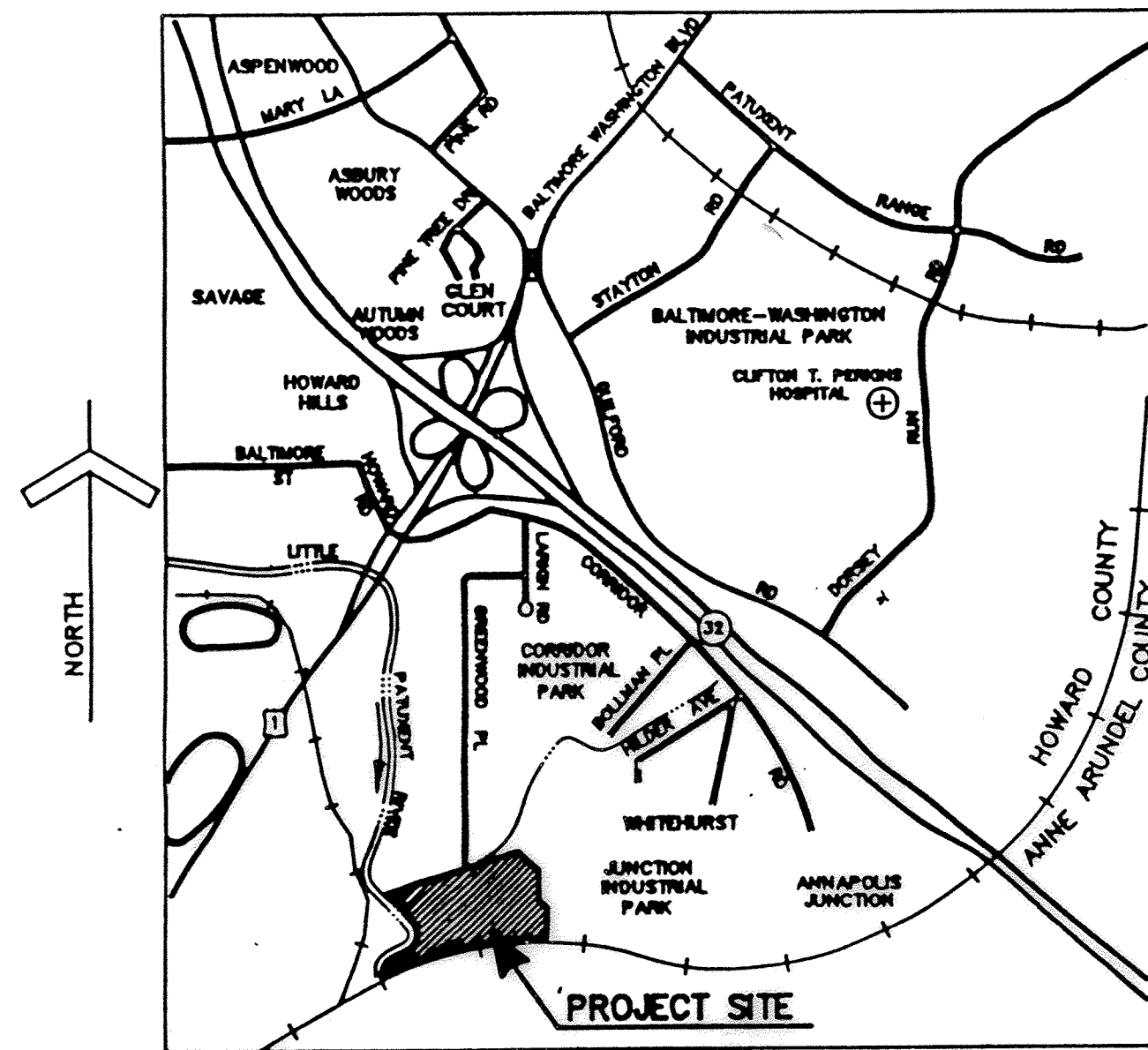


# HOWARD COUNTY, MARYLAND DEPARTMENT OF PUBLIC WORKS



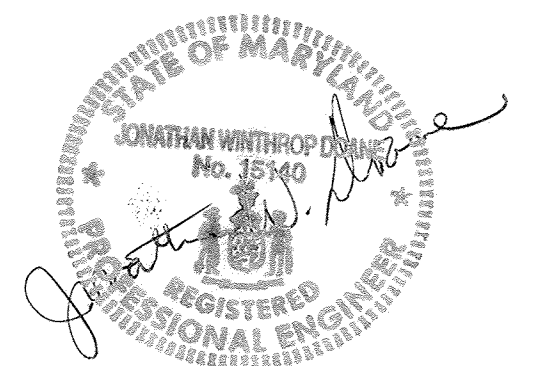
VICINITY MAP



## LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATIONS

FOAM PUMPING SYSTEM  
CAPITAL PROJECT NO. S-6153  
CONTRACT NO. 20-3405

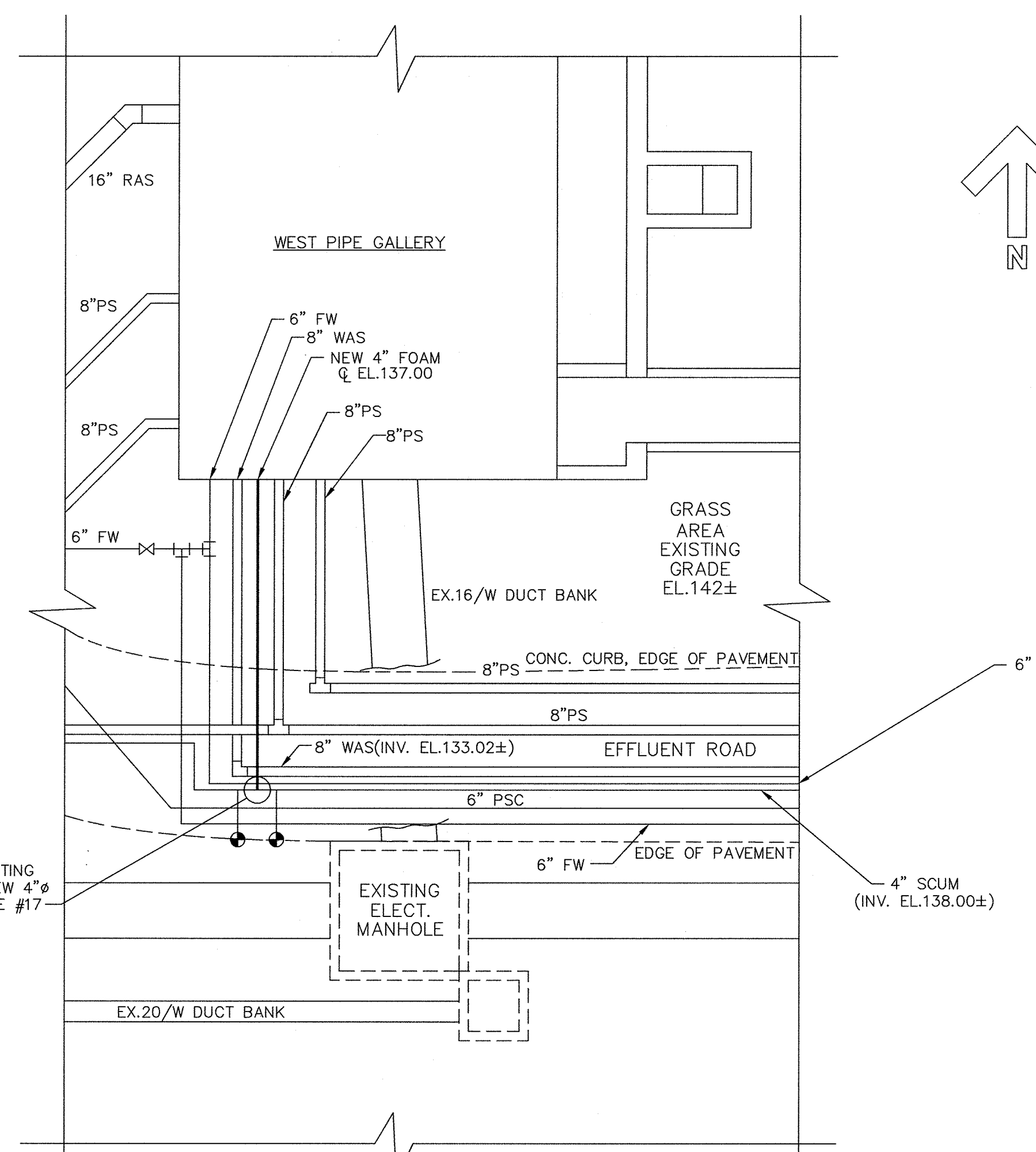
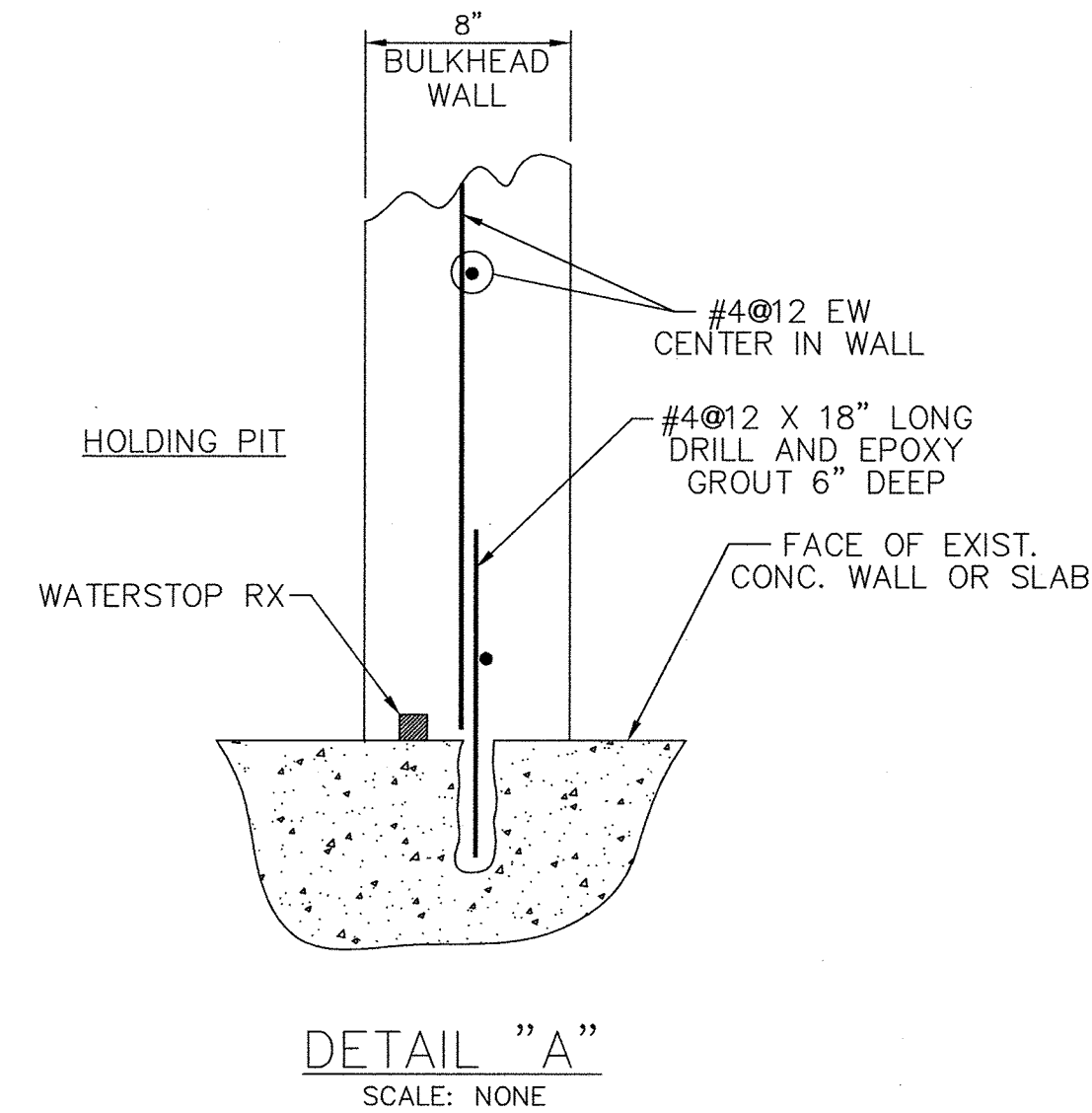
*Sam P. Lee* 10/6/95  
 DIRECTOR OF PUBLIC WORKS DATE  
*John H. Spear* 9/27/95  
 CHIEF, BUREAU OF ENGINEERING DATE  
*Robert B. ...* 9-27-95  
 CHIEF, WATER AND SEWER DESIGN DIV. DATE  
*Robert B. ...* 10-5-95  
 CHIEF, BUREAU OF UTILITIES DATE



**M&E** METCALF & EDDY  
 14502 GREENVIEW DRIVE  
 SUITE 500  
 LAUREL, MARYLAND 20708

**GENERAL NOTES**

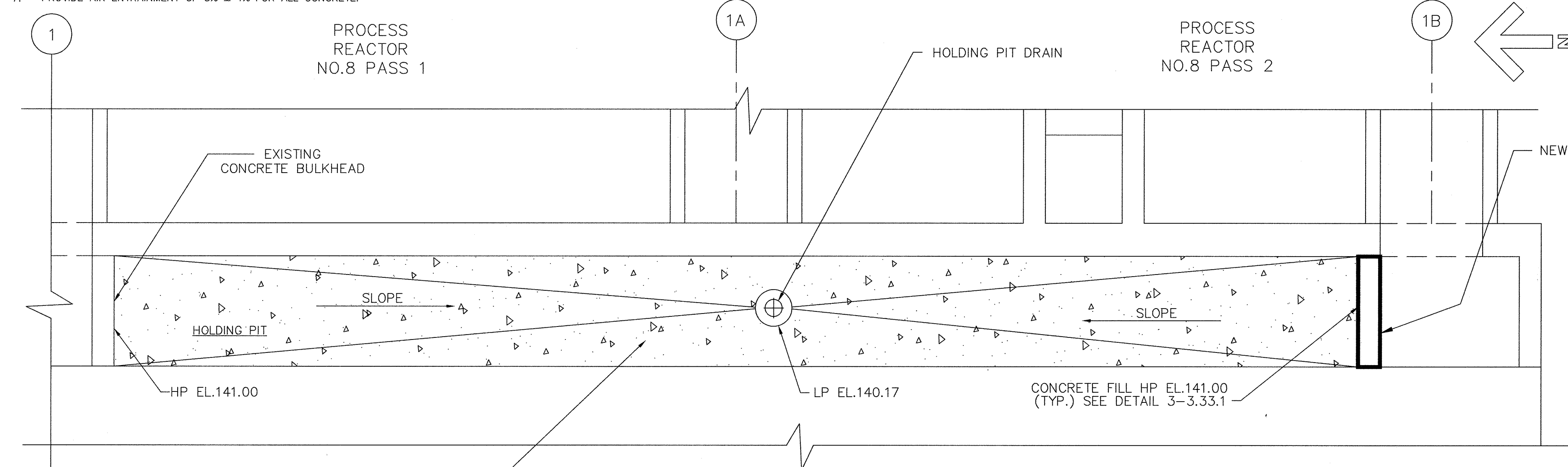
1. THE LOCATION OF THE EXISTING UTILITIES WHERE SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING LINES AND STRUCTURES AND MAINTAIN UNINTERRUPTED SUPPLY. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY.
2. THE CONTRACTOR SHALL LOCATE EXISTING UTILITIES BY TEST PITS A MINIMUM OF TWO WEEKS IN ADVANCE OF CONSTRUCTION OPERATION IN THE VICINITY OF THE UTILITIES.
3. ALL PIPELINE ELEVATIONS ARE INVERT ELEVATIONS UNLESS OTHERWISE NOTED.
4. THE LOCATION OF ALL VALVES, FITTINGS, ETC. SHALL BE LOCATED WHERE SHOWN ON THE DRAWINGS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
5. FOR STANDARD DETAILS REFER TO HOWARD COUNTY DESIGN MANUAL VOLUME IV - STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION, AND APPENDIX "A" OF THE TECHNICAL SPECIFICATIONS.
6. ALL FITTINGS SHALL BE RESTRAINED WITH SPECIAL APPROVED DEVICES-SEE SPECIFICATIONS.
7. PIPELINES SHALL BE CLASS DUCTILE IRON PIPE AS LISTED IN THE SPECIFICATIONS. ALL PIPELINES SHALL HAVE A MINIMUM COVER OF 4 FEET UNLESS OTHERWISE INDICATED.
8. CLEAR ALL UTILITIES BY A MINIMUM OF 6 INCHES VERTICALLY. ALL PARALLEL PIPE SYSTEMS SHALL HAVE 1.5 FEET MINIMUM HORIZONTAL CLEARANCE UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
9. THE CONTRACTOR SHALL PROVIDE A JOINT IN ALL EXTERIOR LOOSE JOINTED PIPE SYSTEMS WITHIN 2 FEET OF EXTERIOR WALLS. PER SPECIFICATION SECTION 02615 FLEXIBLE RESTRAINED JOINTS ARE REQUIRED.
10. ALL EXISTING VALVE BOXES, MANHOLE FRAMES AND COVERS AND SIMILAR APPURTENANCES SHALL BE ADJUSTED TO FINISHED GRADE PRIOR TO RESURFACING.
11. ALL DISTURBED AREAS NOT PAVED OR SODDED SHALL BE FINE GRADED AND SHALL HAVE TOPSOIL, SEED, FERTILIZER, LIME AND MULCH PLACED IN ACCORDANCE WITH THE SPECIFICATIONS.
12. ELEVATIONS ARE BASED ON THE MARYLAND STATE SYSTEM.
13. FOR LOCATION OF UTILITIES ENTERING BUILDINGS, SEE MECHANICAL AND ELECTRICAL DRAWINGS.
14. CONNECTIONS TO EXISTING PIPELINES MAY BE MADE BY USE OF SLEEVES AND SPACERS WITH SHUT DOWN OF SYSTEM. ATTENTION IS DIRECTED TO THE SPECIFICATIONS FOR PLANT OPERATIONAL REQUIREMENTS WHILE MAKING CONNECTIONS.
15. ALL EXISTING WALKWAYS, PAVED AREAS AND CURBS THAT REQUIRE REMOVAL FOR CONSTRUCTION PURPOSES OR THAT ARE DISTURBED OR DAMAGED BY CONSTRUCTION ACTIVITIES SHALL BE REPLACED AS SHOWN IN STANDARD DETAILS G4.01, R3.03, AND R3.05 IN HOWARD COUNTY STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION, VOLUME IV.
16. EXISTING SITE TOPOGRAPHY, EXISTING UTILITIES AND EXISTING GROUND PROFILES SHOWN ON THESE CONTRACT DRAWINGS ARE A COMPOSITE OF FIELD SURVEYS COMPLETED IN 1974 THRU 1990 AND DESIGN DRAWINGS OF VARIOUS CONSTRUCTION CONTRACTS. IN ADDITION, EXISTING UNDERGROUND UTILITIES THROUGHOUT THE PLANT ARE SIGNIFICANT IN NUMBER, HOWEVER, ONLY A VERY LIMITED AMOUNT HAVE BEEN SHOWN ON THE DRAWINGS. THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE CONTRACT CONDITIONS IN THIS REGARD.
17. CONTRACTOR IS REQUIRED TO CONNECT NEW 4" FOAM DISCHARGE PIPING TO EXISTING 4" DIP SECONDARY SCUM PIPING. A SCHEDULED SHUTDOWN OF EXISTING SCUM SYSTEM IS REQUIRED. THE EXISTING PIPING IS REQUIRED TO BE CUT AND A TEE INSTALLED. ALL JOINTS AND COUPLINGS USED MUST BE RESTRAINED USING TIE RODS OR RESTRAINED COUPLINGS PER SPECIFICATION SECTION 02615. THRUST BLOCKS WILL NOT BE PERMITTED.
18. SEE DRAWING E-2 FOR COMPLETE PLAN SHOWING PROCESS REACTORS AND EAST AND WEST PIPE GALLERIES.
19. FOR TRENCH BEDDING, USE "TRENCH WITH GRAVEL BACKFILL BELOW SUBGRADE" IN STANDARD DETAIL G2.01 OF HOWARD COUNTY STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION VOLUME IV.



