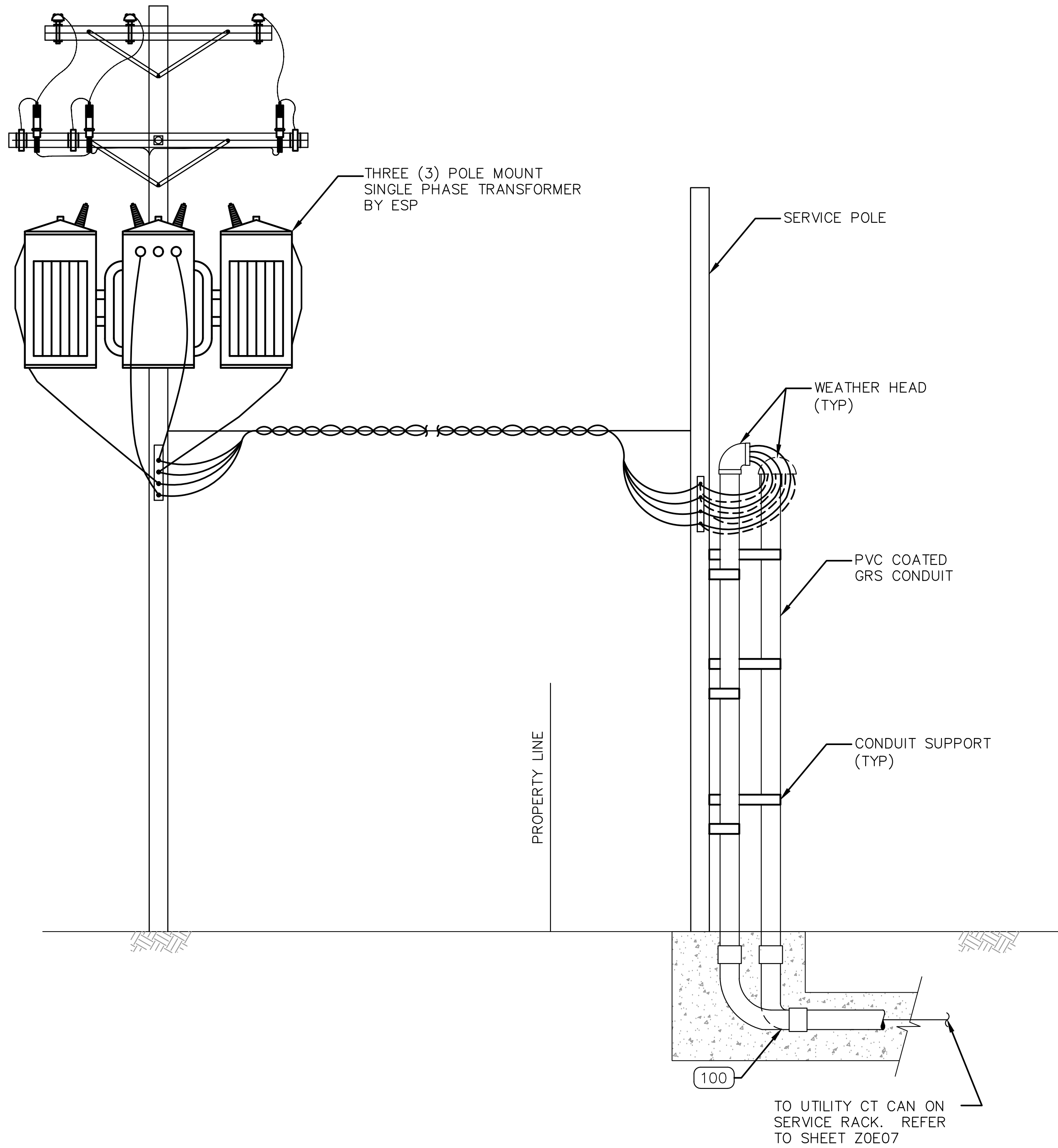
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FIELD BOOK NO.