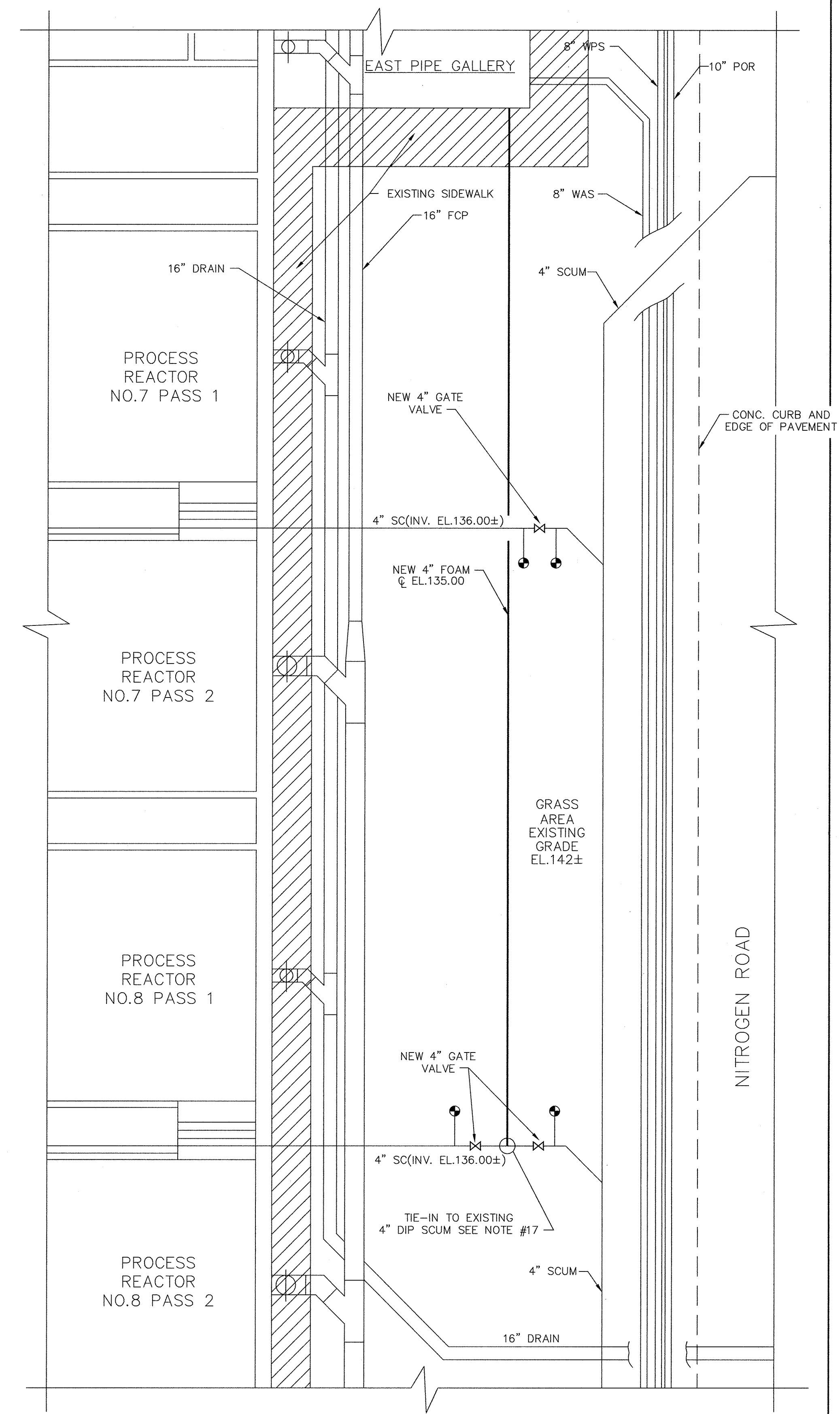
**YARD PIPING WEST GALLERY**  
SCALE: 1/8"=1'-0"

**CONCRETE NOTES**

1. CONCRETE CONSTRUCTION AND REINFORCING BAR DETAILS SHALL CONFORM TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI-318-89).
2. ALL STRUCTURAL CONCRETE (INCLUDING CONCRETE FILL) SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 LBS. PER SQ. INCH AT THE END OF 28 DAYS.
3. REINFORCING STEEL SHALL BE GRADE 60 CONFORMING TO A.S.T.M. A615.
4. WELDED WIRE FABRIC SHALL CONFORM TO A.S.T.M. A185. LAP TWO SQUARES AT ALL SPLICES AND TIE AT 3-FOOT CENTERS.
5. CONCRETE FILL 2-INCHES OR MORE THICK SHALL BE REINFORCED WITH WELDED WIRE FABRIC SIZED IN ACCORDANCE WITH THE DRAWINGS.
6. CHAMFER EXPOSED CORNER 3/4".
7. PROVIDE AIR ENTRAINMENT OF 5% ± 1% FOR ALL CONCRETE.



**FOAM HOLDING PIT PLAN**  
**EXISTING PROCESS REACTOR INFLUENT CHANNEL**  
SCALE: 3/16"=1'-0"



**YARD PIPING EAST GALLERY**  
SCALE: 1/8"=1'-0"

**ABBREVIATIONS LEGEND**

PIPE LINE	
FW	FLUSHING WATER
PS	PRIMARY SLUDGE
PSC	PRIMARY SCUM
RAS	RETURN ACTIVATED SLUDGE
SC	SCUM
WAS	WASTE ACTIVATED SLUDGE
⊕	PROCESS REACTOR Y-WALL

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

*James A. Slavin* 10/6/95  
DIRECTOR OF PUBLIC WORKS

*Robert M. Swain* 10-5-95  
CHIEF, BUREAU OF UTILITIES

*Paul H. Sporn* 9/27/95  
CHIEF, BUREAU OF ENGINEERING

*Cy. Don Rieu* 9-27-95  
CHIEF, WATER AND SEWER DESIGN DIVISION

**M&E Metcalf & Eddy**

*Matthew W. Stone* 8/12/95  
REG. PROF. ENGR.



DES	C.d.B.				
DRN	M.J.C.				
CHK	J.E.H.				
DATE	5/23/95	BY	NO.	REVISION	DATE

CIVIL/STRUCTURAL

**YARD PIPING AND FOAM HOLDING PIT PLANS**

LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATIONS  
CAPITAL PROJECT S-6153

CONTRACT NO. 20-3405  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN

SHEET 2 OF 12

C-1



DWG. ABBREV.	ITEM	SYMBOL	NOTES
	GATE VALVE		
	KNIFE GATE		
	PLUG VALVE		FLOW DIAGRAM ONLY
	BUTTERFLY VALVE		
	BALL VALVE		
	3-WAY BALL VALVE		
	BALL CHECK VALVE		
	DIAPHRAGM VALVE		
HG	HOSE GATE		
	PRESSURE REDUCING VALVE		
	BACK-PRESSURE VALVE		
	PRESSURE REGULATING VALVE		
	RELIEF VALVE		
	GLOBE VALVE		
	3-WAY VALVE		
	ANGLE VALVE		
	CHECK VALVE		
	PINCH VALVE		
	ROTAMETER		
	SCREWED UNION		
	FLANGED UNION		
	FLEXIBLE COUPLING		
	INSECT SCREEN		
	FLEXIBLE HOSE		
SG	SLUICE GATE		
PG	PREFABRICATED SLIDE GATE		
	WEIR		FLOW DIAGRAM ONLY
	MIXER		
	PULSATION DAMPER		
	CALIBRATION STAND PIPE		
	QUICK-DISCONNECT COUPLING		
	STATIC MIXER		
	TELESCOPING VALVE		
	FLAP VALVE		
	MUD VALVE		
WS	WATER SURFACE		
	ORIFACE PLATE		
	SCREW CONVEYOR		

DWG. ABBREV.	ITEM	SYMBOL	NOTES
	PIPE: 2"DIA. & SMALLER		
	PIPE: 3"DIA. & LARGER		
	FLANGE		
BF	BLIND FLANGE		
MJ	MECHANICAL JOINT		
	SLEEVE COUPLING		
	RESTRAINED COUPLING		
	VENTURI FLOW ELEMENT		
	WELDED PIPE		
	EXISTING PIPE AND FACILITIES		
	PROPOSED PIPE AND EQUIPMENT		
	EXISTING PIPE TO BE REMOVED		
	INSULATION PIPE: 2"DIA. & SMALLER		
	INSULATION PIPE: 3"DIA. & LARGER		
	SPLIT COUPLING		
	Y-STRAINER		
	DUPLEX STRAINER		
	GAUGE		
	DIRECTION OF FLOW		
	PITCH PIPE DOWN IN DIRECTION OF ARROW		
	CONCENTRIC REDUCER		
	ECCENTRIC REDUCER FLAT ON TOP		F.O.T.
	ECCENTRIC REDUCER FLAT ON BOTTOM		F.O.B.
	ANCHOR		
	DIAPHRAGM SEAL		
	SONIC METER		
	MAGNETIC FLOWMETER		
	LIMITS OF WORK (TRADE, CONTRACT, ETC.)		
	POINT OF CONNECTION - NEW WORK TO EXIST. WORK		
	MOTOR OPERATED ACTUATOR		M
	SOLENOID OPERATED ACTUATOR		S
	DIAPHRAGM ACTUATOR		D
	CYLINDER-PNEUMATIC ACTUATOR		H

DWG. ABBREV.	ITEM	SYMBOL	NOTES
	CYLINDER-PNEUMATIC ACTUATOR		
	EQUIPMENT MOTOR		
<b>WALL CASTINGS</b>			
FLG & MJ	FLANGE & MECHANICAL JOINT		
MJ & MJ	MECHANICAL JOINT & MECHANICAL JOINT		
MJ & PE	MECHANICAL JOINT & PLAIN END		
FLG & FLG	FLANGE & FLANGE		
FLG & PE	FLANGE & PLAIN END		
	BELL & BELL		
BELL & FLG	BELL & FLANGE		
BELL & PE	BELL & PLAIN END		
<b>FITTINGS</b>			
	TEE		
90° ELL	90° ELBOW		
45° ELL	45° ELBOW		
BASE ELL	BASE ELBOW		
	CROSS		
	LATERAL		
	CONCENTRIC REDUCER		
	ECCENTRIC REDUCER		

**GENERAL NOTES**

- THE CONTRACTOR'S ATTENTION IS DIRECTED TO APPENDIX A OF THE SPECIFICATIONS WHICH ARE PART OF THE CONTRACT DOCUMENTS. MANY OF THE DETAILS REFERRED TO ON THESE DRAWINGS MAY BE FOUND THEREIN. ADDITIONAL DETAILS MAY BE FOUND IN HOWARD COUNTY DESIGN MANUAL IV.
- UNLESS OTHERWISE INDICATED, LIQUID PIPING SHALL HAVE 3/4" LOW POINT DRAINS AND 3/4" HIGH POINT VENTS.
- IN-LINE INSTRUMENTATION SHALL BE PROVIDED WITH ISOLATED PRESSURE TAPS.
- THE CONTRACTOR SHALL MAKE ALL REQUIRED FIELD MEASUREMENTS TO VERIFY EXISTING AND CONTRACT INTERFACE DIMENSIONS, LOCATIONS, ELEVATIONS, AND OTHER CONDITIONS.
- REFER TO INSTRUMENTATION DRAWINGS FOR INSTRUMENTATION AND CONTROL SYSTEMS: INSTRUMENT LOCATIONS ARE INDICATED ON MECHANICAL PROCESS DRAWINGS IN APPROXIMATE LOCATION ONLY. THE INSTALLATION IS TO BE FIELD COORDINATED.
- SMALL PIPING (SAMPLE, SERVICE WATER, ETC.) IS SHOWN DIAGRAMMATICALLY: FIELD-ROUTING SUBJECT TO APPROVAL OF THE ENGINEER.
- WALL AND FLOOR SLEEVES SHALL BE LARGE ENOUGH TO ACCOMMODATE FLANGES. FLOOR SLEEVES SHALL PROJECT AT LEAST 2" ABOVE FINISHED FLOOR. UNLESS OTHERWISE SHOWN, REFER TO DETAILS.
- SLEEVE OR SPLIT COUPLINGS ARE TO BE USED AS SHOWN.
- ALL FLEXIBLE CONNECTORS, INCLUDING EXPANSION JOINTS AND SLEEVE COUPLINGS SHALL BE RESTRAINED AS INDICATED ON STANDARD DETAIL 15-4.17.1.
- ALL PIPE PENETRATIONS THROUGH INTERIOR AND EXTERIOR WALLS AND FLOORS SHALL BE SEALED WATERTIGHT, PER STANDARD DETAIL 15-4.2.6.
- ALL PROCESS EQUIPMENT, INCLUDING PUMPS AND COMPRESSORS, SHALL BE ISOLATED FROM PIPING LOADS AND DYNAMICS BY FLEXIBLE CONNECTORS IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS, EXCEPT AS OTHERWISE SHOWN. ALL MECHANICAL EQUIPMENT SHALL BE PROVIDED WITH TEFLON OR OTHER APPROVED PADS TO MINIMIZE VIBRATION AND/OR NOISE TRANSMISSION.
- ALL EXISTING PIPING TO BE MODIFIED IS DUCTILE IRON. ALL NEW PIPING IS TO BE CLASS 53 DUCTILE IRON PER SPECIFICATION SECTION 02615.
- ALL PIPING ELEVATIONS ARE GIVEN BASED ON A PROCESS REACTOR TOP OF WALL ELEVATION OF 143.76. CONTRACTOR IS REQUIRED TO VERIFY ELEVATIONS AND COORDINATE AS NECESSARY TO ENSURE PROPER TIE-IN TO EXISTING PIPING.
- SEE DRAWING E-2 FOR A COMPLETE PLAN SHOWING PROCESS REACTORS, EAST AND WEST PIPE GALLERIES.

**ABBREVIATIONS LEGEND**

A	AIR	INV.	INVERT
AFF	ABOVE FINISHED FLOOR	JT	JOINT
AHP	AIR HIGH PRESSURE	L	LIME
APPROX.	APPROXIMATE	L.P.	LOW POINT
BLDG.	BUILDING	LR	LONG RADIUS
BOTT.	BOTTOM	MH	MANHOLE
CL	CENTER LINE	MIN.	MINIMUM
CONC.	CONCRETE	MAX.	MAXIMUM
CONN.	CONNECTION	NO.	NUMBER
CONT.	CONTINUATION	N.T.S.	NOT TO SCALE
DIA.	DIAMETER	NWS	NON-POTABLE WATER SUPPLY
DN	DOWN	O.C.	ON CENTER
DSL	DEWATERED SLUDGE	OD	OUTSIDE DIAMETER
ECC.	ECCENTRIC	OP'G	OPENING
EL.	ELEVATION	PL	PLATE
ELL	ELBOW	R	RADIUS
EXIST.	EXISTING	RED.	REDUCER OR REDUCING FITTING
FIN.GR.	FINISHED GRADE	SHT.	SHEET
FLEX.	FLEXIBLE	S.S.	STAINLESS STEEL
FLOCC.	FLOCCULATOR	T.O.C.	TOP OF CONCRETE
FLG.	FLANGE	TS	THICKENED SLUDGE
H.P.	HIGH POINT	TYP.	TYPICAL
I.D.	INSIDE DIAMETER	W/	WITH
AN	ANAEROBIC	W.S.	WATER SURFACE
AX	ANOXIC	PSIS	PHOSPHORUS STRIPPER INFLUENT SLUDGE
D	DRAIN	PSS	PHOSPHORUS STIPPED SLUDGE
FW	FLUSHING WATER	PR	PROCESS REACTOR
IR	INTERNAL RECYCLE	RAS	RETURN ACTIVATED SLUDGE
OX	OXIC	WL	WATER LEVEL
PG	PREFABRICATED GATE	WCS	WASTE CHEMICAL SLUDGE

**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

*James P. Lewis* 10/6/95  
DIRECTOR OF PUBLIC WORKS DATE

*Robert M. Sawyer*  
CHIEF, BUREAU OF UTILITIES

*Robert M. Sawyer* 9/27/95  
CHIEF, WATER AND SEWER DESIGN DIVISION DATE

**M&E Metcalf & Eddy**

**JONATHAN W. DOWNE**  
No. 15140  
REGISTERED PROFESSIONAL ENGINEER

*Jonathan W. Downe* 8/23/95  
REGISTERED PROFESSIONAL ENGINEER DATE

DES	C.d.B.				
DRN	M.J.C.				
CHK	J.E.H.				
DATE	5/23/95				
BY	NO.	REVISION	DATE		

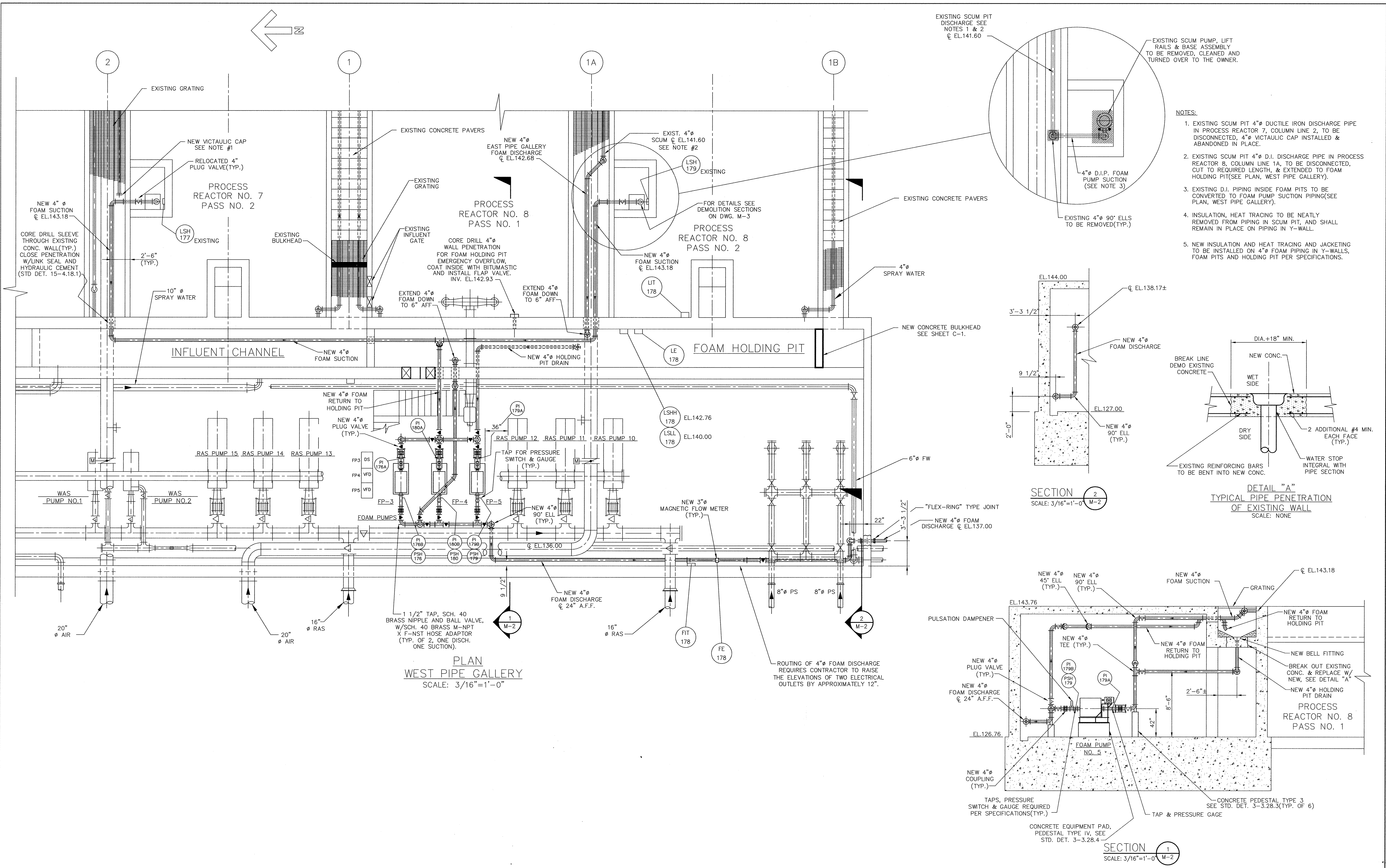
MECHANICAL

LEGEND, SYMBOLS & NOTES

LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATIONS  
CAPITAL PROJECT S-6153

CONTRACT NO. 20-3405  
HOWARD COUNTY, MARYLAND





- NOTES:**
- EXISTING SCUM PIT 4" DUCTILE IRON DISCHARGE PIPE IN PROCESS REACTOR 7, COLUMN LINE 2, TO BE DISCONNECTED, 4" VICTAULIC CAP INSTALLED & ABANDONED IN PLACE.
  - EXISTING SCUM PIT 4" D.I. DISCHARGE PIPE IN PROCESS REACTOR B, COLUMN LINE 1A, TO BE DISCONNECTED, CUT TO REQUIRED LENGTH, & EXTENDED TO FOAM HOLDING PIT (SEE PLAN, WEST PIPE GALLERY).
  - EXISTING D.I. PIPING INSIDE FOAM PITS TO BE CONVERTED TO FOAM PUMP SUCTION PIPING (SEE PLAN, WEST PIPE GALLERY).
  - INSULATION, HEAT TRACING TO BE NEATLY REMOVED FROM PIPING IN SCUM PIT, AND SHALL REMAIN IN PLACE ON PIPING IN Y-WALL.
  - NEW INSULATION AND HEAT TRACING AND JACKETING TO BE INSTALLED ON 4" FOAM PIPING IN Y-WALLS, FOAM PITS AND HOLDING PIT PER SPECIFICATIONS.

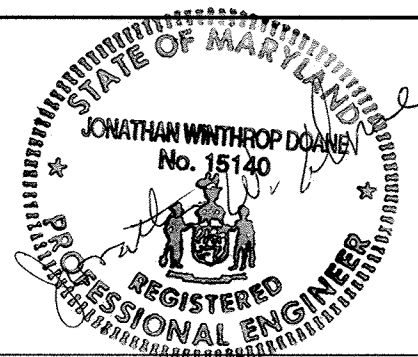
**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

*Robert A. Benjamin* 10-5-95  
DATE  
CHIEF, BUREAU OF UTILITIES

*Robert A. Benjamin* 10-5-95  
DATE  
CHIEF, BUREAU OF UTILITIES

**M&E Metcalf & Eddy**

*Jonathan W. Downe* 8/17/95  
DATE  
REG. PROF. ENGR.



DES: C.d.B.					
DRN: M.J.C.					
CHK: J.E.H.					
DATE: 5/23/95	BY	NO.	REVISION	DATE	

MECHANICAL

**WEST PIPE GALLERY MODIFICATIONS PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATIONS**  
CAPITAL PROJECT S-6153

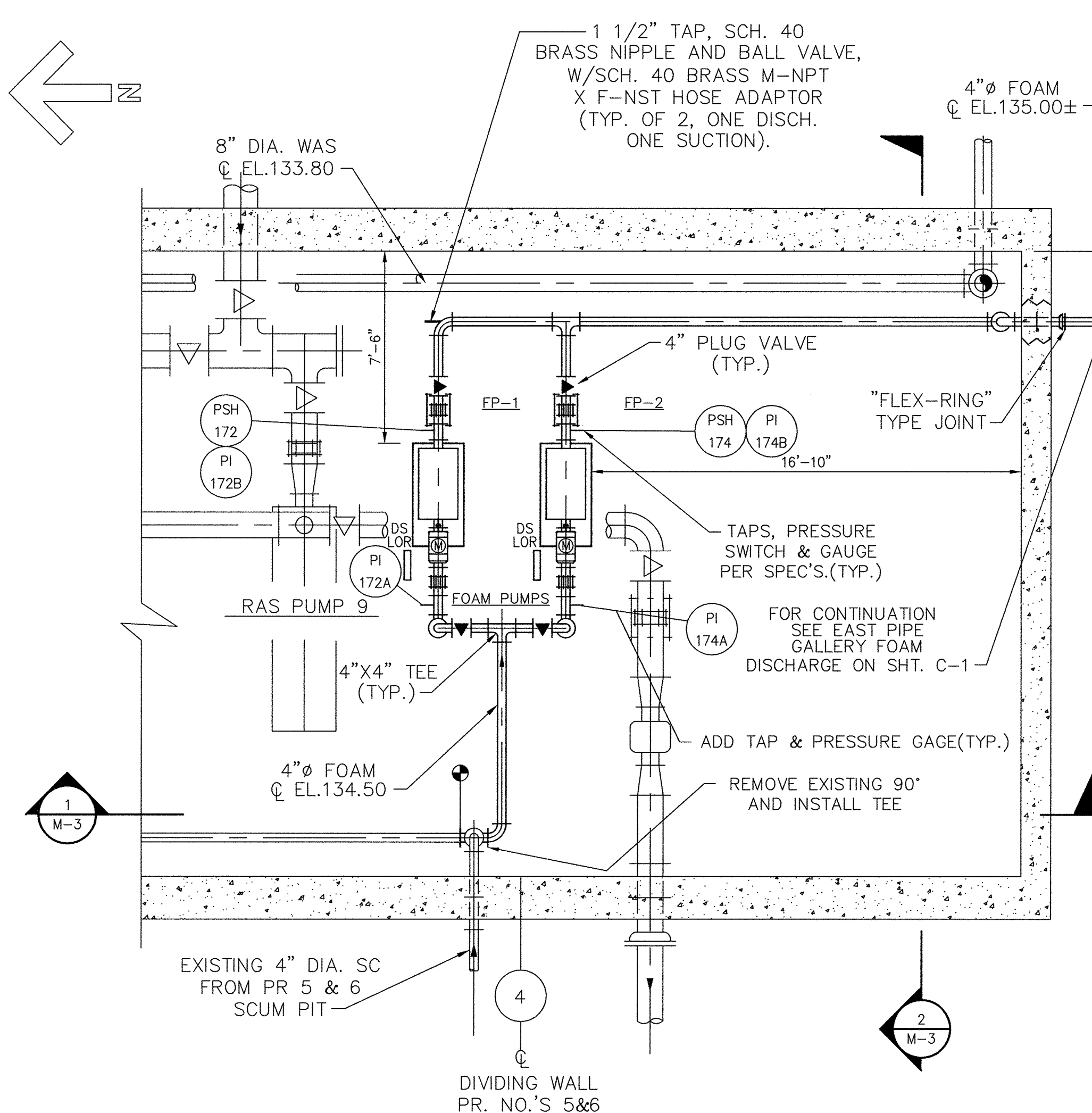
CONTRACT NO. 20-3405  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN

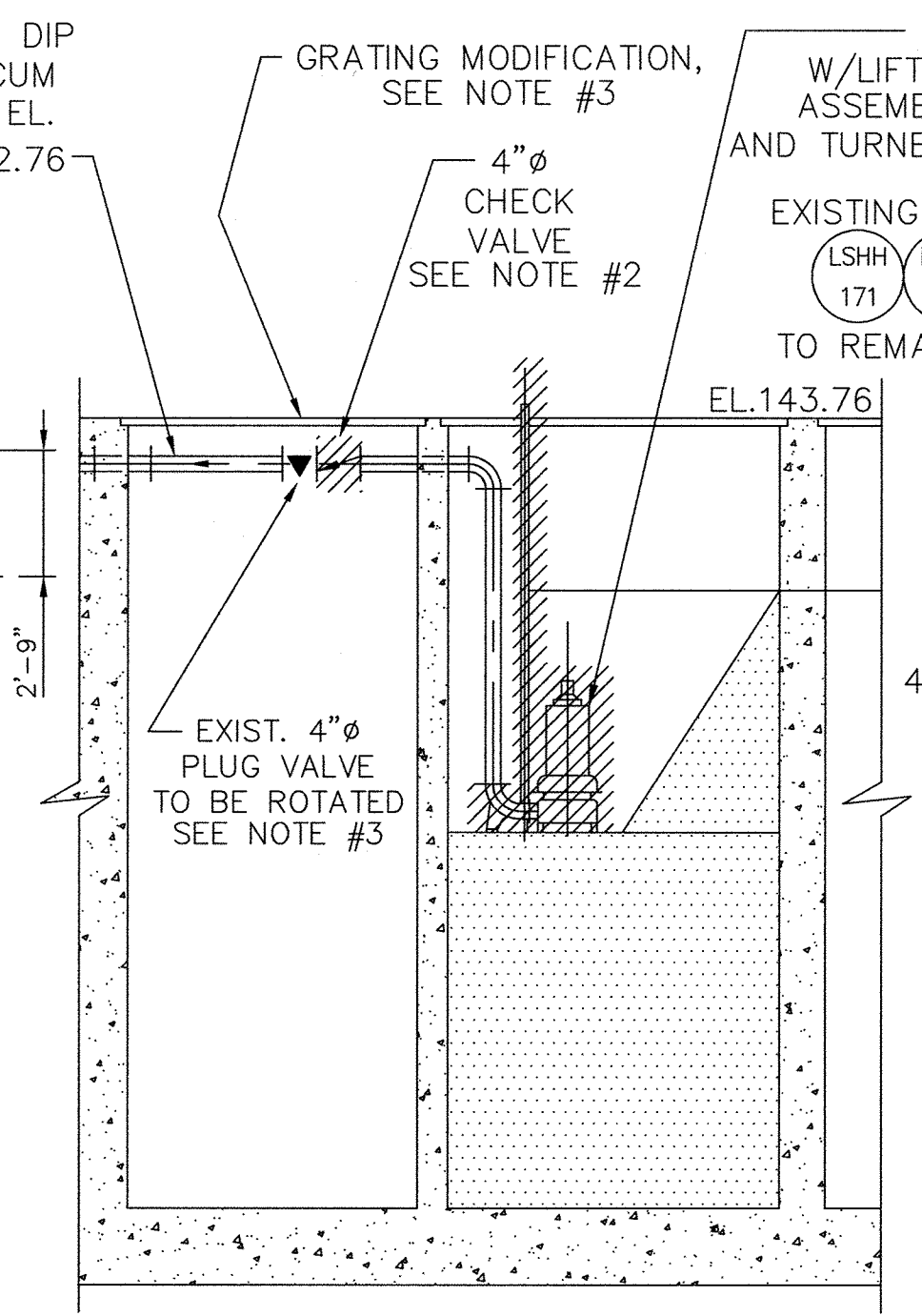
SHEET 4 OF 12

M-2

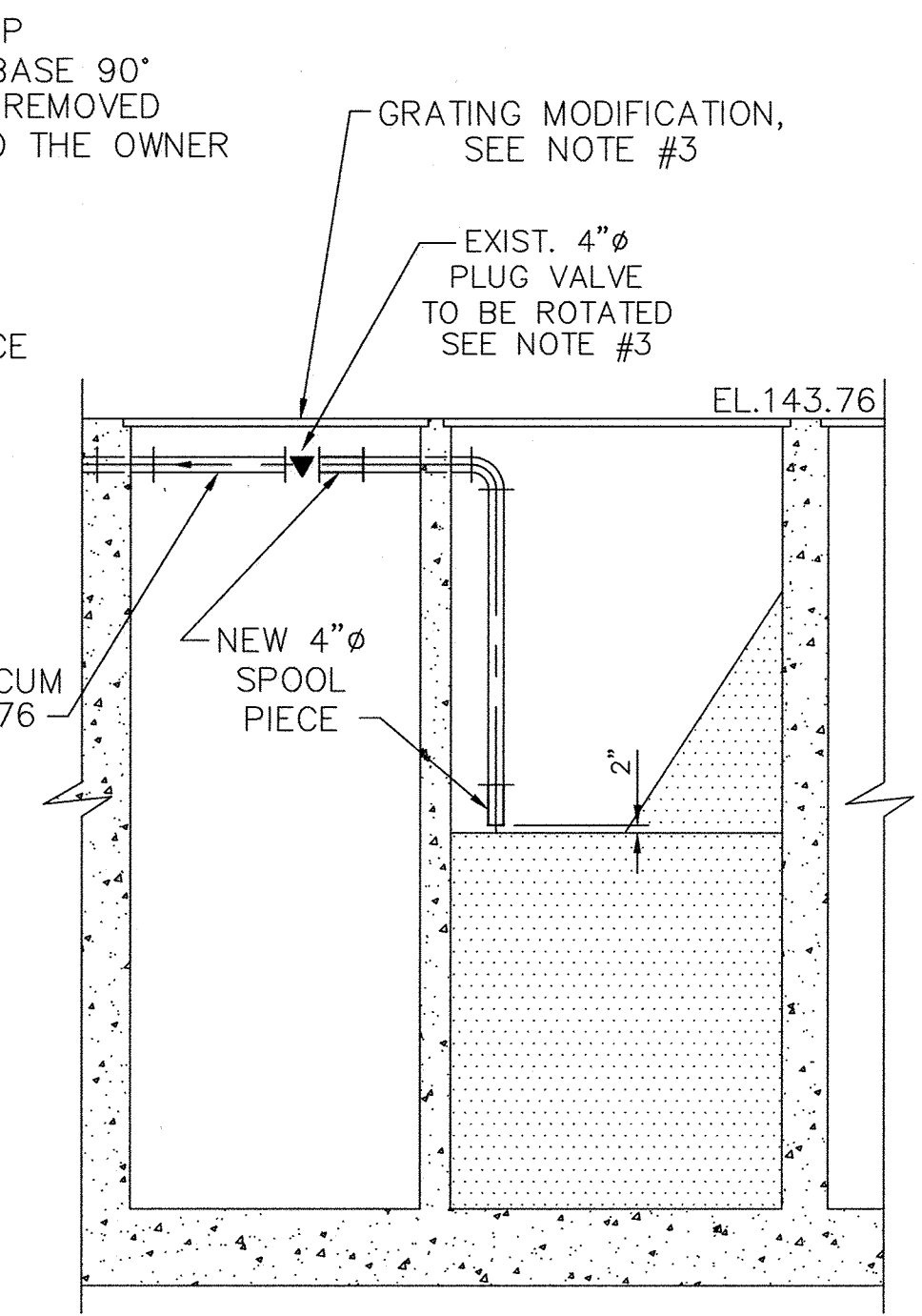




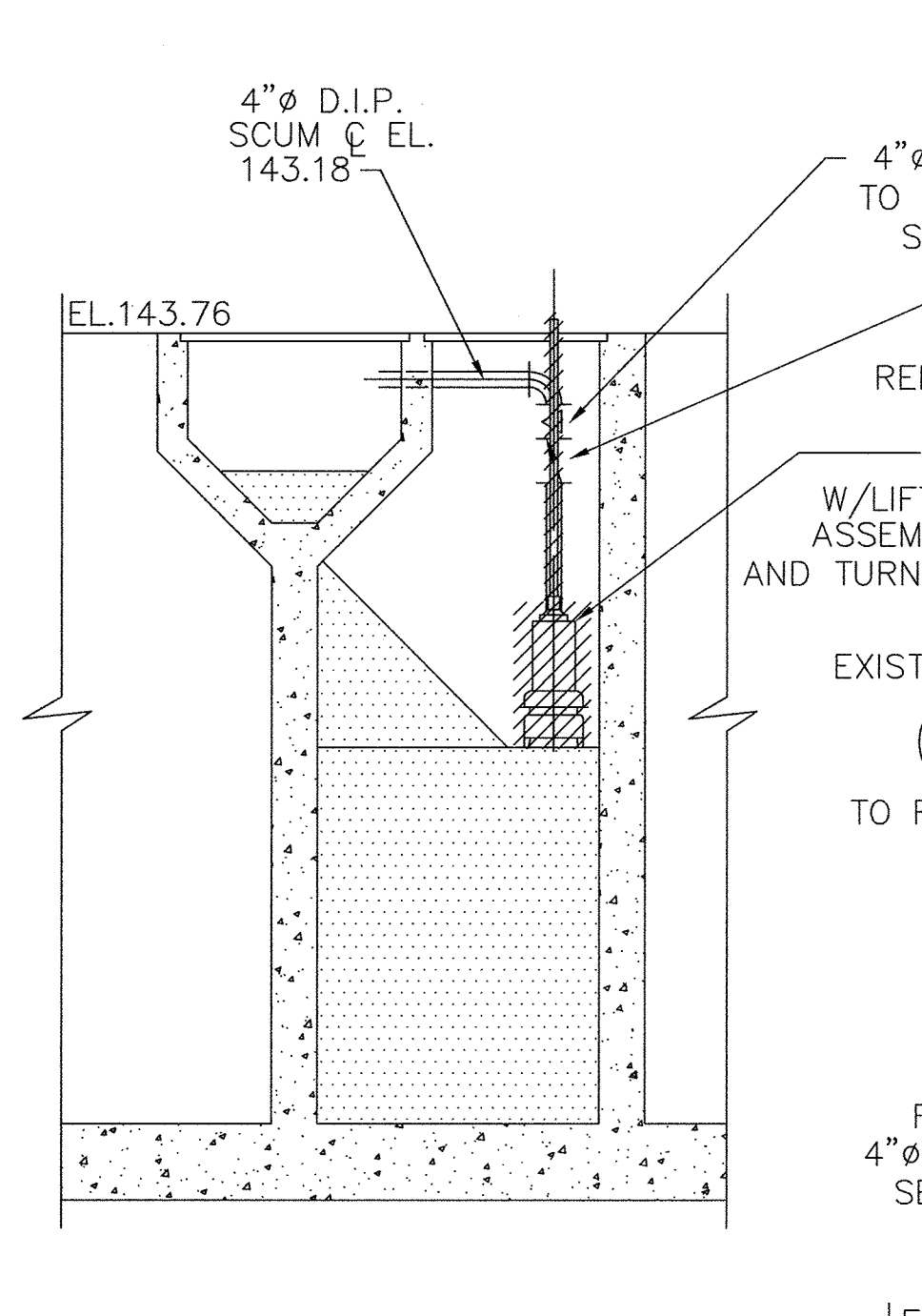
EAST PIPE GALLERY PLAN  
SCALE: 1/4"=1'-0"



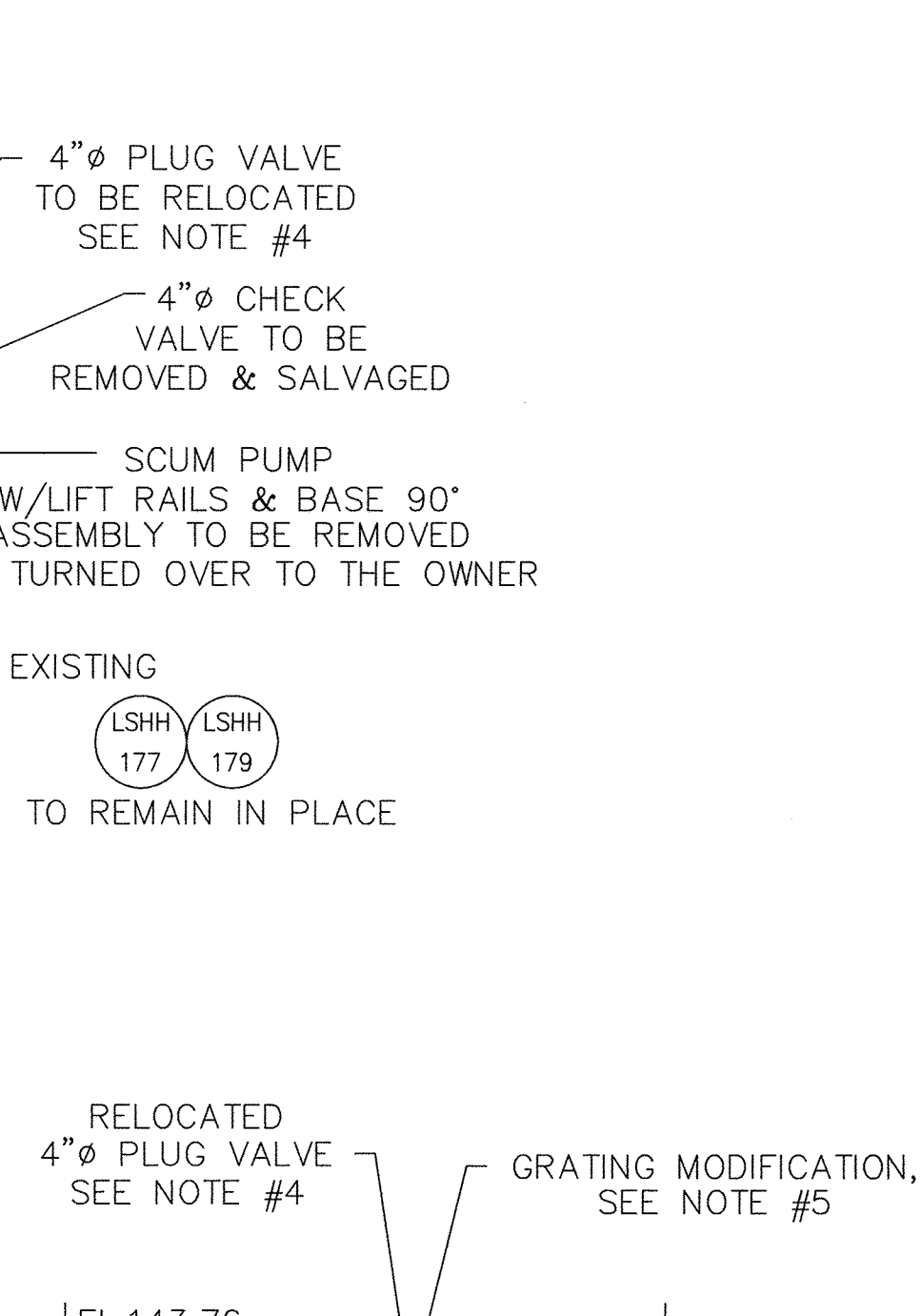
EXISTING EAST SIDE SCUM PIT MODIFICATIONS TYPICAL OF THREE DEMOLITION SECTION  
SCALE: 1/4"=1'-0"



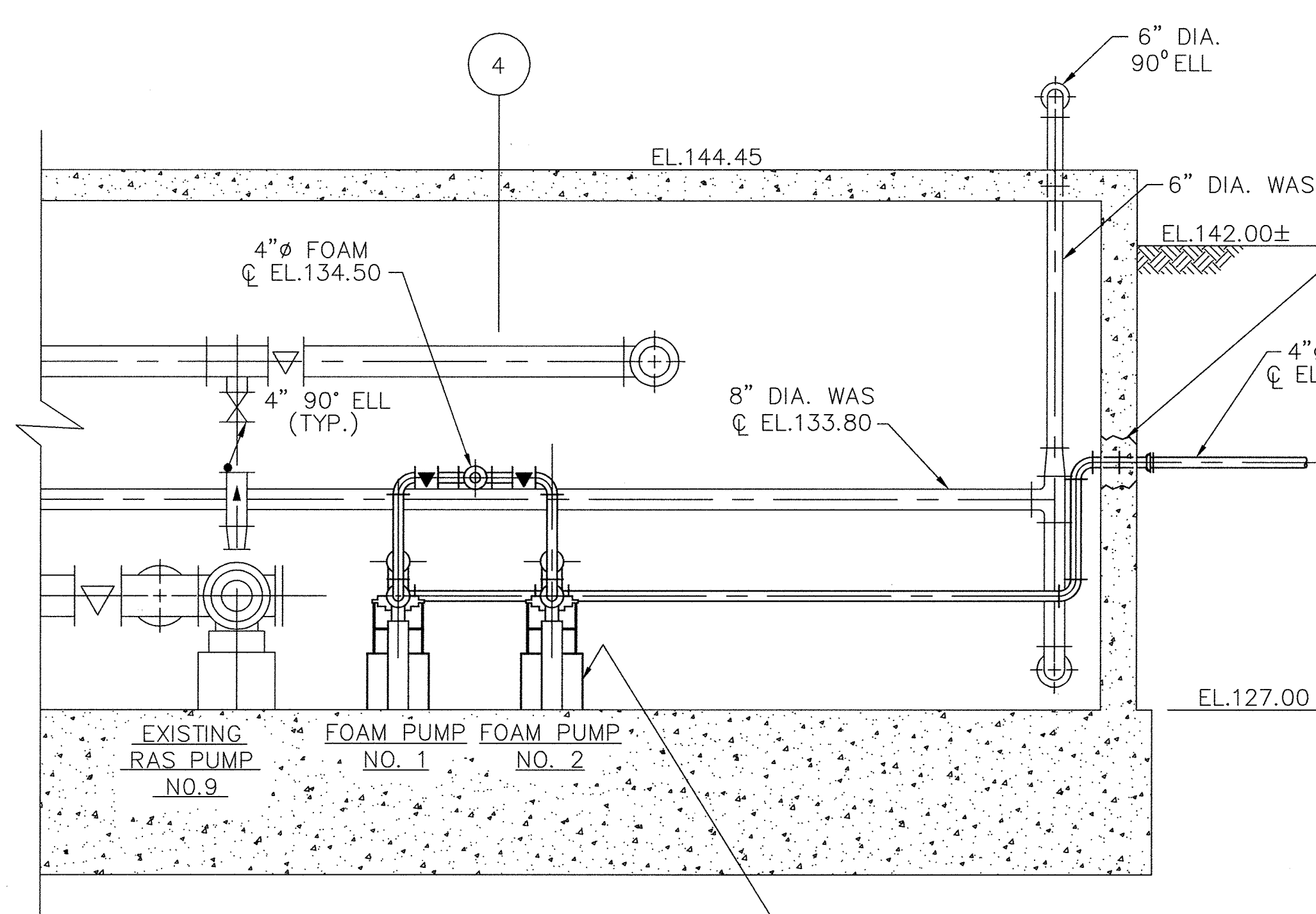
EXISTING EAST SIDE SCUM PIT MODIFICATIONS SECTION TYPICAL OF THREE  
SCALE: 1/4"=1'-0"