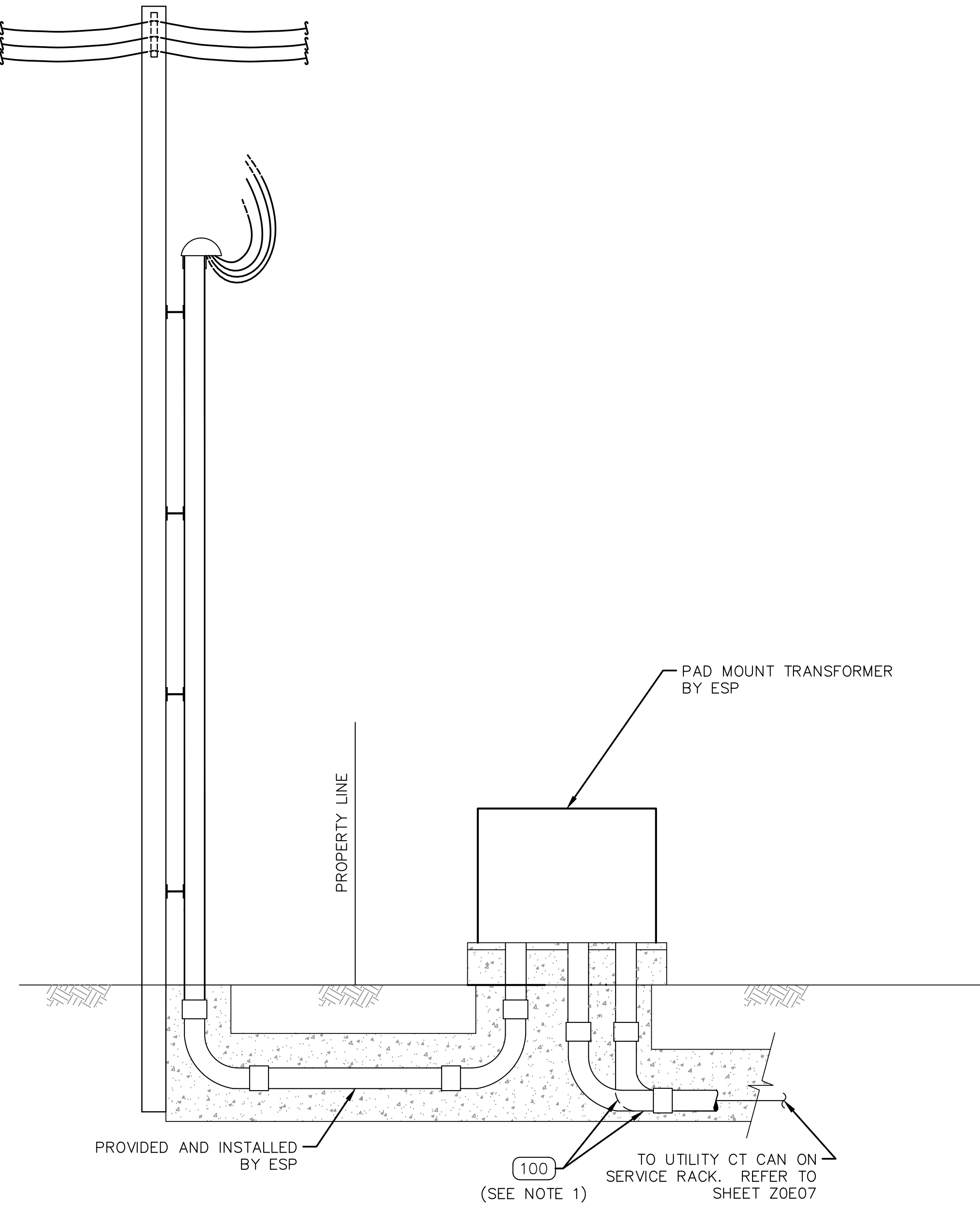
REV. NO.	DESCRIPTION	APP'D	DATE

CADD DWG. FILE NO. : Z0E07.DWG



TYPICAL ELECTRICAL SERVICE ENTRANCE
FOR POWER SUPPLY BELOW 500KVA

DETAIL 19
Z0E08



TYPICAL ELECTRICAL SERVICE ENTRANCE
FOR POWER SUPPLY 500KVA AND GREATER

DETAIL 20
Z0E08