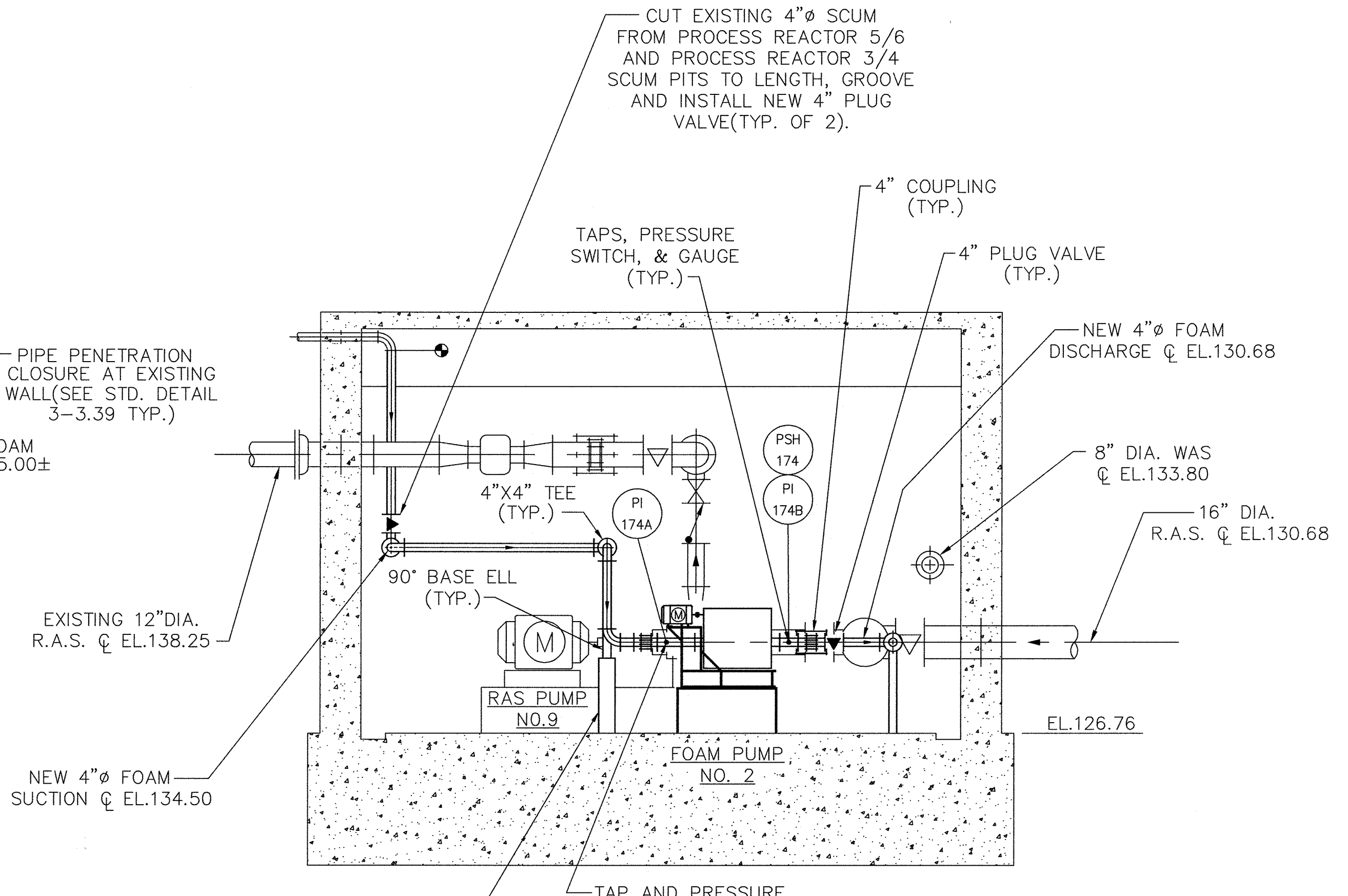
EXISTING WEST SIDE SCUM PIT MODIFICATIONS TYPICAL OF TWO DEMOLITION SECTION  
SCALE: 1/4"=1'-0"



EXISTING WEST SIDE SCUM PIT MODIFICATIONS SECTION TYPICAL OF TWO  
SCALE: 1/4"=1'-0"



SECTION 1  
SCALE: 1/4"=1'-0"



SECTION 2  
SCALE: 1/4"=1'-0"

NOTE:

1. A TOTAL OF FIVE 4" SWING CHECK VALVES ARE TO BE REMOVED BY CONTRACTOR, CLEANED AND TURNED OVER TO THE COUNTY.
2. CONTRACTOR TO NEATLY REMOVE EXISTING INSULATION, JACKETING AND HEAT TRACING FROM PIPING WHERE CHECK VALVES ARE BEING REMOVED AND REPLACE IN KIND.
3. EXISTING 4" NUT ACTUATED PLUG VALVES (TOTAL OF 3) IN EAST SIDE PROCESS REACTOR EFFLUENT PITS TO BE ROTATED SUCH THAT CENTER LINE THROUGH NUT IS PERPENDICULAR TO THE GRATING. EXISTING GRATING IS TO BE MODIFIED AT THE LOCATION OF THE NUT BY CUTTING A HOLE, APPROXIMATELY 3" SQUARE SO THAT TOP OF NUT CAN BE ACCESSED THROUGH THE GRATING. APPLY BEARING BAR BANDING EQUAL IN THICKNESS AND TYPE TO THE EXISTING GRATING IN THE LOCATION OF THE ACCESS HOLES.
4. EXISTING 4" HANDWHEEL ACTUATED PLUG VALVE IN PROCESS REACTOR 7 & 8 SCUM PITS (TOTAL OF 2) TO BE RELOCATED AS SHOWN. VALVE TO BE INSTALLED SUCH THAT GEAR AND HOUSING IS LOCATED 90° FROM TOP OF PIPE, WITH HANDWHEEL IN A PARALLEL PLANE TO THE GRATING AS SHOWN. CONTRACTOR IS REQUIRED TO ROTATE ACTUATOR MOUNTING POSITION IF NEEDED TO ACHIEVE DESIRED INSTALLATION.
5. CONTRACTOR IS REQUIRED TO CUT 12"x12" ACCESS HOLE IN EXISTING GRATING FOR PLUG VALVES IN PROCESS REACTOR 7 & 8 SCUM PITS. INSTALL TWO SETS OF HINGES PER STANDARD DETAIL S-2.1.3 ON GRATING AND CUT-OUT TO FORM ACCESS DOOR. ADJUST SIZE OF CUT-OUT AS NECESSARY TO FIT NEATLY WITHIN THE OPENING. APPLY BEARING BAR BANDING WHERE BARS ARE CUT AROUND OPENING AND CUT-OUT. WELD 1/4" ALUMINUM PLATE 1" WIDE ALONG LENGTH OF SIDE OF GRATING OPPOSITE HINGES TO SUPPORT ACCESS DOOR.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*Robert M. Benjira* 10/6/95  
DIRECTOR OF PUBLIC WORKS

*Paul D. Egan* 9/27/95  
CHIEF, BUREAU OF ENGINEERING

*Robert M. Benjira* 10-5-95  
CHIEF, BUREAU OF UTILITIES

*Paul D. Egan* 9-27-95  
CHIEF, WATER AND SEWER DESIGN DIVISION

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*Jonathan W. Egan* 8/17/95  
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STATE OF MARYLAND  
JONATHAN W. EGAN  
No. 15140  
REGISTERED PROFESSIONAL ENGINEER

DES	C.d.B.				
DRN	M.J.C.				
CHK	J.E.H.				
DATE	5/23/95	BY	NO.	REVISION	DATE

MECHANICAL  
EAST PIPE GALLERY MODIFICATIONS AND SCUM PIT DEMOLITION & MODIFICATIONS PLAN & SECTIONS

LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATIONS  
CAPITAL PROJECT S-6153  
CONTRACT NO. 20-3405  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 5 OF 12  
M-3

### MEANINGS OF IDENTIFICATION LETTERS

THIS TABLE APPLIES ONLY TO THE FUNCTIONAL IDENTIFICATION OF INSTRUMENTS

FIRST LETTER	SUCCEEDING LETTERS				
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS	ANALOG	ALARM		
B	BURNER FLAME		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	CONDUCTIVITY (ELECTRICAL)			CONTROL	
D	DENSITY (MASS) OR SPECIFIC GRAVITY	DIFFERENTIAL OR DIGITAL			
E	VOLTAGE (EMF)		PRIMARY ELEMENT		
F	FLOW RATE	RATIO (FRACTION)			
G	GAGING (DIMENSIONAL)		GLASS		
H	HAND (MANUALLY INITIATED)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE OR INPUT		
J	POWER	SCAN			
K	TIME OR TIME SCHEDULE			CONTROL STATION	
L	LEVEL		LIGHT (PILOT)		LOW
M	MOISTURE OR HUMIDITY				MIDDLE OR INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE (RESTRICTION)		
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVENT	INTEGRATE OR TOTALIZE			
R	RADIOACTIVITY	RELIEF	RECORD OR PRINT		
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VISCOSITY			VALVE, DAMPER OR LOUVER	
W	WEIGHT OR FORCE		WELL		
X	UNCLASSIFIED		UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	LEAK			RELAY OR COMPUTE	
Z	POSITION			DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

THE FOLLOWING DESIGNATIONS ARE USED TO BETTER IDENTIFY AN INSTRUMENT CONTROL FUNCTION

I/P	CURRENT TO PNEUMATIC CONVERTER	f(x)	CHARACTERISTIC
E/I	VOLTAGE TO CURRENT CONVERTER	P	PROPORTIONAL CONTROL MODE
Σ	ADD OR TOTALIZE	D	DERIVATIVE
√	SQUARE ROOT	I	INTEGRAL CONTROL MODE
X	MULTIPLY	pH	HYDROGEN ION CONCENTRATION
$\frac{\circ}{\circ}$	DIVIDE	LP	LOCAL PANEL
>	HIGH SELECT	VFD	VARIABLE FREQUENCY DRIVE
MV	MEASURED VARIABLE	(I)	FURNISHED BY INSTRUMENTATION
<	LOW SELECT	(M)	FURNISHED BY MECHANICAL
S.P.	SET POINT	(E)	FURNISHED BY ELECTRICAL
		Δ	DIFFERENCE

	HYDRAULIC CONTROL LINES
	ELECTRIC INSTRUMENT LINES
	PNEUMATIC SIGNAL
	PROCESS FLOW
	CAPILLARY TUBING
	ELECTROMAGNETIC OR SONIC SIGNAL
	BALL VALVE
	BALL CHECK VALVE
	SWING CHECK VALVE
	BUTTERFLY VALVE, DAMPER, OR LOUVER
	PLUG VALVE
	GATE VALVE
	DIAPHRAGM VALVE
	GLOBE VALVE
	FLOAT VALVE
	3-WAY MIX VALVE
	3-WAY DIVERTER VALVE
	3-WAY SOLENOID VALVE
	4-WAY MIX VALVE
	4-WAY SOLENOID VALVE
	ANGLE VALVE
	SOLENOID VALVE
	SELF-OPERATING BACK PRESSURE REGULATOR VALVE
	SELF-OPERATING PRESSURE REGULATOR VALVE
	PRESSURE REDUCING REGULATOR VALVE W/EXTERNAL PRESSURE TAP
	PRESSURE RELIEF VALVE
	VACUUM RELIEF VALVE
	KNIFE GATE VALVE
	PINCH VALVE

### SYMBOLS

	ACCUMULATOR		BLOWER
	RUPTURE DISC (PRESSURE RELIEF)		CENTRIFUGAL PUMP
	RUPTURE DISC (VACUUM RELIEF)		DIAPHRAGM PUMP
	CHEMICAL SEAL		HOSE PUMP
	STRAINER		METERING PUMP
	QUICK DISCONNECT		POSITIVE DISPLACEMENT PUMP
	DRAIN		PRESSURE PUMP
	CALIBRATION STANDPIPE		SUBMERSIBLE PUMP
	PULSATION DAMPENER		MIXER
	FLEXIBLE HOSE		STATIC MIXER
	LOAD CELL		ORIFICE PLATE
	SLUICE GATE		MAGNETIC FLOWMETER
	SLIDE GATE		ROTAMETER
	MOTOR		
	HAND OPERATOR		
	DIAPHRAGM ACTUATOR WITH POSITIONER		
	CYLINDER ACTUATOR		
	TERMINAL STRIP IN LOCAL PANEL FOR INTERFACE WITH COMPUTER/MUX		

### HAND SWITCH POSITION SYMBOLS

(UNLABELLED SWITCHES ARE TO BE ON-OFF)

A	AUTOMATIC
C	CLOSE
H	HAND
J	JOG
L	LOCAL
M	MANUAL
O	OPEN OR OFF
R	REMOTE
E/S	EMERGENCY STOP
S/S	START/STOP

### INSTRUMENT SYMBOLS

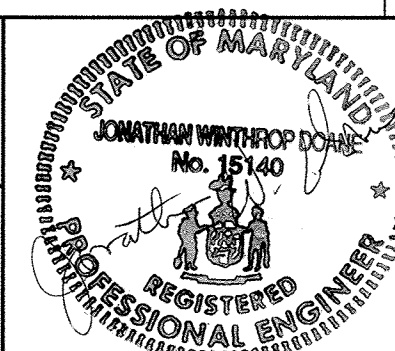
	FRONT PANEL MOUNTED		COMPUTER CONTROL SYSTEM CONFIGURABLE FUNCTION (DISPLAYED ON CRT)
	REAR PANEL MOUNTED		COMPUTER CONTROL SYSTEM CONFIGURABLE FUNCTION (NOT DISPLAYED ON CRT)
	FIELD MOUNTED		120 VAC POWER SUPPLY
			INTERLOCK LOGIC
			STATUS INDICATION

### COMPUTER INPUT/OUTPUT SYMBOLS

	COMPUTER ANALOG INPUT		COMPUTER DIGITAL INPUT
	COMPUTER ANALOG OUTPUT		COMPUTER DIGITAL OUTPUT
	COMPUTER INCREMENTAL MODULATING OUTPUT		COMPUTER PULSE INPUT

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

**M&E** Metcalf & Eddy



DES: T.M.			
DRN: T.M.			
CHK: F.B.			
DATE: 5/23/95	BY: NO.	REVISION	DATE

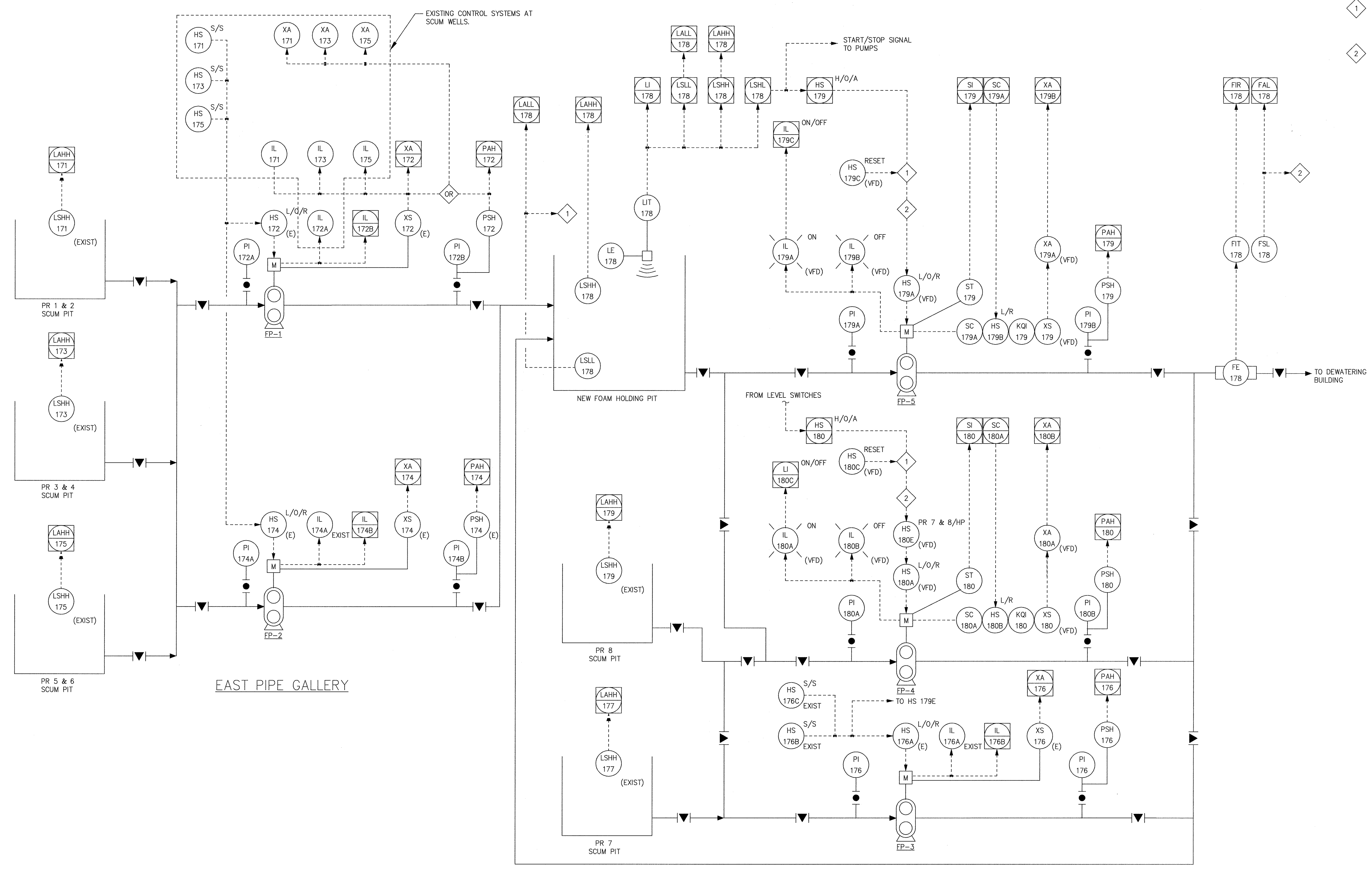
INSTRUMENTATION  
INSTRUMENTATION  
LEDGEND, SYMBOLS AND  
GENERAL NOTES

LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATIONS  
CAPITAL PROJECT S-6153

CONTRACT NO. 20-3405  
HOWARD COUNTY, MARYLAND

SCALE  
NONE  
SHEET  
6 OF 12  
1-1





- 1 SHUT DOWN PUMPS ON LOW LEVEL IN HOLDING PIT. MANUAL RESET AT VFD.
- 2 STOP PUMP AFTER 30 SECONDS AT LOW FLOW DETECTION.

FOAM PUMP LOOP DIAGRAM

WEST PIPE GALLERY

EAST PIPE GALLERY

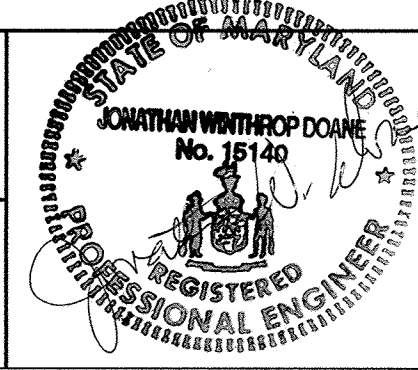
DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND

*Robert Benji* 10/6/95  
 DIRECTOR OF PUBLIC WORKS  
 CHIEF, BUREAU OF UTILITIES

*Robert Benji* 10-5-95  
 CHIEF, BUREAU OF UTILITIES

**M&E** Metcalf & Eddy

*Jonathan W. Blane* 8/17/95  
 REG. PROF. ENGR.



DES: T.M.				
DRN: T.M.				
CHK: F.B.				
DATE: 5/23/95	BY:	NO.:	REVISION:	DATE:

INSTRUMENTATION

EAST AND WEST PIPE GALLERIES  
 LOOP DIAGRAMS

LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATIONS  
 CAPITAL PROJECT S-6153

CONTRACT NO. 20-3405  
 HOWARD COUNTY, MARYLAND

SCALE: NONE

SHEET 7 OF 12

1-2

FOR PLAN VIEW ONLY

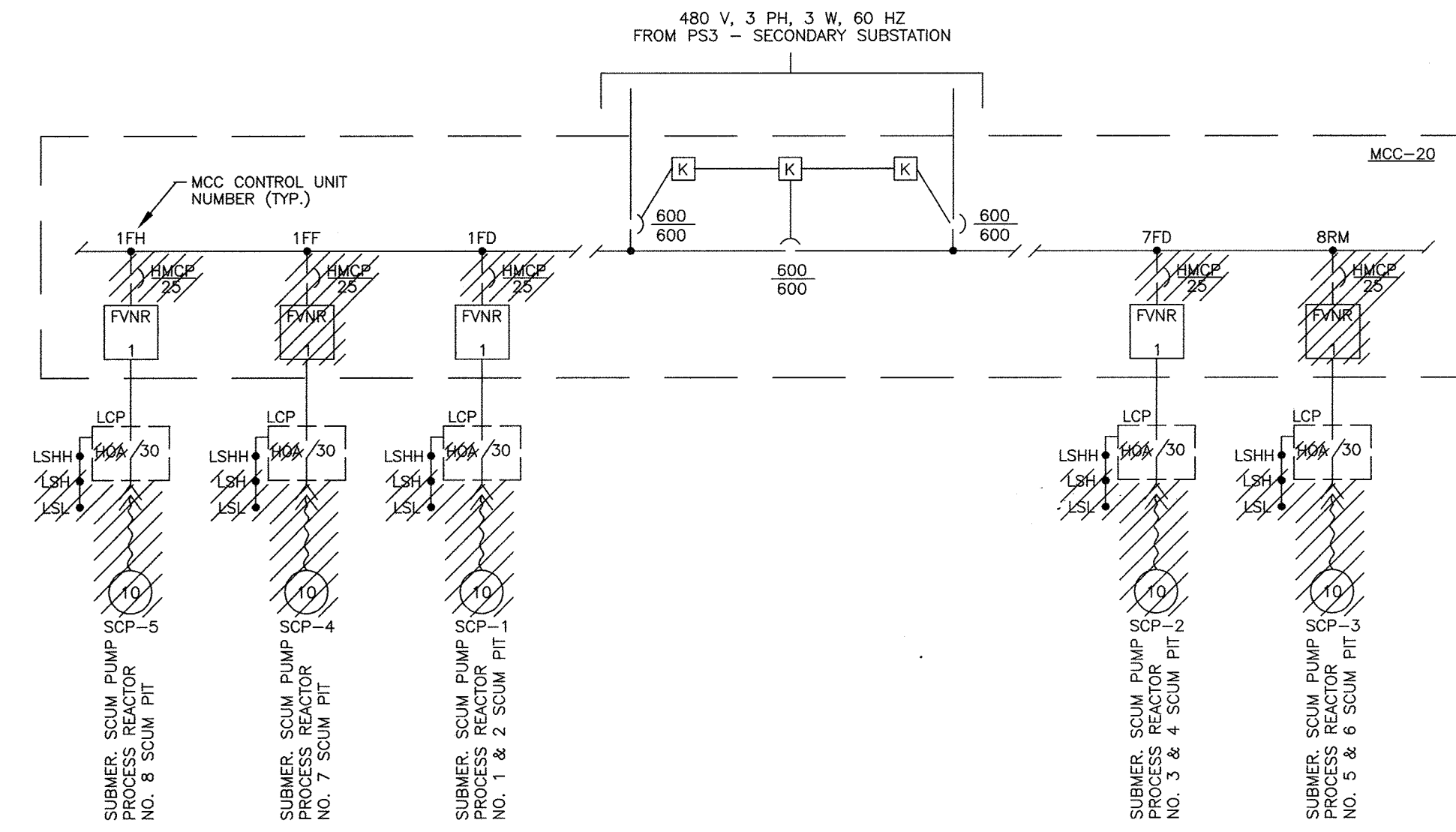
- ⦿ SPECIAL PURPOSE RECEPTACLE, TYPE AND AMPERE RATING AS INDICATED ON PLAN
- ⊠ MAGNETIC MOTOR STARTER
- ⊠ MAGNETIC MOTOR STARTER AND DISCONNECT SWITCH
- DISCONNECT SWITCH
- PANELBOARD
- ▨ POWER DISTRIBUTION PANEL
- MOTOR - FOR HORSEPOWER RATING, SEE PANELBOARD SCHEDULE OR SINGLE LINE DIAGRAM
- ⊙ JUNCTION BOX
- ⊗ GROUND ROD - TYPE AND SIZE AS INDICATED ON PLAN
- CONTROL STATION
- ⊗ EXPLOSIONPROOF SEALING FITTING
- E— CONDUIT FITTING—E DENOTES EXPANSION FITTING
- CONDUIT RUNS CONCEALED IN FLOOR, WALL AND UNDERGROUND
- CONDUIT RUNS EXPOSED
- CONDUIT TURNING UP OR TOWARD OBSERVER
- CONDUIT TURNING DOWN OR AWAY FROM OBSERVER
- ~ FLEXIBLE CONDUIT
- LP-22.3 HOMERUN TO PANELBOARD - LETTERS AND NUMERALS DENOTE PANELBOARD AND CIRCUIT NUMBERS. ARROWS INDICATE NUMBER OF CIRCUITS (SEE GENERAL NOTE 4).
- DENOTES SECTION NO. OR DETAIL LETTER
- DENOTES SHEET NO. ON WHICH SECTIONS OR DETAIL IS EITHER SHOWN AND/OR TAKEN
- C-506 CONDUIT NUMBER FOR WIRING - SEE SCHEDULE
- A.F.F. ABOVE FINISHED FLOOR
- W DENOTES WATERTIGHT EQUIPMENT
- WP DENOTES WEATHERPROOF EQUIPMENT
- XP DENOTES EXPLOSIONPROOF EQUIPMENT
- ⊙ SOLENOID VALVE
- CWS CONDUIT WALL ENTRANCE SEAL
- PULL BOX
- CTB = CONTROL WIRING TERMINAL BOX
- STB = SIGNAL WIRING TERMINAL BOX

FOR SINGLE LINE DIAGRAMS

- 100/15 MOLDED CASE CIRCUIT BREAKER, THERMAL MAGNETIC TRIP, WITH CURRENT LIMITING FUSES. 3-POLE UNLESS OTHERWISE NOTED. UPPER NUMERAL INDICATES FRAME SIZE, LOWER NUMERAL INDICATES TRIP SETTING.
- 100/15 MOLDED CASE CIRCUIT BREAKER, THERMAL MAGNETIC TRIP, 3-POLE UNLESS OTHERWISE NOTED, UPPER NUMERAL INDICATES FRAME SIZE, LOWER NUMERAL INDICATES TRIP SETTING.
- MCP MOTOR CIRCUIT PROTECTOR. NUMERAL INDICATES CONTINUOUS CURRENT RATING. MCP = WITH CURRENT LIMITING FUSES. HMCP = HIGH INTERRUPTING CAPACITY MCP.
- 100 UNFUSED DISCONNECT SWITCH. NUMERAL DENOTES AMPERE RATING.
- 100/70 FUSED DISCONNECT SWITCH, 3-POLE UNLESS OTHERWISE NOTED. UPPER NUMERAL INDICATES FUSE CLIP AMPERE SIZE. LOWER NUMERAL INDICATES FUSE RATING.
- TRANSFORMER, SIZE AS NOTED
- MAGNETIC STARTER
  - FVNR = FULL VOLTAGE, NON-REVERSING
  - FVR = FULL VOLTAGE, REVERSING
  - FVTS = FULL VOLTAGE TWO SPEED
  - RVNR = REDUCED VOLTAGE, NON-REVERSING
  - AT = AUTO-TRANSFORMER TYPE
  - PW = PART WINDING
  - C = MAGNETIC CONTACTOR (WITHOUT OL)
- AUXILIARY CONTACTS: 1a = ONE NORMALLY OPEN  
1b = ONE NORMALLY CLOSED
- NUMERAL INDICATES NEMA SIZE
- SQUIRREL CAGE INDUCTION MOTOR. NUMERAL DENOTES HORSEPOWER.
- FUSE-CLF DENOTES CURRENT LIMITING TYPE
- INDICATING LIGHTS:  
R=RED, B=BLUE, G=GREEN, A=AMBER
- ELECTRICALLY INTERLOCKED
- MECHANICALLY INTERLOCKED
- |--- NORMALLY OPEN CONTACT (DEENERGIZED POSITION)
- |/--- NORMALLY CLOSED CONTACT (DEENERGIZED POSITION)
- ATS AUTOMATIC TRANSFER SWITCH
- AL ALARM
- AN ANNUNCIATOR
- CR CONTROL RELAY
- TD TIME DELAY RELAY
- OL'S MOTOR OVERLOADS
- MCP MOTOR CIRCUIT PROTECTOR

NOTES - DEMOLITION/MODIFICATION

1. REUSE MCC CONTROL UNIT HOUSING ("BUCKETS") & DEVICES FOR SCP-1 TO SCP-5, EXCEPT AS NOTED AND SHOWN HEREIN.
2. UNITS 1FH, 1FD AND 7FD:
  - a) REMOVE EXIST. 25 AMP. MOTOR CIRCUIT PROTECTOR (HMCP, TO BECOME OWNER'S SHELF SPARES) AND REPLACE WITH NEW 15 AMP. HMCP, SAME BRAND, MODEL, AND INTERRUPTING CAPACITY AS EXIST. HMCP.
  - b) REMOVE EXIST. OVERLOAD HEATER COILS (TO BECOME OWNER'S SHELF SPARES) AND REPLACE WITH NEW HEATER COILS, SIZED FOR ACTUAL MOTOR NAMEPLATE CURRENT, SAME BRAND AS EXISTING OVERLOAD RELAY.
3. UNITS 1FF AND 8RM:
  - a) REMOVE EXIST. HMCP AND STARTER (TO BECOME OWNER'S SHELF SPARES) AND REPLACE WITH NEW 20 AMP. TRIP THERMAL-MAGNETIC CIRCUIT BREAKER, SAME BRAND AND INTERRUPTING CAPACITY AS EXISTING FEEDER BREAKERS.
  - b) RETAIN POWER AND CONTROL WIRES FROM LCP. EXTEND CONTROL WIRES FROM MCC-20 TO NEW VFDS.
4. REMOVE OLD NAMEPLATES FOR SCP-1 TO SCP-5 FROM MCC-20 AND PROVIDE NEW NAMEPLATES FOR FP-1 THROUGH FP-5. SEE NAMEPLATE SCHEDULE FOR MARKINGS.
5. LOCAL CONTROL PANELS (LCP):
  - a) DISCONNECT AND REMOVE LSL, LSH, HOA, SCUM PUMP WITH CABLE AND PLUG, AND POWER RECEPTACLE, TO BECOME OWNER'S SHELF SPARES. EXISTING LSHH TO REMAIN IN PLACE.
  - b) COVER ALL HOLES TO RETAIN WATERTIGHT RATING.
6. MCC-20 AND LCP:
  - a) REFER TO SCHEMATIC DIAGRAMS FOR MORE DETAILS ON MODIFICATIONS, AND NEW WIRING TO PLANT COMPUTER INTERFACE UNITS (PIUs).



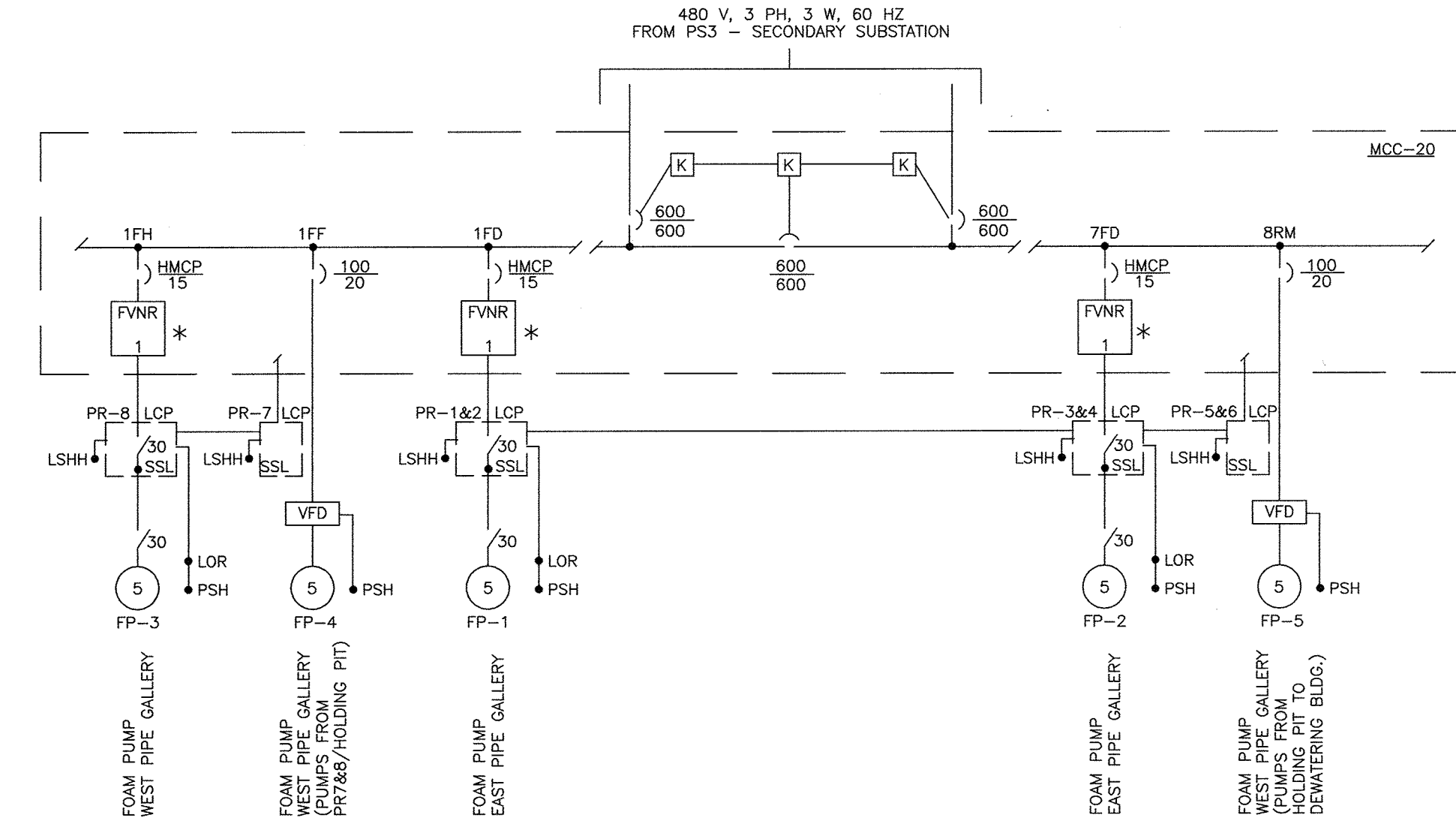
PART ONE LINE DIAGRAM - EXISTING MCC-20 DEMOLITION

FOR SINGLE LINE DIAGRAM AND PLAN VIEW CONTROL DEVICES

- SL STOP-PUSHBUTTON, MOMENTARY-CONTACT TYPE WITH LOCKOUT LATCH
- SS START-STOP PUSHBUTTON, MOMENTARY-CONTACT TYPE WITH LOCKOUT LATCH
- SSL START-STOP PUSHBUTTON, MOMENTARY-CONTACT TYPE WITH LOCKOUT LATCH
- SSI START-STOP PUSHBUTTON, MOMENTARY-CONTACT TYPE WITH RED (RUN) AND GREEN (OFF) INDICATING LIGHTS
- SC SPEED CONTROLLER
- RTM RUNNING TIME METER
- HOA HAND-OFF-AUTOMATIC SELECTOR SWITCH
- LR LOCAL-REMOTE SELECTOR SWITCH
- LOR LOCAL-OFF-REMOTE SELECTOR SWITCH
- OC OPEN-CLOSE SWITCH
- OCA OPEN-CLOSE-AUTO SELECTOR SWITCH
- OSC OPEN-STOP-CLOSE PUSHBUTTON
- SSM START-STOP PUSHBUTTON, MAINTAINED-CONTACT TYPE
- ES EMERGENCY STOP SWITCH
- FS FLOAT SWITCH
- TS TIME SWITCH
- LS LIMIT SWITCH
- PS PRESSURE SWITCH
- SV SOLENOID VALVE
- VPS VACUUM PRESSURE SWITCH
- TQ TORQUE ALARM SWITCH
- SQ SEQUENCE SELECTOR SWITCH
- SEL SELECTOR SWITCH
- FC FLOW CONTROLLER
- FE FLOW ELEMENT
- FIT FLOW INDICATING TRANSMITTER
- FT FLOW TRANSMITTER
- LC LEVEL CONTROLLER
- LE LEVEL ELEMENT
- LI LEVEL INDICATOR
- LIT LEVEL INDICATING TRANSMITTER
- LLS LOW LEVEL SHUTDOWN
- LT LEVEL TRANSMITTER
- MCC MOTOR CONTROL CENTER
- MSD MOISTURE SENSING DETECTION PANEL
- MTP MOTOR THERMAL PROTECTOR (BUILT-IN)
- MOV MOTOR OPERATED VALVE
- RB RESET BUTTON
- SI SPEED INDICATOR
- SCR SILICON CONTROL RECTIFIER
- SWSV SEAL WATER SOLENOID VALVE
- TI TIMER
- HOS HAND-OFF-STANDBY SELECTOR SWITCH
- SH SPACE HEATER

GENERAL NOTES

1. ALL CONDUIT AND EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE LATEST RULES AND REGULATIONS OF THE NATIONAL ELECTRICAL CODE AND APPLICABLE LOCAL CODES.
2. CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONFLICTS WITH EQUIPMENT AND STRUCTURAL CONDITIONS. EXPOSED CONDUITS SHALL BE INSTALLED PARALLEL TO BEAMS AND WALLS.
3. CONDUITS SHALL BE TERMINATED SO AS TO PERMIT NEAT CONNECTIONS TO MOTORS AND OTHER EQUIPMENT.
4. NO CONDUIT SMALLER THAN 3/4" PIPE SIZE NOR WIRE SMALLER THAN NO.12 A.W.G. SHALL BE USED UNLESS OTHERWISE NOTED.
5. THE WIRING DIAGRAMS, QUANTITY AND SIZE OF WIRES AND CONDUIT REPRESENT A SUGGESTED ARRANGEMENT BASED UPON SELECTED STANDARD COMPONENTS OF ELECTRICAL EQUIPMENT. MODIFICATIONS ACCEPTABLE TO THE ENGINEER MAY BE MADE BY THE CONTRACTOR TO ACCOMMODATE EQUIPMENT ACTUALLY PURCHASED. THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS.
6. ALL SURFACE MOUNTED PANELS AND PANELBOARDS ON THE INSIDE OF THE EXTERIOR WALLS ABOVE GRADE, OR IN OTHER LOCATIONS CONSIDERED AS DAMP, SHALL BE MOUNTED SO AS TO MAINTAIN A 1/4" AIR SPACE BETWEEN THE ENCLOSURE AND THE WALL.
7. ALL PANELBOARDS AND PANELS SHALL BE MOUNTED SO THAT THE DISTANCE FROM THE TOP CIRCUIT BREAKER OPERATING HANDLE TO THE FLOOR SHALL NOT EXCEED 6'-6".
8. OUTLET, SWITCH, JUNCTION, PULL AND TERMINAL BOXES SHALL BE PROVIDED WITH NEMA ENCLOSURES AS INDICATED IN THE SPECIFICATIONS.
9. ALL CONDUIT RUNS CROSSING EXPANSION JOINTS SHALL HAVE EXPANSION OR EXPANSION AND DEFLECTION TYPE FITTINGS AS REQUIRED. FOR EXACT LOCATIONS OF EXPANSION JOINTS SEE STRUCTURAL DRAWINGS.
10. SWITCHGEAR AND MCC COMPARTMENT DESIGNATIONS AS INDICATED BELOW:
  - BLANK - NOT INTENDED FOR USE--PLATE ONLY (SAME AS "UNUSE").
  - SPACE - CONTAINS NECESSARY BUS AND HARDWARE FOR FUTURE ADDITION OF BREAKERS OR STARTERS WITHIN SIZE RANGE SHOWN (SAME AS "FUTURE").
  - SPARE - CONTAINS A COMPLETE BREAKER OR STARTER INSTALLED, SIZE AS INDICATED, AVAILABLE FOR FUTURE USE.
11. ALL MOTOR STARTER CONTROL TRANSFORMERS SHALL BE SIZED TO PROVIDE SUFFICIENT VOLT-AMPERE CAPACITY FOR OPERATING ALL ELECTRICAL DEVICES ASSOCIATED WITH CONTROL OF THE MOTOR; IN ADDITION TO THE STARTER COIL, IT SHALL INCLUDE RELAYS, TIMERS, MOTOR HEATERS, INDICATING LIGHTS, ETC.
12. DUCTLINE CONDUIT SIZES ARE GIVEN IN THE DUCTLINE SECTIONS WHERE THE SAME CONDUIT NUMBER IS USED BOTH IN THE DUCTLINE AND IN THE BUILDING. THE CONDUIT SIZE GIVEN IN THE CONDUIT SCHEDULE APPLIES TO THE CONDUIT IN THE BUILDING ONLY.
13. FOR EXPLANATION OF INSTRUMENTATION SYMBOLS SHOWN ON ELECTRICAL DRAWINGS, SEE INSTRUMENTATION LEGEND AND NOTES SHEET.