NOTES TO DESIGN ENGINEER:
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C. THE DESIGN ENGINEER SHALL CONSULT THE SERVICE STANDARD OF ELECTRICAL SERVICE PROVIDER (ESP). PRIOR TO DESIGNING SERVICE ENTRANCE.

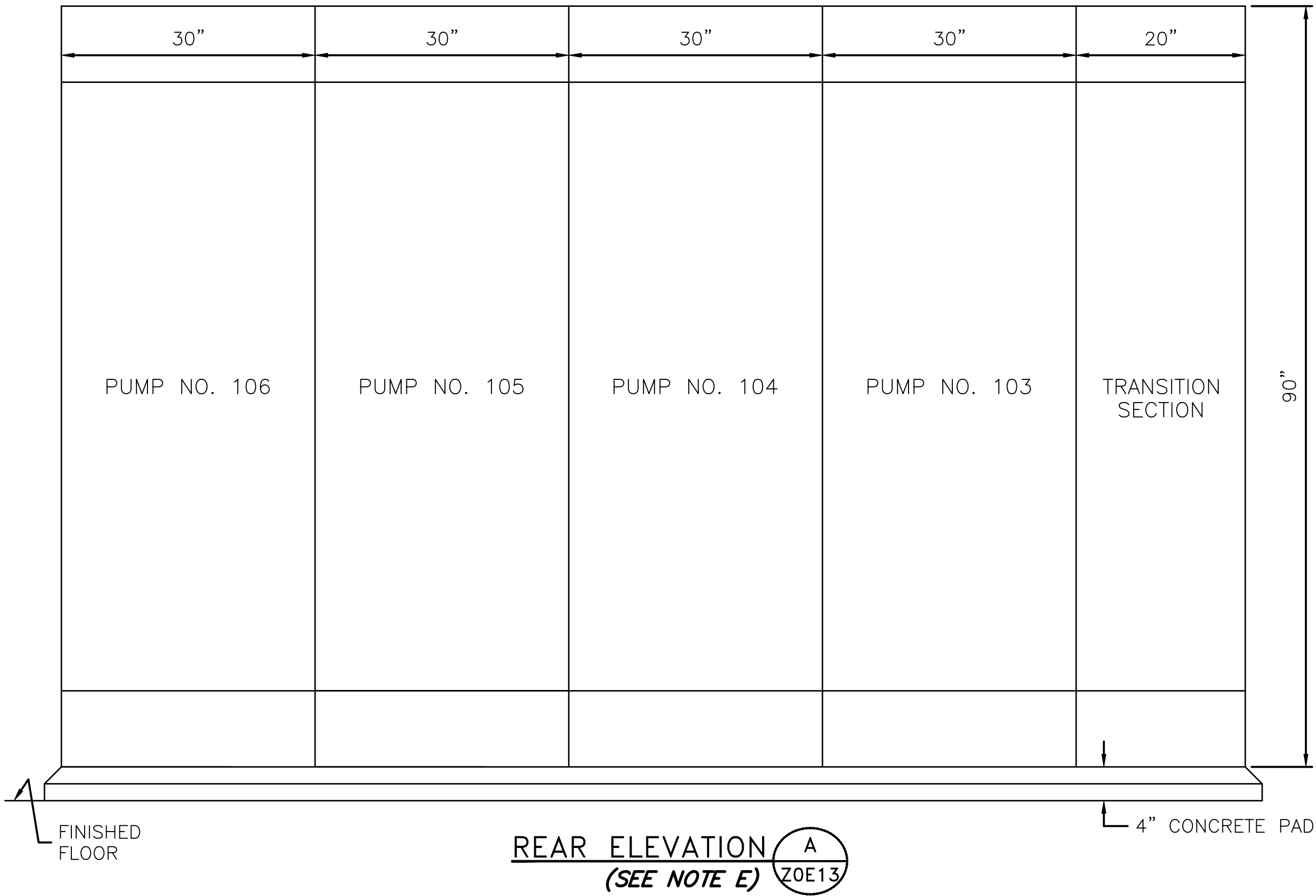
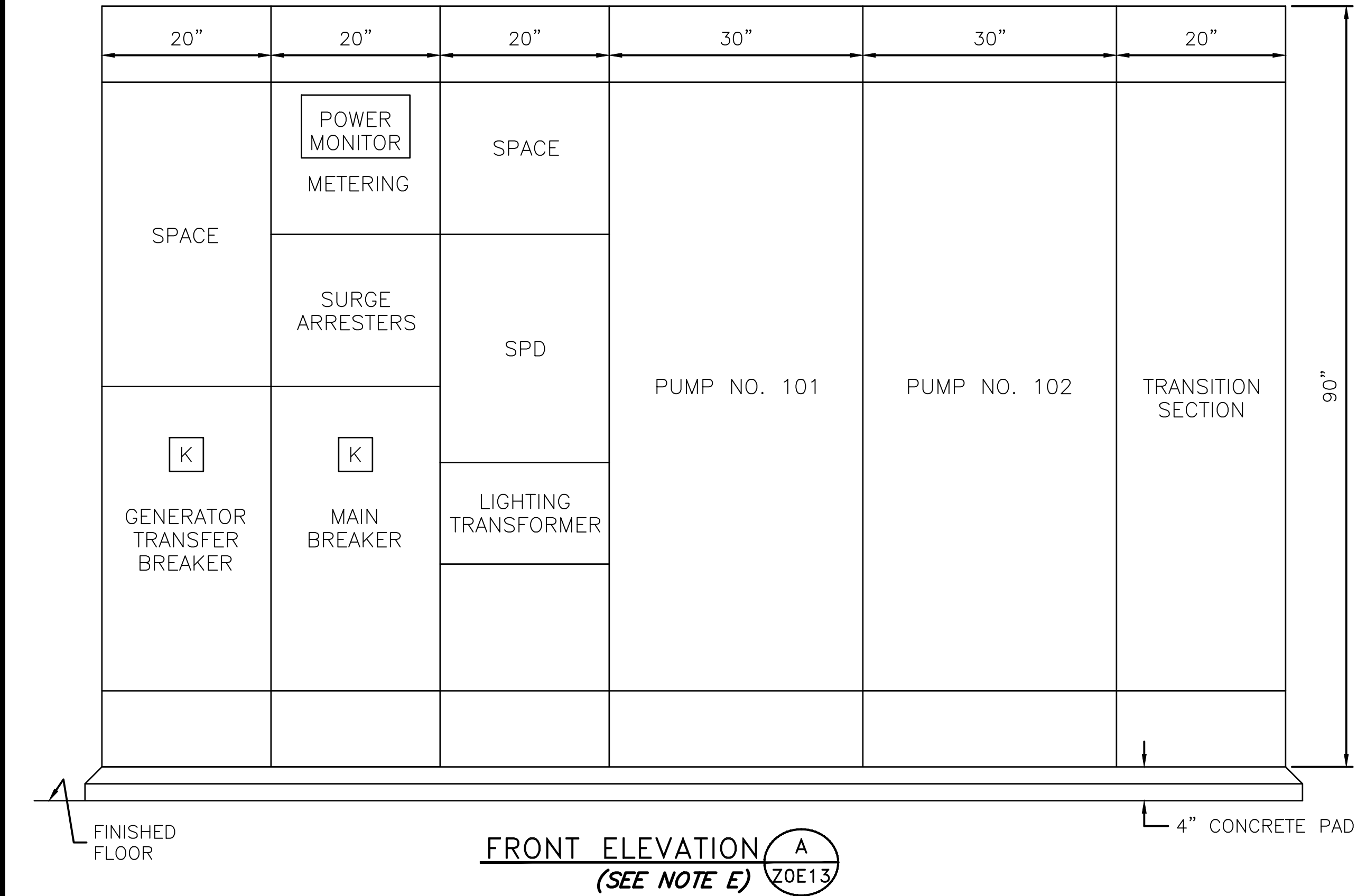
NOTES:

6 PUMP VFD INDOOR
TYPICAL ELECTRICAL DETAILS
PROJECT NO. R-000265-0XXX-X
TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

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SCALE:	NONE	DESIGNED BY:
SUBMITTED:		DRAWN BY:
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FIELD BOOK NO.		



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B. ELEVATIONS FOR SERVICES 400A AND ABOVE.

C. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

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6 PUMP VFD INDOOR
MCC ELEVATIONS

PROJECT NO. R-000265-0XXX-X

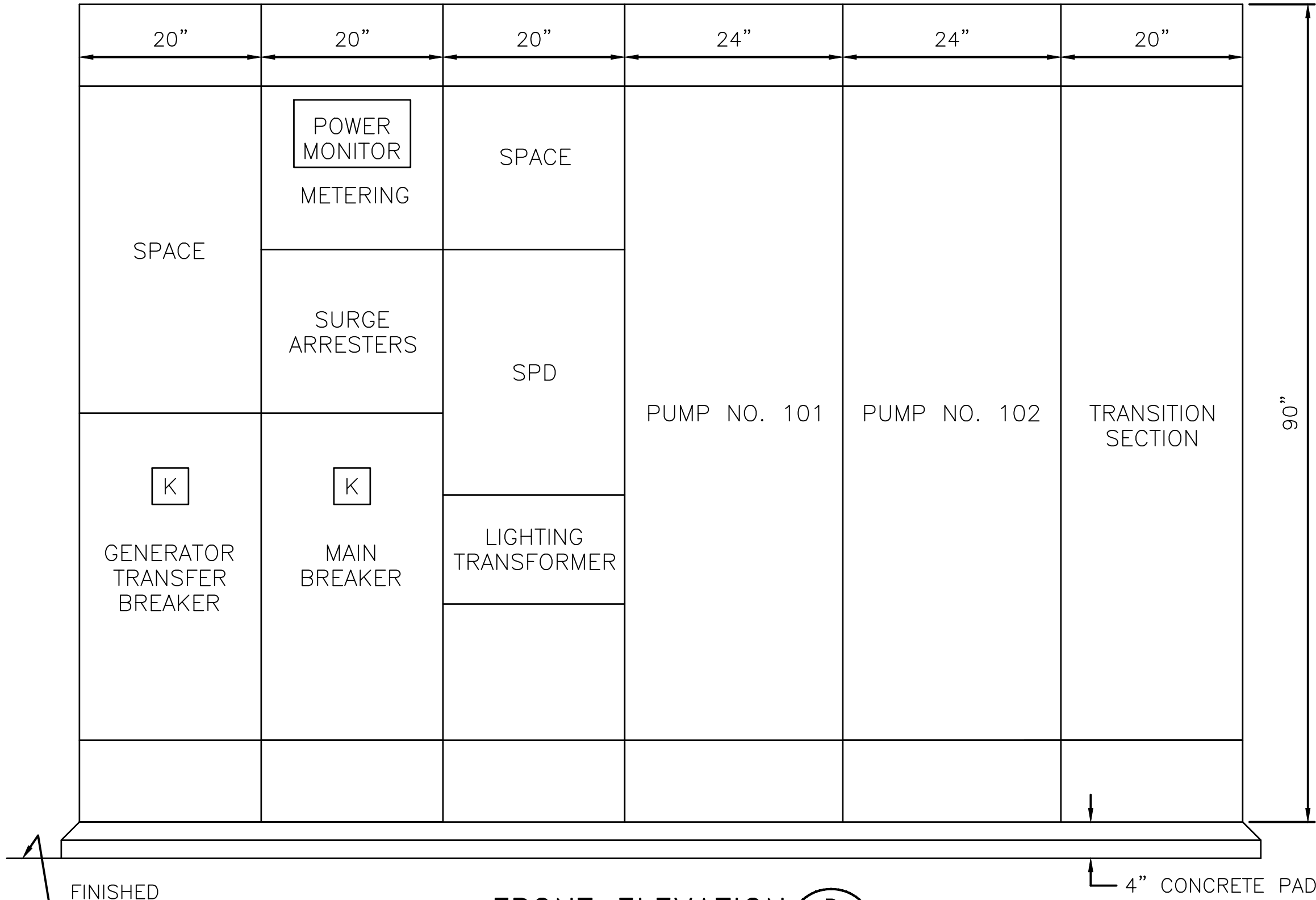
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CITY OF HOUSTON
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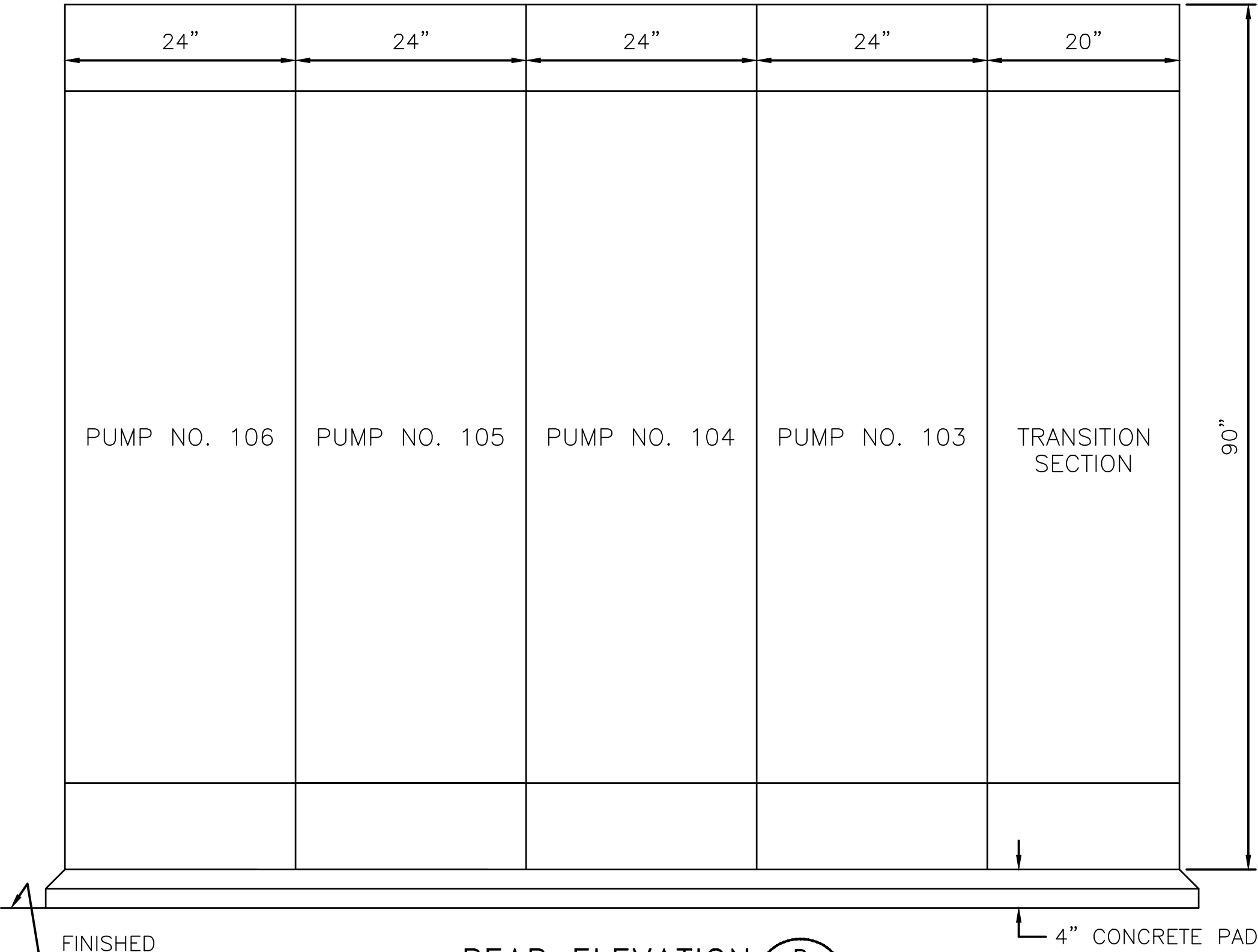
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DATE:		SHEET NO. OF SHEETS
SURVEY BY:		DWG. NO. Z0E13-0516
FIELD BOOK NO.		



FRONT ELEVATION B
(SEE NOTE E) Z0E14



REAR ELEVATION B
(SEE NOTE E) Z0E14

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MCC ELEVATIONS

PROJECT NO. R-000265-0XXX-X

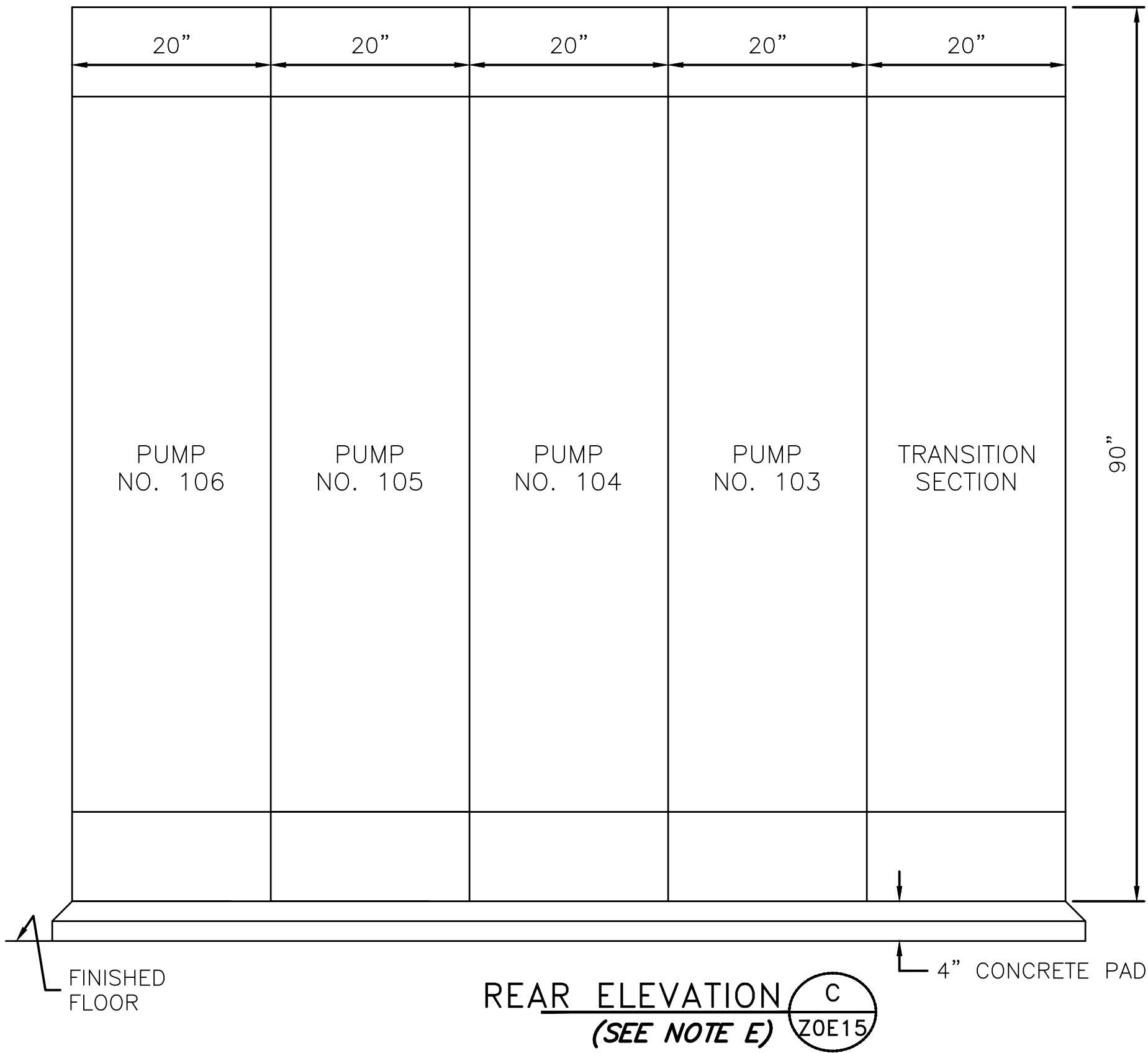
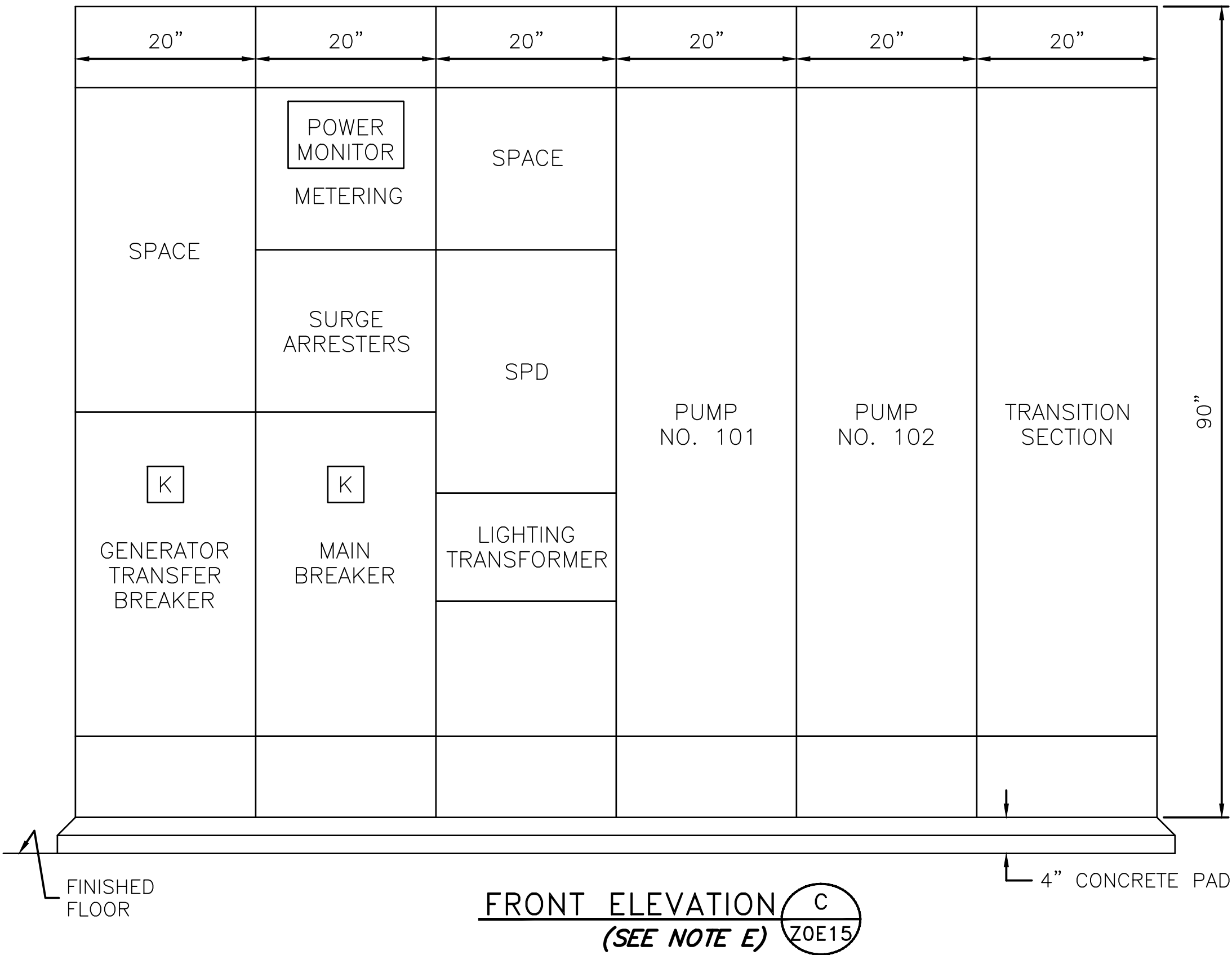
TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET Z0C0X

REV. NO.	DESCRIPTION	APP'D	DATE

SCALE:	NONE	DESIGNED BY:
SUBMITTED:		DRAWN BY:
DATE:		SHEET NO. OF SHEETS
SURVEY BY:		DWG. NO. Z0E14-0516
FIELD BOOK NO.		



NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS. IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. ELEVATIONS FOR SERVICES 400A AND ABOVE.

C. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

D. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

E. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

6 PUMP VFD INDOOR
MCC ELEVATIONS

PROJECT NO. R-000265-0XXX-X

TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET Z0C0X

REV. NO.	DESCRIPTION	APP'D	DATE

SCALE:	NONE	DESIGNED BY:
SUBMITTED:		DRAWN BY:
DATE:		SHEET NO. OF SHEETS
SURVEY BY:		DWG. NO.
FIELD BOOK NO.		ZOE15-0516

	DESCRIPTION	SERVICE		FROM	ROUTING TO		CONDUIT & WIRE SIZE
		VOLTAGE	AMPS OR HP			VIA	
A	MAIN BONDING JUMPER	---	--	MAIN FUSED DISCONNECT NEUTRAL	MAIN FUSED DISCONNECT GROUND	--	
B	EQUIPMENT BONDING JUMPER	---	--	MAIN FUSED DISCONNECT GROUND	MCC PANEL & EQUIPMENT	--	
C	GROUNDING ELECTRODE CONDUCTOR	---	--	GROUNDING ELECTRODE	MAIN SERVICE FUSED DISCONNECT	--	
*100	SERVICE ENTRANCE	480V	VARIES	SERVICE	CT CAN	--	SEE NOTE G
*100A	SERVICE POWER	480V	VARIES	SERVICE DISCONNECT	MAIN BREAKER IN MCC	--	SEE NOTE G
*100B	EMERGENCY POWER	480V	VARIES	GENERATOR DISCONNECT	GENERATOR TRANSFER SWITCH	--	SEE NOTE G
*100C	EMERGENCY POWER	480V	VARIES	GENERATOR DISCONNECT	PORTABLE GENERATOR	CAPPED CONDUITS	SEE NOTE G
101	GROUND ELECTRODE CONDUCTOR	--	--	POWER PANEL	GROUND FIELD	--	
102	GROUND ELECTRODE CONDUCTOR	--	--	BUILDING STEEL	GROUND FIELD	--	
103	LIGHTNING DOWN LEAD	--	--	LIGHTNING ARRESTOR	LIGHTNING GROUND FIELD	--	
104	GROUND ELECTRODE CONDUCTOR	--	--	CONTROL PANEL OR MOTOR CONTROL CENTER	GROUND FIELD	--	
105	COMMUNICATION	--	--	UTILITY SERVICE	PANEL PPU	--	
200	PUMP NO. 101 POWER	480V	HP AS NOTED	PUMP NO. 101	PUMP NO. 101 JUNCTION BOX	--	SEE NOTE E
201	PUMP NO. 101 CONTROLS	120V	--	PUMP NO. 101	PUMP NO. 101 JUNCTION BOX	--	SEE NOTE E
202	PUMP NO. 101 POWER	480V	HP AS NOTED	PUMP NO. 101 JUNCTION BOX	PUMP STARTER	--	
203	COMBINED PUMP CONTROLS	120V	--	PUMP NO. 101 JUNCTION BOX	PUMP STARTER	--	COMBINE 200, 300, & 400 TAG WIRING
205	PUMP NO. 101 CONTROLS	120V	--	STARTER IN MOTOR CONTROL CENTER	CONTROL PANEL	--	
300	PUMP NO. 102 POWER	480V	HP AS NOTED	PUMP NO. 102	PUMP NO. 102 JUNCTION BOX	--	SEE NOTE E
301	PUMP NO. 102 CONTROLS	120V	--	PUMP NO. 102	PUMP NO. 102 JUNCTION BOX	--	SEE NOTE E
302	PUMP NO. 102 POWER	480V	HP AS NOTED	PUMP NO. 102 JUNCTION BOX	PUMP STARTER	--	
305	PUMP NO. 102 CONTROLS	120V	--	STARTER IN MOTOR CONTROL CENTER	CONTROL PANEL	--	
400	PUMP NO. 103 POWER	480V	HP AS NOTED	PUMP NO. 103	PUMP NO. 103 JUNCTION BOX	--	SEE NOTE E
401	PUMP NO. 103 CONTROLS	120V	--	PUMP NO. 103	PUMP NO. 103 JUNCTION BOX	--	SEE NOTE E
402	PUMP NO. 103 POWER	480V	HP AS NOTED	PUMP NO. 103 JUNCTION BOX	PUMP STARTER	--	
405	PUMP NO. 103 CONTROLS	120V	--	STARTER IN MOTOR CONTROL CENTER	CONTROL PANEL	--	
500	PUMP NO. 104 POWER	480V	HP AS NOTED	PUMP NO. 104	PUMP NO. 104 JUNCTION BOX	--	SEE NOTE E
501	PUMP NO. 104 CONTROLS	120V	--	PUMP NO. 104	PUMP NO. 104 JUNCTION BOX	--	SEE NOTE E
502	PUMP NO. 104 POWER	480V	--	PUMP NO. 104 JUNCTION BOX	PUMP STARTER	--	
505	PUMP NO. 104 CONTROLS	120V	--	STARTER IN MOTOR CONTROL CENTER	CONTROL PANEL	--	
600	LIGHTING PANEL FEEDER	480V	--	MOTOR CONTROL CENTER	LIGHTING TRANSFORMER	--	
601	LIGHTING PANEL GROUND	--	--	LIGHTING PANEL	GROUND FIELD	--	
602	LIGHTING PANEL FEEDER	120/240V	--	LIGHTING TRANSFORMER	LIGHTING PANEL	--	
700	PUMP NO. 105 POWER	480V	HP AS NOTED	PUMP NO. 105	PUMP NO. 105 JUNCTION BOX	--	
701	PUMP NO. 105 CONTROLS	120V	--	PUMP NO. 105	PUMP NO. 105 JUNCTION BOX	--	
702	PUMP NO. 105 POWER	480V	HP AS NOTED	PUMP NO. 105 JUNCTION BOX	PUMP STARTER	--	
703	COMBINED PUMP CONTROLS	120V	--	PUMP NO. 104 OR NO. 105 JUNCTION BOX	PUMP STARTER	--	COMBINE 500, 700, & 800 TAG WIRING
705	PUMP NO. 105 CONTROLS	120V	--	STARTER IN MOTOR CONTROL CENTER	CONTROL PANEL	--	
800	PUMP NO. 106 POWER	480V	HP AS NOTED	PUMP NO. 106	PUMP NO. 106 JUNCTION BOX	--	
801	PUMP NO. 106 CONTROLS	120V	--	PUMP NO. 106	PUMP NO. 106 JUNCTION BOX	--	
802	PUMP NO. 106 POWER	480V	HP AS NOTED	PUMP NO. 106	PUMP STARTER	--	
805	PUMP NO. 106 CONTROLS	120V	--	STARTER IN MOTOR CONTROL CENTER	CONTROL PANEL	--	

CADD DWG. FILE NO. : Z0E21.DWG

COHSTD.BDR0123

ORIGINAL SCALE IN INCHES
FOR REDUCED PLANS

NOTES TO DESIGN ENGINEER:

A. THESE LIFT STATION DRAWINGS ARE CONSIDERED TO BE DESIGN GUIDELINES FOR THE CONSTRUCTION OF CITY OF HOUSTON WASTEWATER SUBMERSIBLE LIFT STATIONS. THEIR INTENDED USE IS AS A FRAMEWORK FOR THE CONTRACTED DESIGN ENGINEER IN DEVELOPING SPECIFIC LIFT STATION DESIGNS.