PART ONE LINE DIAGRAM - MCC-20 MODIFICATIONS

\* NOTE: CONTRACTOR SHALL ADJUST OR REPLACE OVERLOAD RELAYS FOR PROPER PROTECTION OF NEW PUMP MOTORS.

1	2	3	4	5	6	7
1FB	2FB	3FB	4FB	5FB FUTURE	6FC FUTURE	7FB FUTURE
1FD 1800/11 FP-1	2FD	3FD	4FD	5FD FUTURE	6FE FUTURE	7FD 1800/11 FP-2
1FF 1800/11 FP-4	2FF	3FF	4FF	5FH	6FH FUTURE	5FH
1FH 1800/11 FP-3	2FH	3FH	4FH			
1FK	2FK	3FK	4FK	5FM INC. BKR.	6FM TIE BKR.	7FM INC. BKR.

MCC-20 PARTIAL FRONT ELEVATION

SCALE: NONE

11	10	9	8
11RG UNUSE	10RB UNUSE	9RB UNUSE	8RB UNUSE
11RD	10RD	9RD	8RD
11RF	10RF	9RF	8RF
11RH	10RH	9RH	8RH
11RK	10RK	9RK	8RK
11RM	10RM	9RM	8RM 1800/11 FP-5

MCC-20 PARTIAL REAR ELEVATION

SCALE: NONE

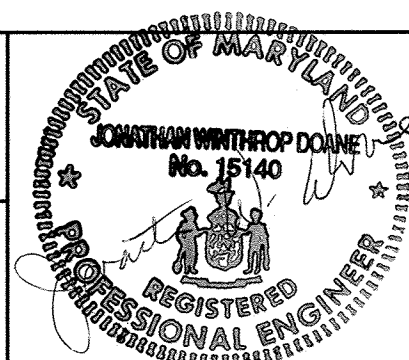
DEPARTMENT OF PUBLIC WORKS

HOWARD COUNTY, MARYLAND

Director of Public Works: *R. J. ...* 10-25-95  
 Chief, Bureau of Engineering: *...* 9-27-95  
 Chief, Water and Sewer Design Division: *...* 9-27-95

M&E Metcalf & Eddy

Project Engineer: *...* 8/17/95



DES	J.S.				
DRN	J.S.				
CHK	E.A./WAT				
DATE	05-95				
BY	NO.	REVISION			DATE

ELECTRICAL

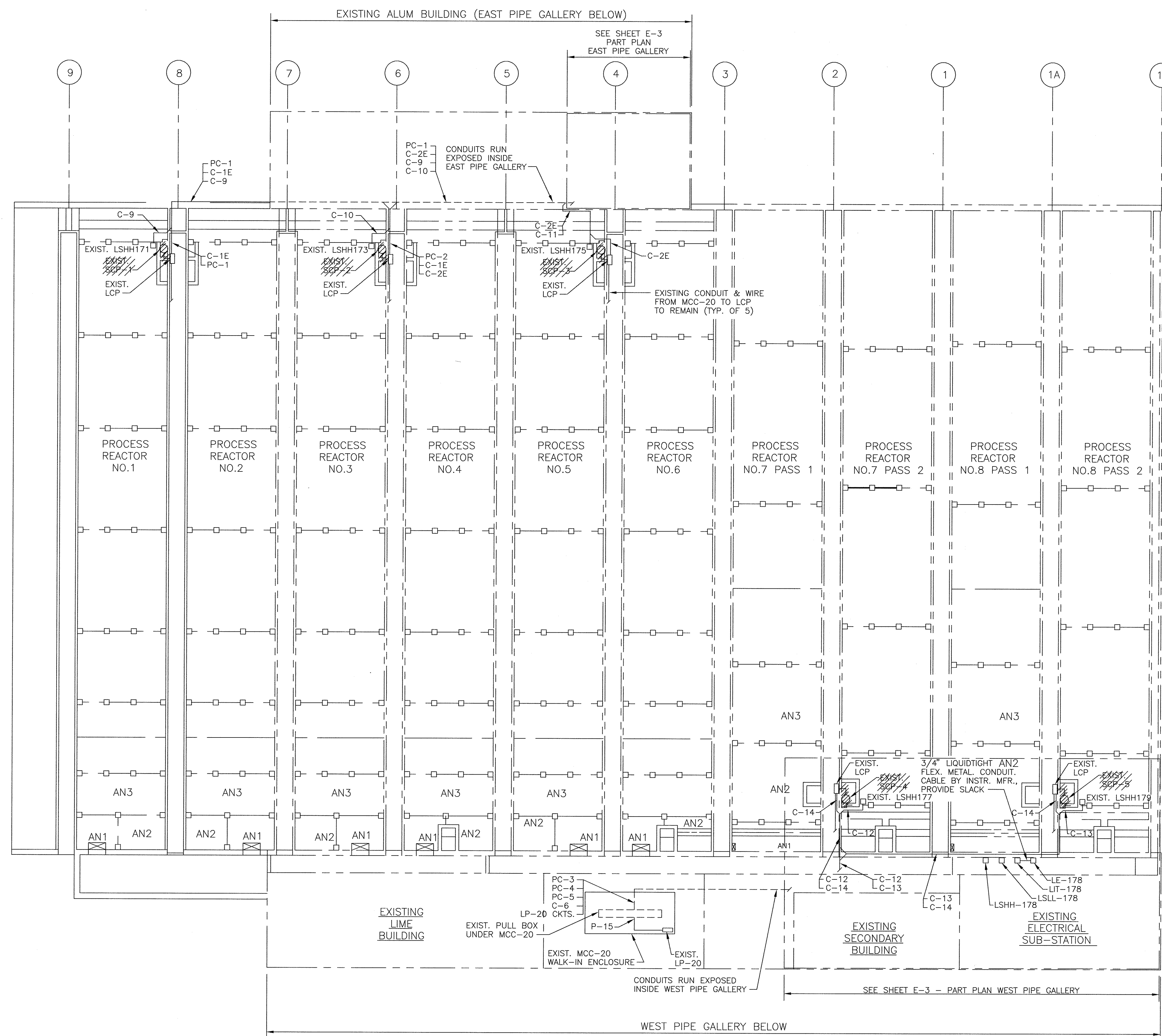
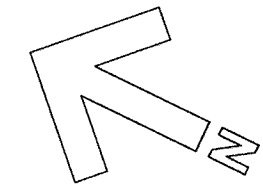
GENERAL NOTES & SYMBOLS  
 PART ONE LINE DIAGRAMS &  
 PART ELEVATIONS - MCC-20

LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATION  
 CAPITAL PROJECT S-6153

CONTRACT NO. 20-3082  
 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
 SHEET 8 OF 12  
 E-1





CONDUIT & WIRE SCHEDULE						
CONDUIT NO.	SIZE	QTY	SIZE	FROM	TO	REMARKS
PC-1	1"	3-1/c 1-1/c 6-1/c	10 12 12	LCP-PR1&2 SCUM PIT	J.B. NEAR DISC. SW. FOR FP-1	POWER GROUND CONTROL
P-1A	3/4"	3-1/c 1-1/c	10 12	J.B. NEAR DISC. SW. FOR FP-1	FP-1 THRU DISC. SW.	POWER GROUND
C-1B	3/4"	4-1/c	12	J.B. NEAR DISC. SW. FOR FP-1	L-0-R SW. FOR FP-1	CONTROL
C-1C	3/4"	2-1/c	12	J.B. NEAR DISC. SW. FOR FP-1	PSH-172	CONTROL
I-1D	3/4"	1-PR	16 SH	J.B. NEAR DISC. SW. FOR FP-1	PIU-4	INSRTUMENT
C-1E	3/4"	6-1/c 2-1/c	12 12	LCP-PR1&2 SCUM PIT	LCP-PR3&4 SCUM PIT	CONTROL SPARE
PC-2	1"	3-1/c 1-1/c 6-1/c	10 12 12	LCP-PR3&4 SCUM PIT	J.B. NEAR DISC. SW. FOR FP-2	POWER GROUND CONTROL
P-2A	3/4"	3-1/c 1-1/c	10 12	J.B. NEAR DISC. SW. FOR FP-2	FP-2 THRU DISC. SW.	POWER GROUND
C-2B	3/4"	4-1/c	12	J.B. NEAR DISC. SW. FOR FP-2	L-0-R SW. FOR FP-2	CONTROL
C-2C	3/4"	2-1/c	12	J.B. NEAR DISC. SW. FOR FP-2	PSH-174	CONTROL
I-2D	3/4"	1-PR	16 SH	J.B. NEAR DISC. SW. FOR FP-2	PIU-4	INSRTUMENT
C-2E	3/4"	6-1/c 2-1/c	12 12	LCP-PR3&4 SCUM PIT	LCP-PR5&6 SCUM PIT	CONTROL SPARE
PC-3	1"	3-1/c 1-1/c 6-1/c	10 12 12	MCC-20	J.B. NEAR DISC. SW. FOR FP-3	POWER GROUND CONTROL
P-3A	3/4"	3-1/c 1-1/c	10 12	J.B. NEAR DISC. SW. FOR FP-3	FP-3 THRU DISC. SW.	POWER GROUND
C-3B	3/4"	4-1/c	12	J.B. NEAR DISC. SW. FOR FP-3	L-0-R SW. FOR FP-3	CONTROL
C-3C	3/4"	2-1/c	12	J.B. NEAR DISC. SW. FOR FP-3	PSH-176	CONTROL
PC-4	3/4"	3-1/c 1-1/c 2-1/c	10 12 12	MCC-20	VFD FOR FP-4	POWER GROUND CONTROL
P-4A	3/4"	3-1/c 1-1/c	10 12	VFD FOR FP-4	FP-4 THRU DISC. SW.	POWER GROUND
C-4B	3/4"	2-1/c	12	VFD FOR FP-4	PSH-180	CONTROL
PC-5	3/4"	3-1/c 1-1/c 2-1/c	10 12 12	MCC-20	VFD FOR FP-5	POWER GROUND CONTROL
P-5A	3/4"	3-1/c 1-1/c	10 12	VFD FOR FP-5	FP-5 THRU DISC. SW.	POWER GROUND
C-5B	3/4"	2-1/c	12	VFD FOR FP-5	PSH-179	CONTROL
C-6	3/4"	10-1/c	12	MCC-20	PIU-6	CONTROL
C-7	1 1/2"	38-1/c	12	PIU-6	CONTROL PULL BOX	CONTROL
C-7A	3/4"	6-1/c	12	CONTROL PULL BOX	J.B. NEAR DISC. SW. FOR FP-3	CONTROL
C-7B	3/4"	12-1/c	12	CONTROL PULL BOX	VFD FOR FP-4	CONTROL
C-7C	3/4"	12-1/c	12	CONTROL PULL BOX	VFD FOR FP-5	CONTROL
C-7D	3/4"	4-1/c	12	CONTROL PULL BOX	LSHH-178, LSL-178	CONTROL
C-7E	3/4"	2-1/c	12	CONTROL PULL BOX	FSL-178	CONTROL
I-8	1 1/2"	6-PR	16 SH	PIU-6	INSTRUMENT PULL BOX	INSTRUMENT
I-8A	3/4"	2-PR	16 SH	INSTRUMENT PULL BOX	VFD FOR FP-4	INSTRUMENT
I-8B	3/4"	2-PR	16 SH	INSTRUMENT PULL BOX	VFD FOR FP-5	INSTRUMENT
I-8C	3/4"	1-PR	16 SH	INSTRUMENT PULL BOX	LIT-178	INSTRUMENT
I-8D	3/4"	1-PR	16 SH	INSTRUMENT PULL BOX	FIT-178	INSTRUMENT
C-9	3/4"	2-1/c	12	EXISTING LSHH-171	PIU-4	CONTROL
C-10	3/4"	2-1/c	12	EXISTING LSHH-173	PIU-4	CONTROL
C-11	3/4"	2-1/c	12	EXISTING LSHH-175	PIU-4	CONTROL
C-12	3/4"	2-1/c	12	EXISTING LSHH-177	PIU-6	CONTROL
C-13	3/4"	2-1/c	12	EXISTING LSHH-179	PIU-6	CONTROL
C-14	3/4"	4-1/c 2-1/c	12 12	LCP-PR7 SCUM PIT	LCP-PR8 SCUM PIT	CONTROL SPARE
P-15	1"	12-1/c	12	LP-20	MCC-20	120V POWER FOR LCP-PR7 & LCP-PR8 & PR6 INSTRUMENTS & HEAT TRACING (4 CIRCUITS)
C-16	3/4"	6-1/c	12	VFD FOR FP-4	VFD FOR FP-5	CONTROL

- NOTES:
- FOR GENERAL NOTES AND SYMBOLS SEE SHT. E-1.
  - FOR CONDUIT AND WIRE SCHEDULE SEE SHT. E-2.
  - CONTRACTOR SHALL INDICATE ON CONTRACT DRAWINGS THE ACTUAL CKTS NUMBERS USED IN LP-20, AND UPDATE THE CIRCUIT DIRECTORY CARD.

PLAN  
SCALE: 1/16" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*James P. Sluiter* 10/6/95  
DIRECTOR OF PUBLIC WORKS

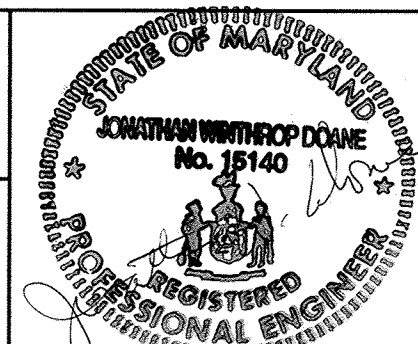
*Robert A. Smith* 10-5-95  
CHIEF, BUREAU OF UTILITIES

*Paul R. ...* 9/27/95  
CHIEF, BUREAU OF ENGINEERING

*...* 9-27-95  
CHIEF, WATER AND SEWER DESIGN DIVISION

M&E Metcalf & Eddy

*Joseph W. ...* 3/17/95  
REG. PROF. ENGR.



DES	J.S.				
DRN	J.S.				
CHK	E.A./WAT				
DATE	05-95	BY	NO.	REVISION	DATE

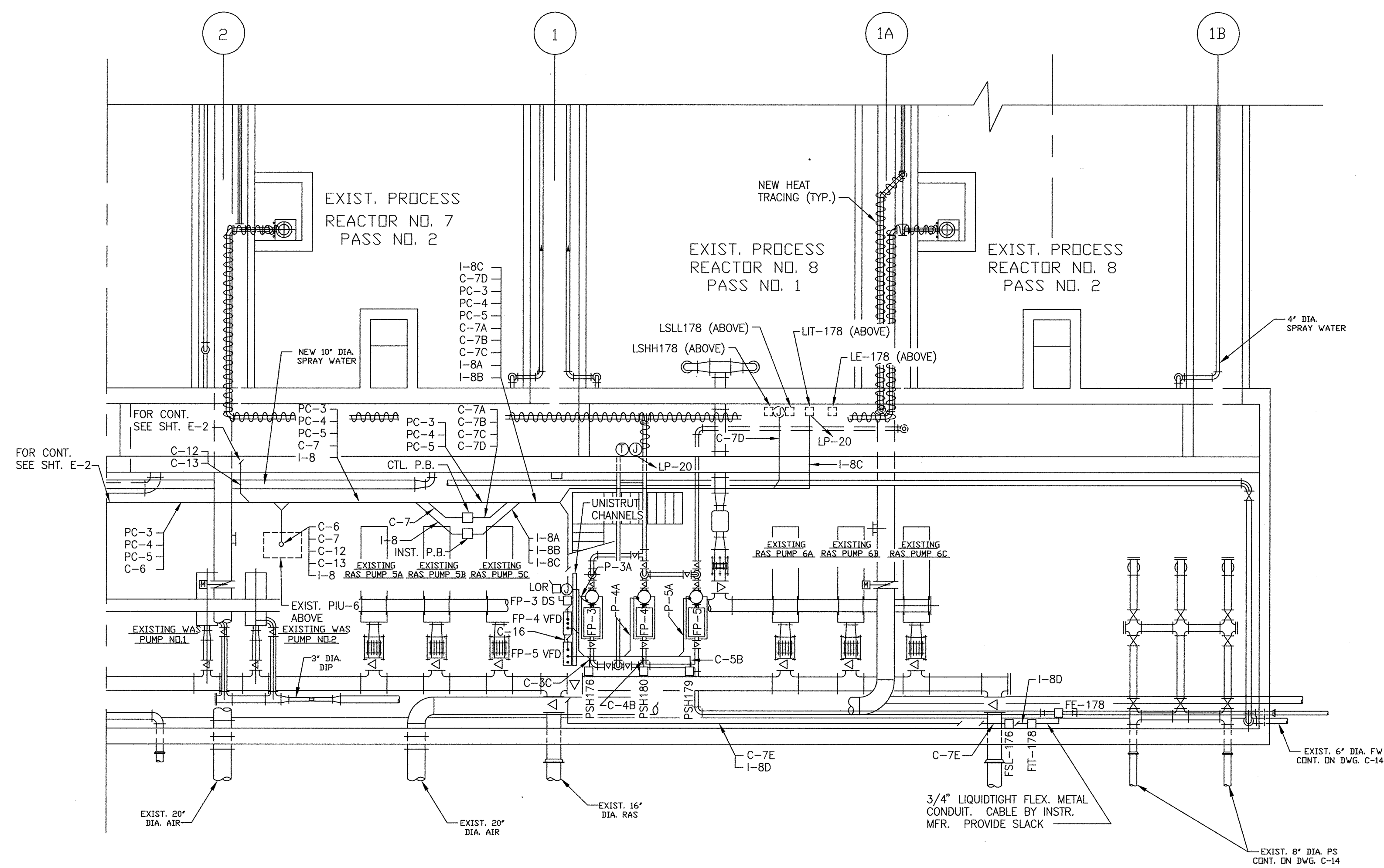
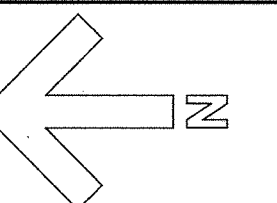
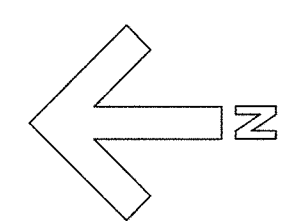
ELECTRICAL

PLAN - PROCESS REACTORS,  
EAST & WEST PIPE GALLERIES,  
CONDUIT & WIRE SCHEDULE

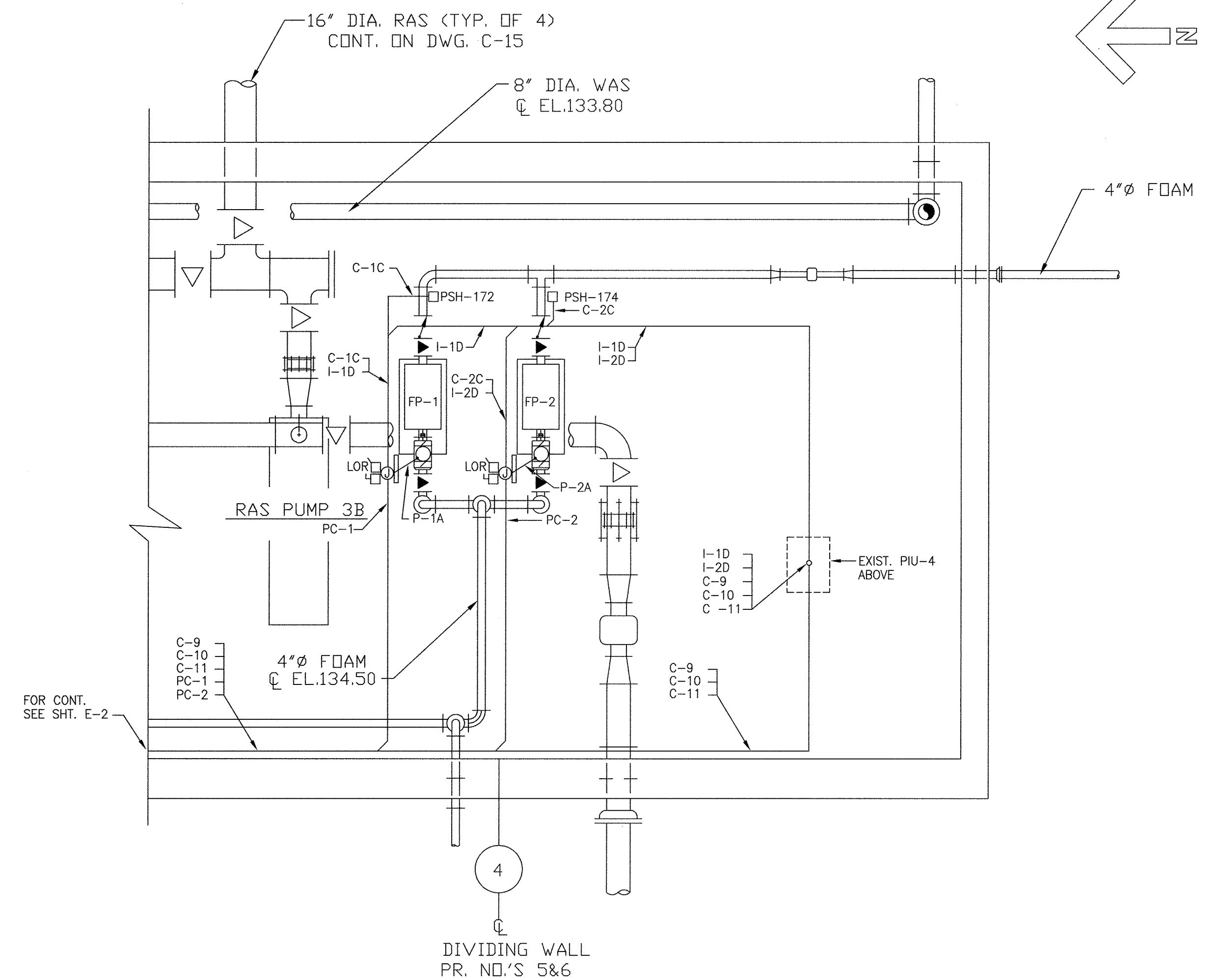
LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATION  
CAPITAL PROJECT 5-6153