IT IS THE RESPONSIBILITY OF THE CONTRACTED DESIGN ENGINEER TO VERIFY THE COMPLETENESS AND ACCURACY OF THE INFORMATION HEREIN CONTAINED AND TO ADJUST ACCORDING TO PROJECT SPECIFIC REQUIREMENTS.

B. CONDUIT NUMBERS 102, 103, 206, 306, 406, 600, 601, EQUIPPED WITH A CONTROL BUILDING.

C. WIRE, CABLE AND CONDUIT SIZES AND QUANTITIES ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER SPECIFIC SITE REQUIREMENTS.

D. CONDUITS LABELED "FUTURE SPACE" ARE THOSE TO BE INSTALLED AND CAPPED IN FIELD.

E. THE DESIGN ENGINEER SHALL SIZE ANY CONDUIT REQUIRING A CSBE TYPE SEAL AT NO SMALLER THAN 2 1/2". CSBE SEALS ARE NOT MANUFACTURED SMALLER THAN 2 1/2".

F. NOT USED.

G. GENERATOR CONDUIT SHALL BE A MINIMUM OF 3" CONDUIT.

H. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.

I. THE DESIGN ENGINEER SHALL CONSULT THE CITY OF HOUSTON DESIGN GUIDELINES MANUAL, THE ENGINEERING DESIGN MANUAL, AND THE MASTER SPECIFICATIONS FOR FURTHER INSTRUCTIONS AND INFORMATION PERTINENT TO THESE STANDARD DESIGN GUIDELINE DRAWINGS.

J. THE DESIGN ENGINEER SHALL REMOVE THESE NOTES, ALL REFERENCES TO THESE NOTES, AND ANY OTHER EXTRANEOUS INFORMATION FROM THE DESIGN GUIDELINE DRAWINGS. DESIGN ENGINEER SHALL PROVIDE ANY NOTES OR OTHER APPROPRIATE INFORMATION NECESSARY TO COMPLETE THE LIFT STATION DESIGN.

- NOTES:
- CONDUITS LABELED "FUTURE SPACE" ARE TO BE INSTALLED AND CAPPED IN FIELD.
 - ANY CONDUIT REQUIRING A CSBE SEAL, SHALL BE A MINIMUM SIZE OF 2 1/2".
 - ALL UNDERGROUND CONDUITS (SINGLE AND MULTI-RUN) TO BE ENCASED IN REINFORCED CONCRETE DUCTBANK.

6 PUMP VFD INDOOR
CONDUIT SCHEDULE
FOR 480 VOLT

PROJECT NO. R-000265-0XXX-X

TITLE CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET Z0C0X

SCALE: NONEDESIGNED BY:
SUBMITTED:DRAWN BY:
DATE:SHEET NO. OF SHEETS
SURVEY BY:DWG. NO.
FIELD BOOK NO.Z0E21-0516

REV. NO.	DESCRIPTION	APP'D	DATE

	DESCRIPTION	SERVICE		ROUTING			CONDUIT & WIRE SIZE
		VOLTAGE	AMPS OR HP	FROM	TO	VIA	
900	INTRUSION ALARM	24VDC	--	MOTION SWITCH	CONTROL PANEL	--	
1000	LEVEL TRANSMITTER	24VDC	--	TRANSMITTER JUNCTION BOX	TRANSMITTER JUNCTION BOX	--	SEE NOTE E
1001	LEVEL TRANSMITTER	24VDC	--	TRANSMITTER JUNCTION BOX	TRANSMITTER JUNCTION BOX	--	SEE NOTE E
1002	COMBINED LEVEL TRANSMITTERS	24VDC	--	CONTROL PANEL	TRANSMITTER JUNCTION BOX	--	
1103	FLOAT SWITCH	120V	--	SUMP PUMP MOTOR STARTER	FLOAT SWITCH	--	2#12 #12G, 1"C
1100	120VAC FOR RECEPTACLE	--	--	LIGHTING PANEL	RECEPTACLE NEXT TO PUMP NO. 106 J-BOX	--	L11, 2#12 #12G, 1"C
1101	SUMP PUMP POWER	--	--	MOTOR STARTER	LIGHTING PANEL	--	L12, 2#12 #12G, 1"C
1200	120VAC FOR RECEPTACLE	--	--	LIGHTING PANEL	RECEPTACLE NEXT TO PUMP NO. 103 J-BOX	--	L13, 2#12 #12G, 1"C
1201	EXHAUST FAN	--	--	MOTOR RATED SWITCH	LIGHTING PANEL	--	L3, 2#12 #12G, 1"C

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B. CONDUIT NUMBERS 102, 103, 206, 306, 406, 600, 601, EQUIPPED WITH A CONTROL BUILDING.
C. WIRE, CABLE AND CONDUIT SIZES AND QUANTITIES ARE TO BE DETERMINED BY THE DESIGN ENGINEER PER SPECIFIC SITE REQUIREMENTS.
D. CONDUITS LABELED "FUTURE SPACE" ARE THOSE TO BE INSTALLED AND CAPPED IN FIELD.
E. THE DESIGN ENGINEER SHALL SIZE ANY CONDUIT REQUIRING A CSBE TYPE SEAL AT NO SMALLER THAN 2 1/2". CSBE SEALS ARE NOT MANUFACTURED SMALLER THAN 2 1/2".
F. NOT USED.
G. GENERATOR CONDUIT SHALL BE A MINIMUM OF 3" CONDUIT.
H. THE DESIGN ENGINEER SHALL INCORPORATE ONLY THE NECESSARY STANDARD GUIDELINE DRAWINGS AND DETAILS INTO HIS PROJECT CONTRACT DOCUMENTATION PACKAGE, AND SHALL ADJUST PAGE NUMBERS AND CROSS REFERENCING ACCORDINGLY.
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NOTES:
1. CONDUITS LABELED "FUTURE SPACE" ARE TO BE INSTALLED AND CAPPED IN FIELD.
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3. ALL UNDERGROUND CONDUITS (SINGLE AND MULTI-RUN) TO BE ENCASED IN REINFORCED CONCRETE DUCTBANK.

6 PUMP VFD INDOOR
CONDUIT SCHEDULE
FOR 480 VOLT

PROJECT NO.
R-000265-0XXX-X

TITLE
CITY OF HOUSTON
DESIGN GUIDELINE DRAWINGS
FOR SUBMERSIBLE LIFT STATIONS

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING
ENGINEERING AND CONSTRUCTION

DESIGN ENGINEER TO INCLUDE COH
STANDARD TITLE BLOCK ON ALL
DRAWINGS, SEE STANDARD TITLE
BLOCK DETAIL ON SHEET Z0C0X

REV. NO.	DESCRIPTION	APP'D	DATE

SCALE:	NONE	DESIGNED BY:
SUBMITTED:		DRAWN BY:
DATE:		SHEET NO. OF SHEETS
SURVEY BY:		DWG. NO.
FIELD BOOK NO.		Z0E22-0516

ITEM	CIRCUIT	DESCRIPTION	RATINGS FOR PUMP SIZES INDICATED					
			6 @ 40HP	6 @ 50HP	6 @ 60HP	6 @ 75HP	6 @ 100HP	6 @ 125HP
I	--	MAIN DISCONNECT SWITCH						
		OPERATING VOLTAGE	600V	600V	600V	600V	600V	600V
		CURRENT RATING	600A	600A	800A	1200A	1200A	1600A
		CURRENT LIMITING	CLASS J	CLASS J	CLASS L	CLASS L	CLASS L	CLASS L
		FUSES TYPE & SIZE	50A	600A	800A	1000A	1200A	1600A
II	--	MOTOR CONTROL CENTER MAIN BUS – 3/C COPPER						
		OPERATING VOLTAGE	480V	480V	480V	480V	480V	480V
		CURRENT RATING	600A	600A	800A	1200A	1600A	1600A
		NEUTRAL SIZE & TYPE	300A LUG	300A LUG	400A LUG	500A LUG	600A LUG	800A LUG
		BUS BRACING	65KA SYM	65KA SYM	65KA SYM	65KA SYM	65KA SYM	65KA SYM
III	(SEE NOTE 1)	MAIN BREAKER						
		3 POLE – TYPE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE
		MOUNTING	FIXED	FIXED	FIXED	FIXED	FIXED	FIXED
		OPERATING VOLTAGE	480V	480V	480V	480V	480V	480V
		FRAME SIZE	600A	600A	800A	1200A	1200A	1600A
		TRIP SETTING	500A	600A	800A	1000A	1200A	1600A
		INTERUPT CAPACITY	42KA SYM	42KA SYM	42KA SYM	42KA SYM	42KA SYM	42KA SYM
		OPTIONS	NONE	NONE	GND FAULT	GND FAULT	GND FAULT	GND FAULT
IV	2 3 4 5 7 8	PUMP MOTOR STARTERS						
		QUANTITY	6	6	6	6	6	6
		MOUNTING	FIXED	FIXED	FIXED	FIXED	FIXED	FIXED
		SHORT CIRCUIT PROTECTION						
		3 POLE – TYPE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE
		OPERATING VOLTAGE	480V	480V	480V	480V	480V	480V
		FRAME SIZE	100A	150A	150A	150A	150A	250A
		TRIP SETTING	FIELD ADJ	FIELD ADJ	FIELD ADJ	FIELD ADJ	FIELD ADJ	FIELD ADJ
		INTERUPT CAPACITY	65KA SYM	65KA SYM	65KA SYM	65KA SYM	65KA SYM	65KA SYM
		MOTOR STARTING CONTACTOR						
		3 POLE – TYPE	VFD	VFD	VFD	VFD	VFD	VFD
		OPERATING VOLTAGE	480V	480V	480V	480V	480V	480V
		SIZE/CURRENT RATING	NEMA 3	NEMA 3	NEMA 4	NEMA 4	NEMA 4	NEMA 5
		OVERLOAD PROTECTION TYPE	VFD STATE MOR	VFD STATE MOR	VFD STATE MOR	VFD STATE MOR	VFD STATE MOR	VFD STATE MOR
V	6	LIGHTING PANEL FEEDER BREAKER						
		NO. OF POLES	2	2	2	2	2	2
		TYPE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE
		OPERATING VOLTAGE	480V	480V	480V	480V	480V	480V
		FRAME SIZE	150A	150A	150A	150A	150A	150A
		TRIP SETTING	50A	50A	50A	50A	50A	50A
		INTERUPT CAPACITY	42KA SYM	42KA SYM	42KA SYM	42KA SYM	42KA SYM	42KA SYM
VIII	--	GENERATOR FUSED DISCONNECT SWITCH	3P, 4W SN	3P, 4W SN	3P, 4W SN	3P, 4W SN	3P, 4W SN	3P, 4W SN
		OPERATING VOLTAGE	600V	600V	600V	600V	600V	600V
		CURRENT RATING	600A	600A	800A	1200A	1200A	1600A
		CURRENT LIMITING	CLASS J	CLASS J	CLASS L	CLASS L	CLASS L	CLASS L
		FUSES TYPE & SIZE	500A	600A	800A	1000A	1200A	1600A
IX	(SEE NOTE 2, 4)	GENERATOR TRANSFER BREAKER						
		3 POLE – TYPE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE	MOLDED CASE
		MOUNTING	FIXED	FIXED	FIXED	FIXED	FIXED	FIXED
		OPERATING VOLTAGE	480V	480V	480V	480V	480V	480V
		FRAME SIZE	600A	600A	800A	1200A	1200A	1600A
		TRIP SETTING (SEE NOTE 2)	500A	600A	800A	1000A	1200A	1600A
		INTERUPT CAPACITY	42KA SYM	42KA SYM	42KA SYM	42KA SYM	42KA SYM	42KA SYM
		OPTIONS	NONE	NONE	GND FAULT	GND FAULT	GND FAULT	GND FAULT
MOTOR CONTROL CENTER ELEVATION LETTER			C	C	B	B	A	A
INDOOR CONTROL PANEL WIDTH (MIN)			72"	72"	72"	72"	72"	72"
MINIMUM CONTROL BUILDING DIMENSIONS	INSIDE LENGTH		20'–0"	20'–0"	20'–0"	20'–0"	21'–0"	21'–0"
	OUTSIDE LENGTH		22'–0"	22'–0"	22'–0"	22'–0"	23'–0"	23'–0"
* SEE NOTE C								

CADD DWG. FILE NO. :
Z0E42.DWG

COHSTD.BDR0123ORIGINAL SCALE IN INCHES
FOR REDUCED PLANS

REV. NO.	DESCRIPTION	APP'D	DATE

SCALE: NONE

SUBMITTED: DATE: SURVEY BY: FIELD BOOK NO.

DESIGNED BY: DRAWN BY: SHEET NO. OF SHEETS

DWG. NO. Z0E42–0516