CONTRACT NO. 20-3082  
HOWARD COUNTY, MARYLAND

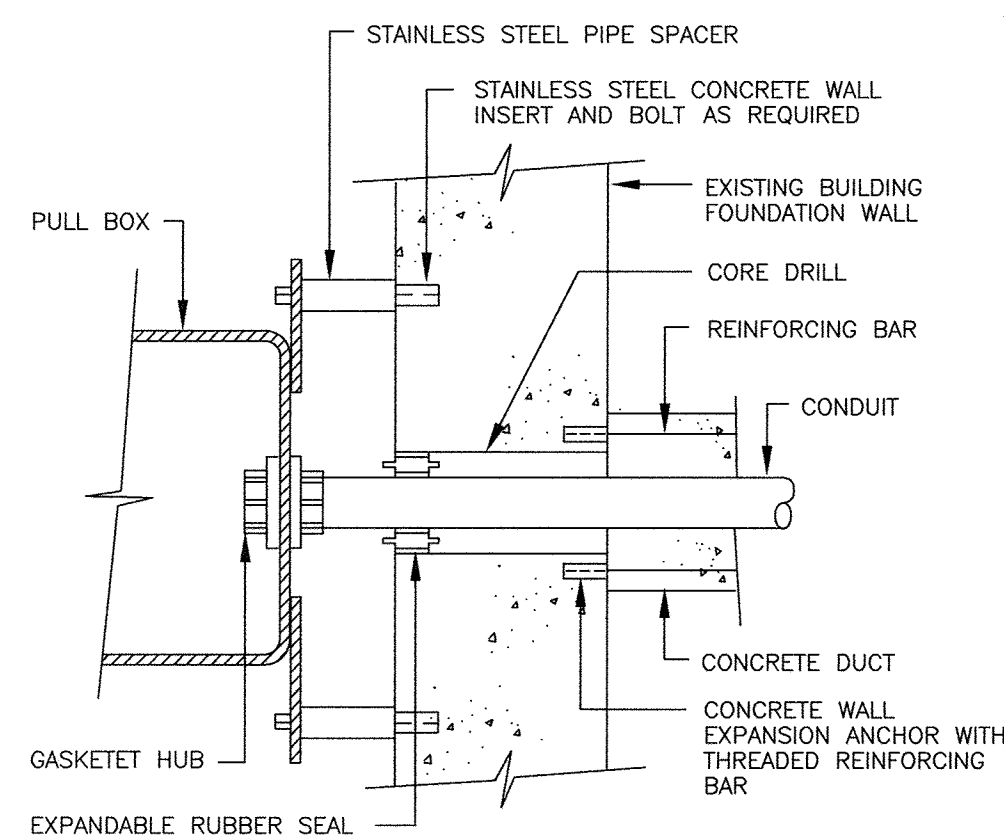
SCALE AS SHOWN  
SHEET 9 OF 12  
E-2



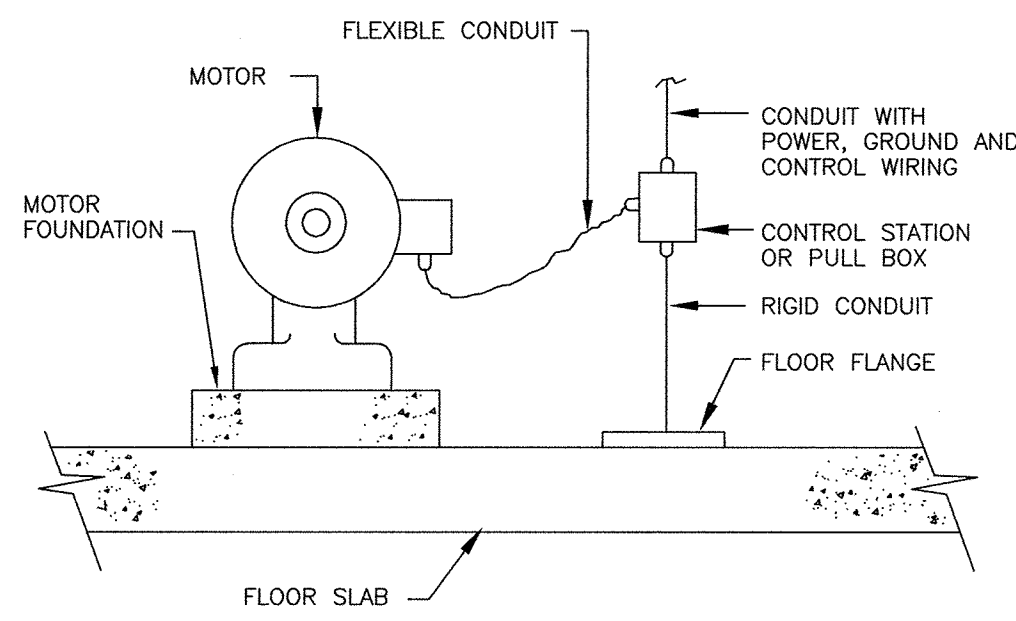
PART PLAN -  
WEST PIPE GALLERY  
SCALE: 1/8"=1'-0"



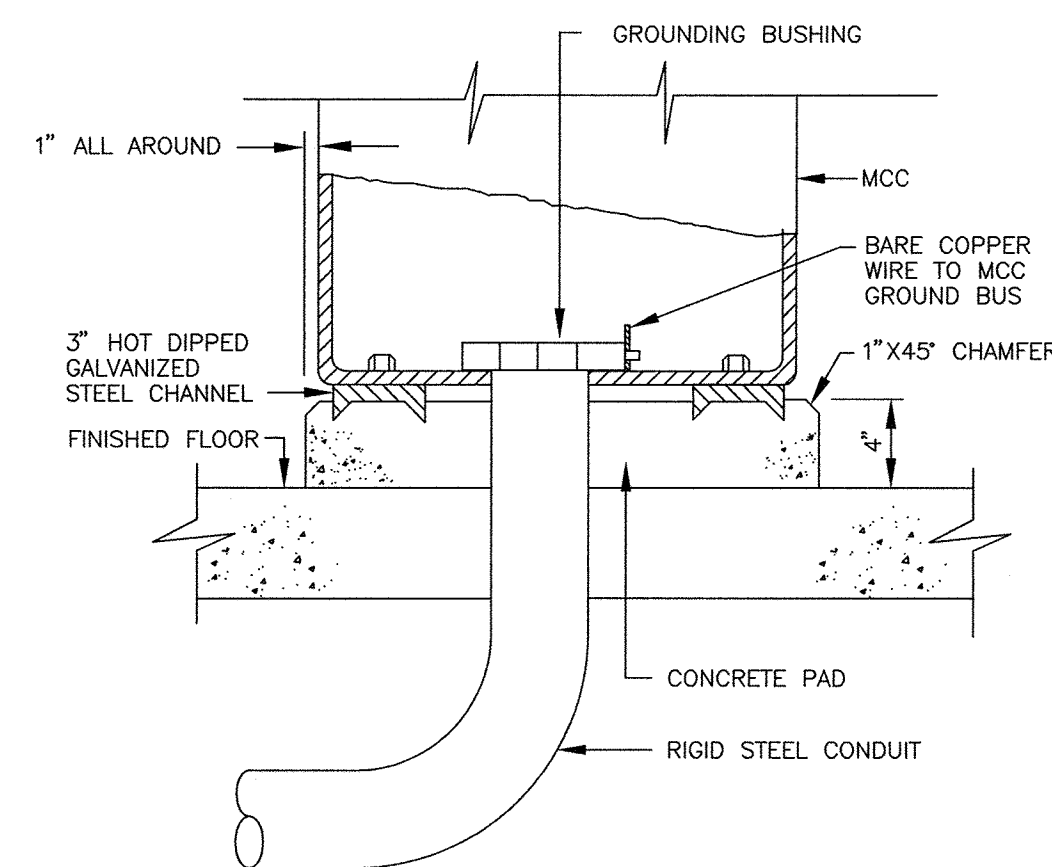
PART PLAN -  
EAST PIPE GALLERY  
SCALE: 1/4"=1'-0"



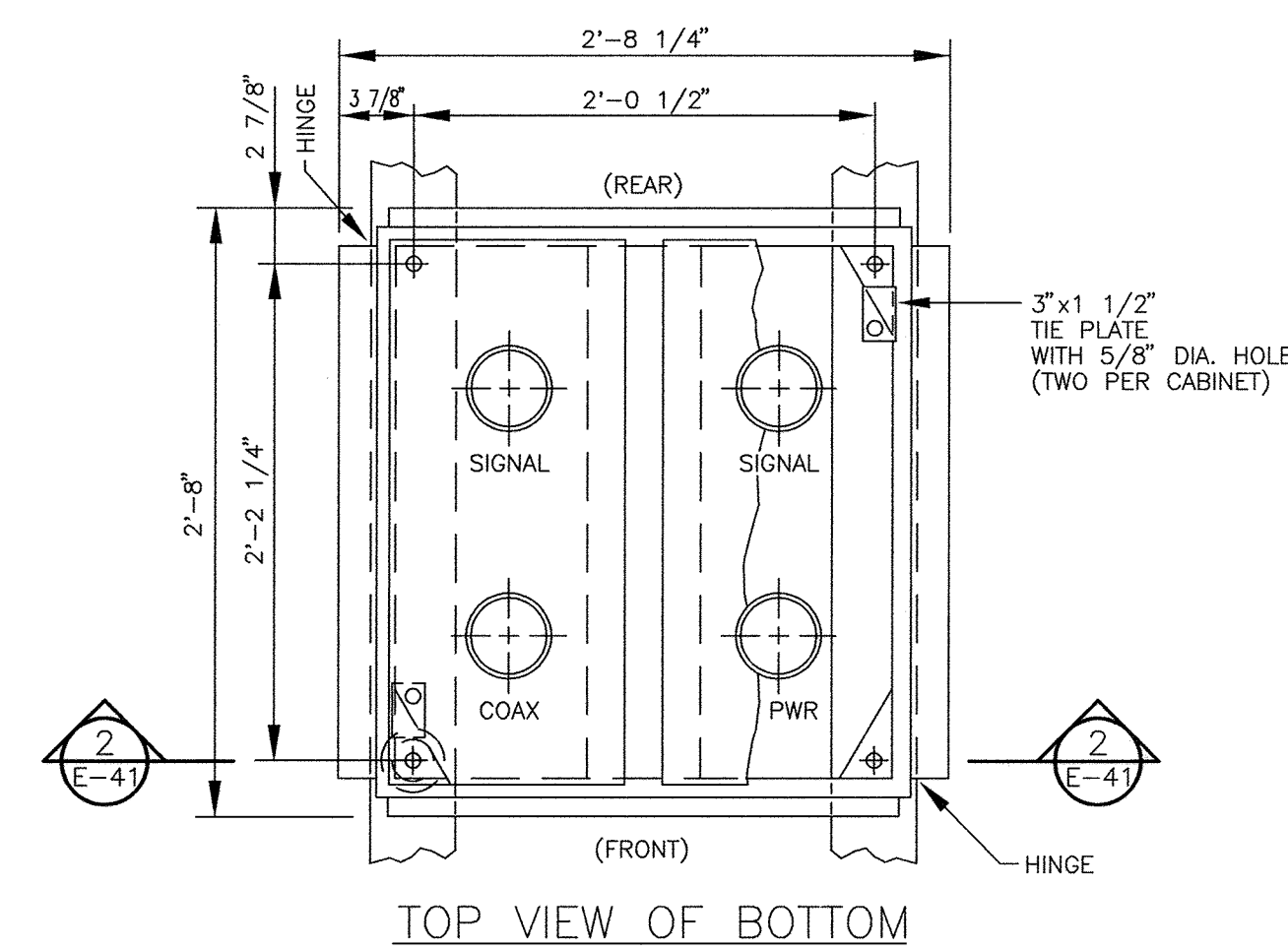
EXISTING BUILDING  
CONDUIT WALL ENTRANCE SEAL  
NO SCALE



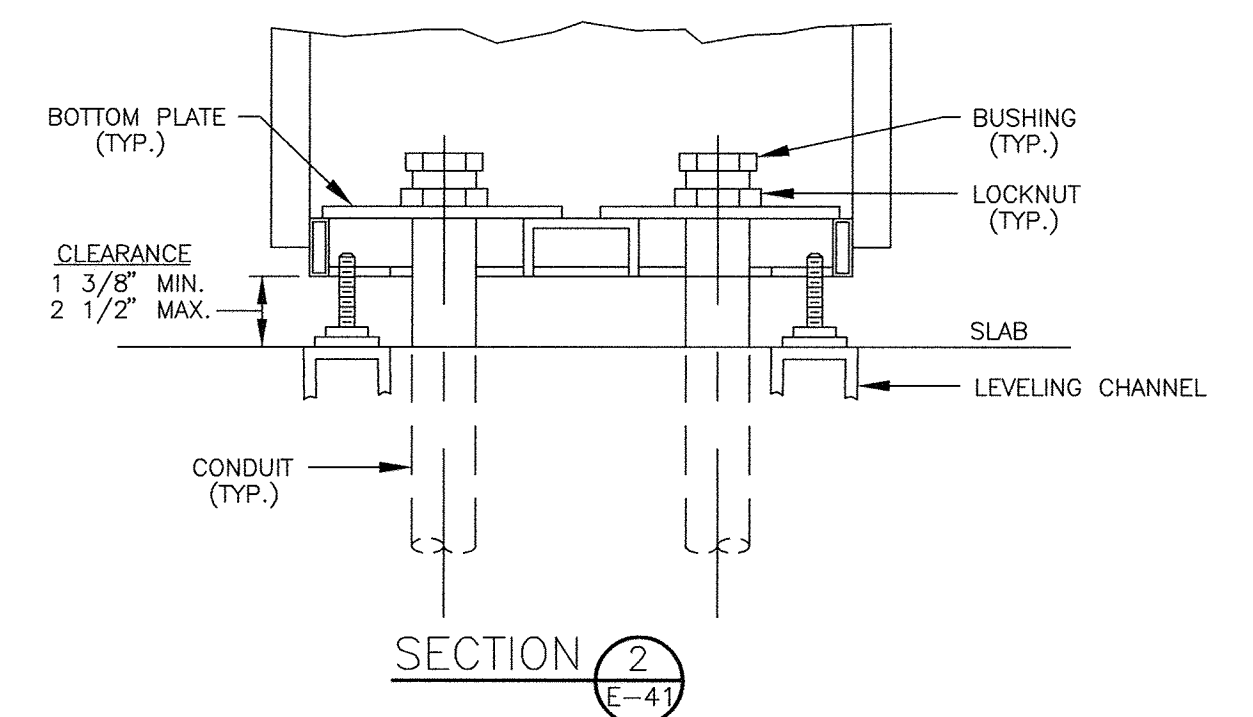
TYPICAL HORIZONTAL FEEDER DETAIL  
NO SCALE



M.C.C. CONDUIT ENTRANCE FROM BELOW  
NO SCALE



TOP VIEW OF BOTTOM



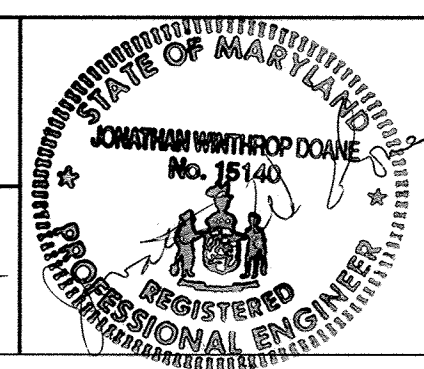
SECTION 2  
E-41

NOTE:  
1. TYPICAL FOR ALL PIU'S EXCEPT PIU-1 WHICH DOES NOT REQUIRE TIE-DOWN.  
2. NO WIRE ENTRY IS POSSIBLE IN THE BATTERY BACK-UP AREA. USE PLATES ONLY.

PIU TIEDOWN AND CONDUIT ENTRY DETAIL  
NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

M&E Metcalf & Eddy



DES: J.S.					
DRN: J.S.					
CHK: E.A./WAT					
DATE: 05-95	BY	NO.	REVISION	DATE	

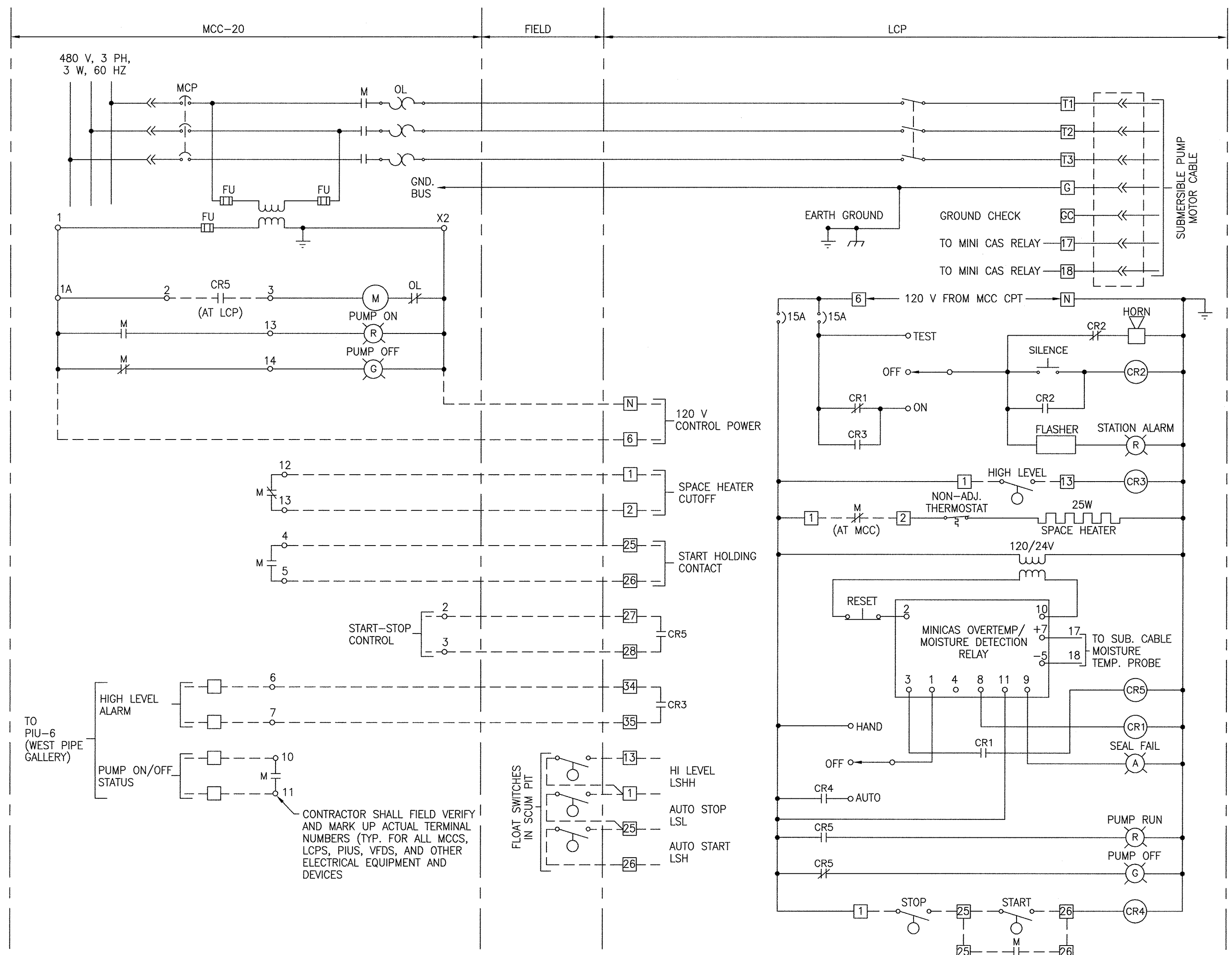
ELECTRICAL  
PART PLANS - EAST & WEST  
PIPE GALLERIES, HOLDING PIT,  
TYPICAL DETAILS

LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATION  
CAPITAL PROJECT S-6153

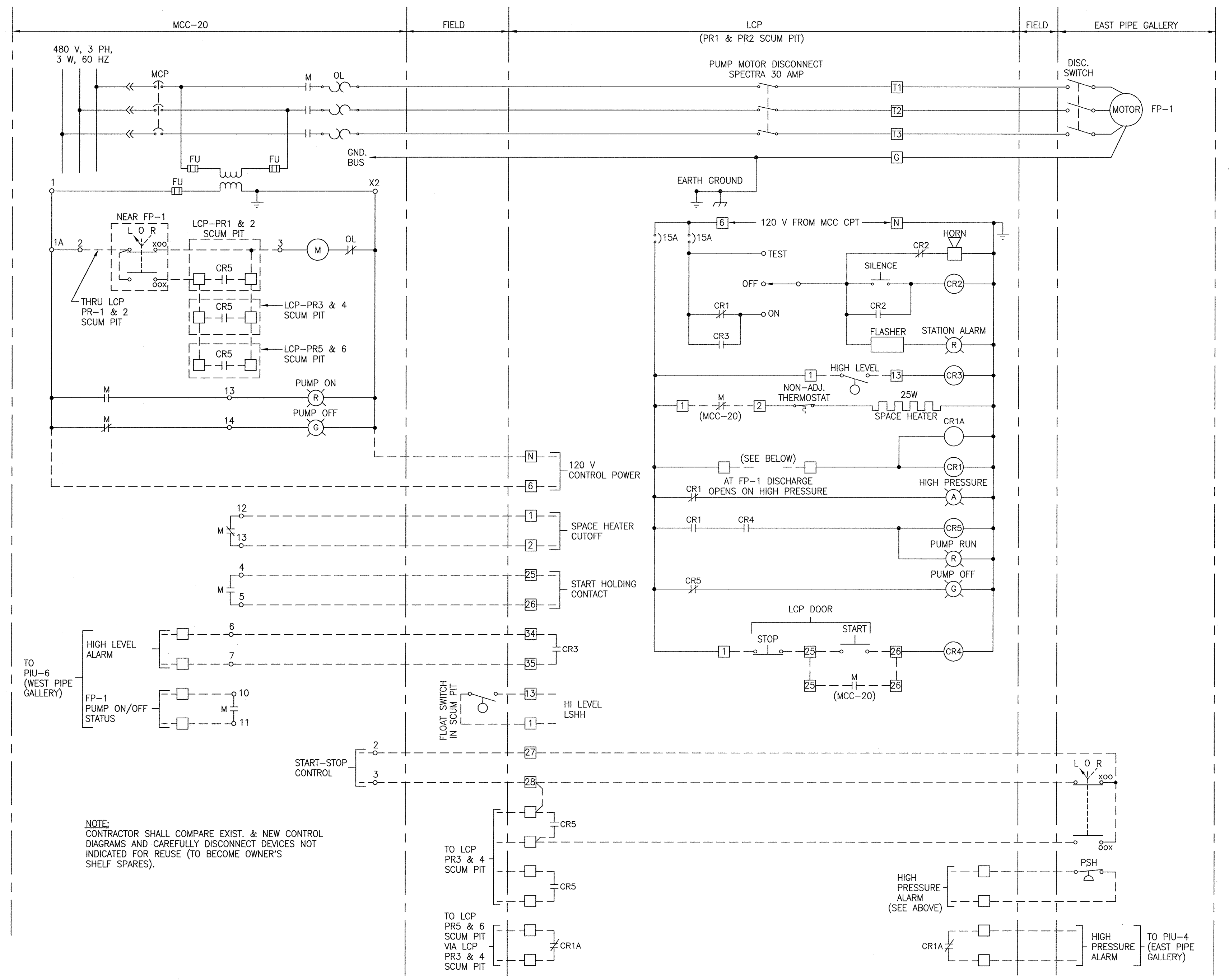
CONTRACT NO. 20-3082  
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN  
SHEET  
10 OF 12  
E-3

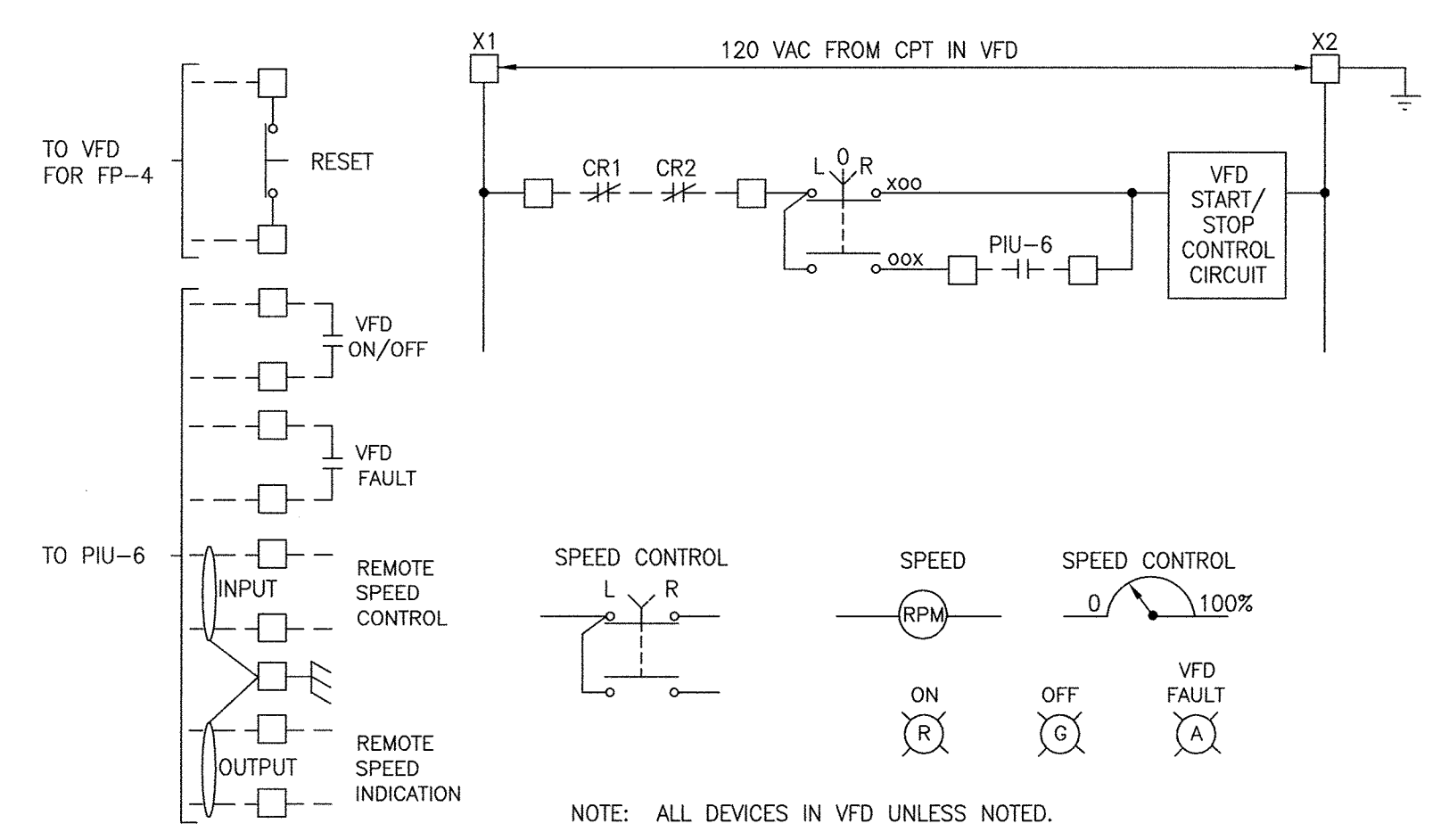




EXISTING SCUM PUMP CONTROL DIAGRAM  
(TYPICAL FOR SCP-1, SCP-2, SCP-3, SCP-4 & SCP-5)

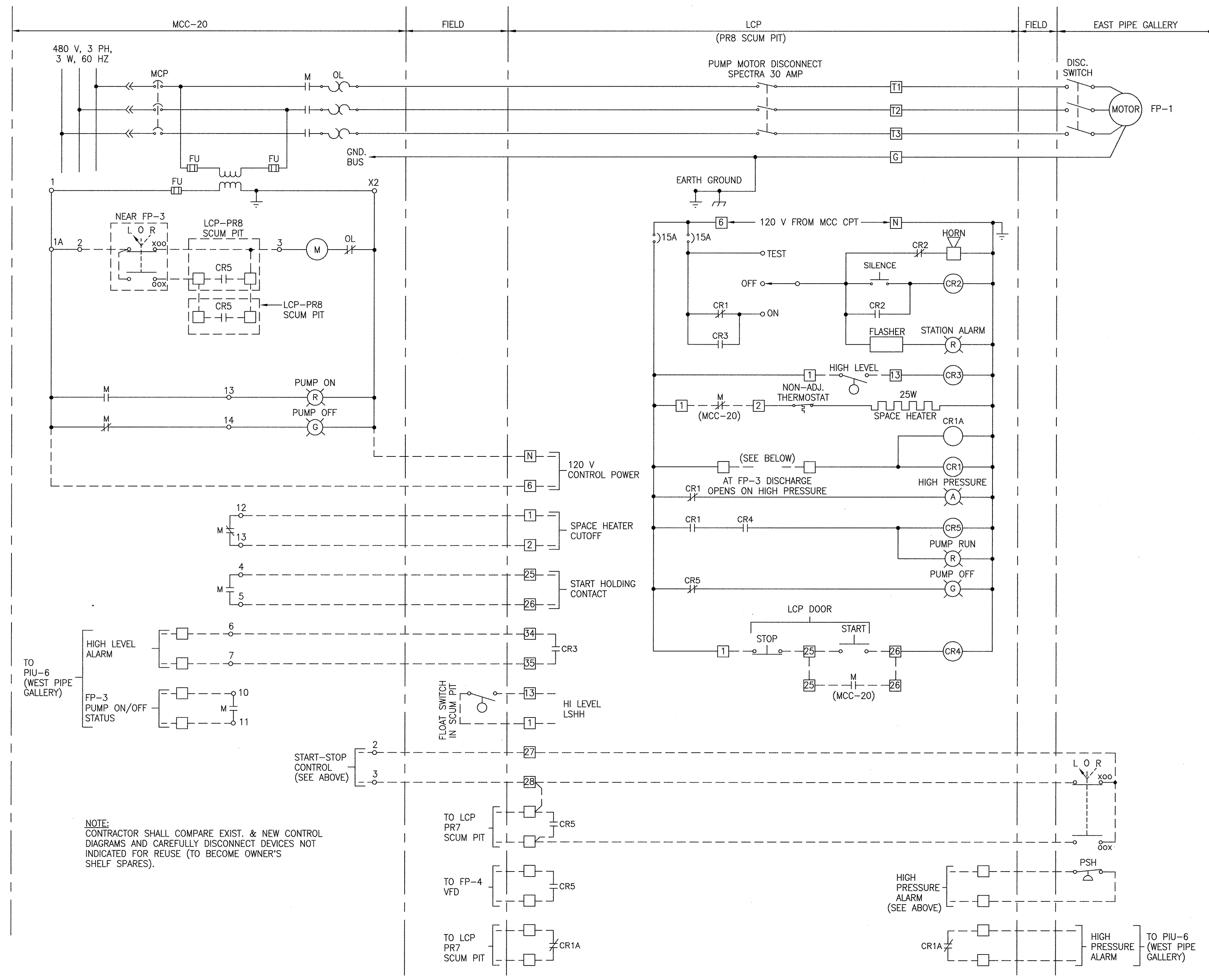


NEW FOAM PUMP FP-1 CONTROL DIAGRAM  
(TYPICAL FOR FOAM PUMP FP-2, EXCEPT USE FP-2 DESIGNATION INSTEAD OF FP-1, AND USE LCP IN PR3 & PR4 SCUM PIT INSTEAD OF PR1 & PR2)



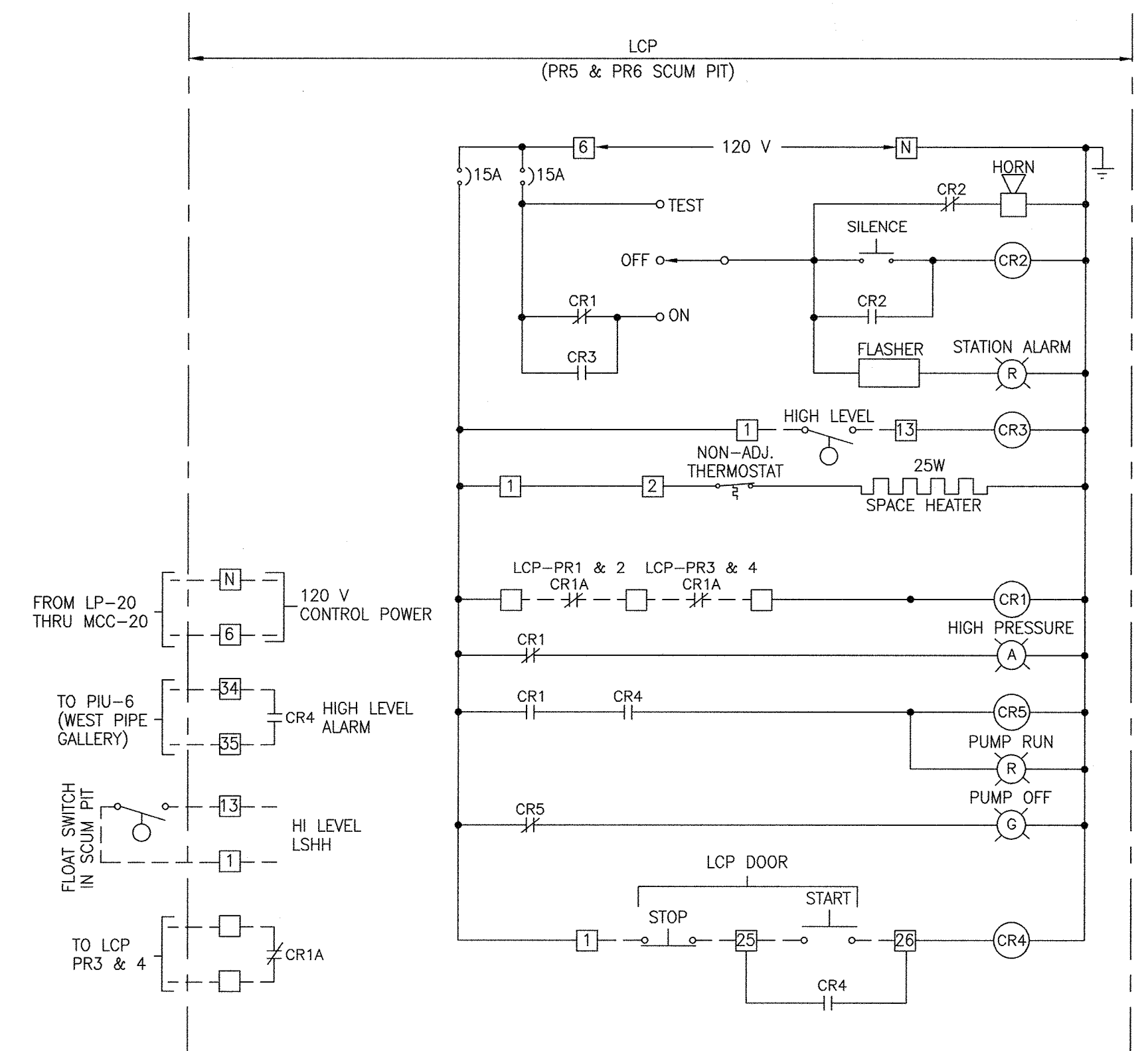
NEW FOAM PUMP FP-5 VFD CONTROL DIAGRAM

- NOTES:
- FOR GENERAL NOTES AND SYMBOLS SEE DWG. E-1.
  - REFER TO DWG. 1-2 FOR MORE DETAILS.
  - CONTRACTOR SHALL FURNISH NECESSARY HARDWARE/SOFTWARE MODIFICATIONS TO EXIST. PIUs AND CENTRAL COMPUTER CONSOLE TO ACCOMMODATE ADDITIONAL SIGNALS.

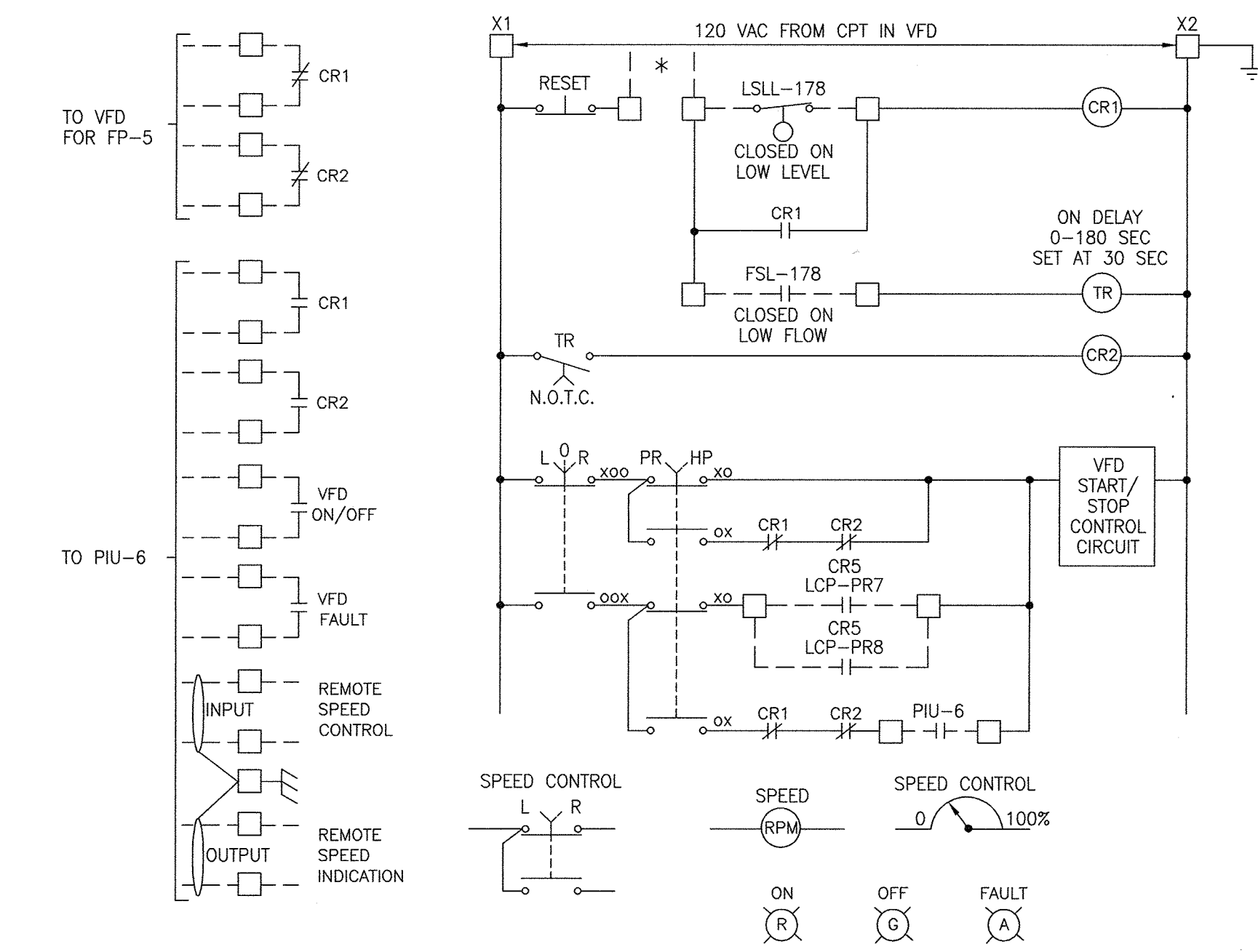


NEW FOAM PUMP FP-3 CONTROL DIAGRAM

NOTE:  
CONTRACTOR SHALL COMPARE EXIST. & NEW CONTROL DIAGRAMS AND CAREFULLY DISCONNECT DEVICES NOT INDICATED FOR REUSE (TO BECOME OWNER'S SHELF SPARES).



MODIFIED LCP-PR5 & PR6 CONTROL DIAGRAM  
(TYPICAL FOR MODIFIED LCP-PR7, EXCEPT CR5 N.O. CONTACT GOES TO LCP-PR8, INSTEAD OF LCP-PR3 & PR4, AND CR1A N.C. CONTACT COMES FROM LCP-PR8, INSTEAD OF LCP-PR1 & PR2 AND LCP-PR3 & PR4)



NEW FOAM PUMP FP-4 VFD CONTROL DIAGRAM

\* RESET BUTTON FROM VFD FOR FP-5  
NOTE: ALL DEVICES IN VFD UNLESS NOTED.

- NOTES:
- FOR GENERAL NOTES AND SYMBOLS SEE DWG. E-1.
  - CONTRACTOR SHALL COMPARE EXIST. & NEW CONTROL DIAGRAMS AND CAREFULLY DISCONNECT DEVICES NOT INDICATED FOR REUSE (TO BECOME OWNER'S SHELF SPARES).

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HOWARD COUNTY, MARYLAND

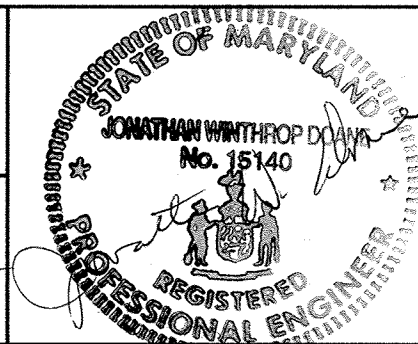
*Robert A. Benjamin* 10/6/95  
DIRECTOR OF PUBLIC WORKS

*John W. Jones* 9/27/95  
CHIEF, BUREAU OF ENGINEERING

*John W. Jones* 9-27-95  
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REG. PROF. ENGR.



DES: J.S.					
DRN: J.S.					
CHK: E.A./WAT					
DATE: 05-95	BY:	NO.:	REVISION:	DATE:	

ELECTRICAL  
SCHEMATIC DIAGRAMS  
MODIFIED LCP-PR5 & PR6  
AND NEW FOAM PUMPS FP-3  
& FP-4

LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATION  
CAPITAL PROJECT S-6153

CONTRACT NO. 20-3082  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 12 OF 12  
E-5