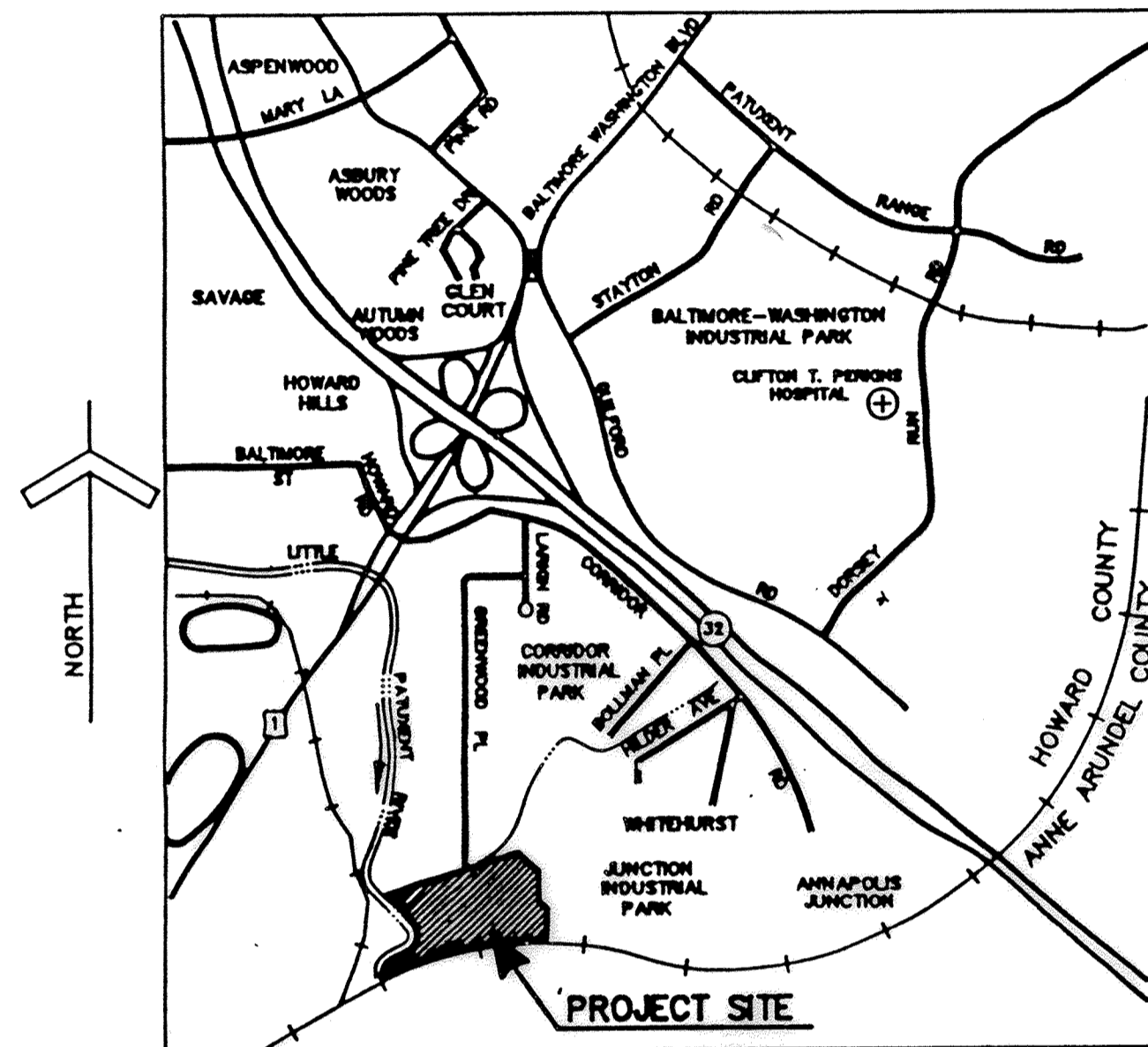


# HOWARD COUNTY, MARYLAND DEPARTMENT OF PUBLIC WORKS



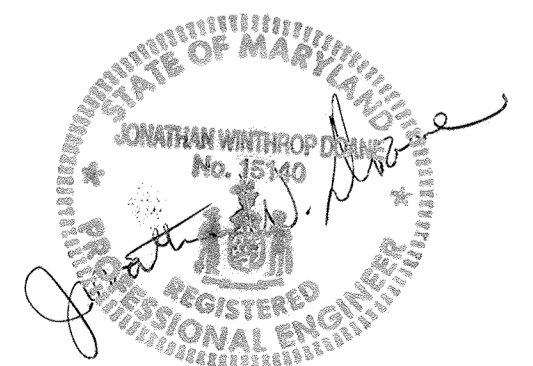
VICINITY MAP



## LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATIONS

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

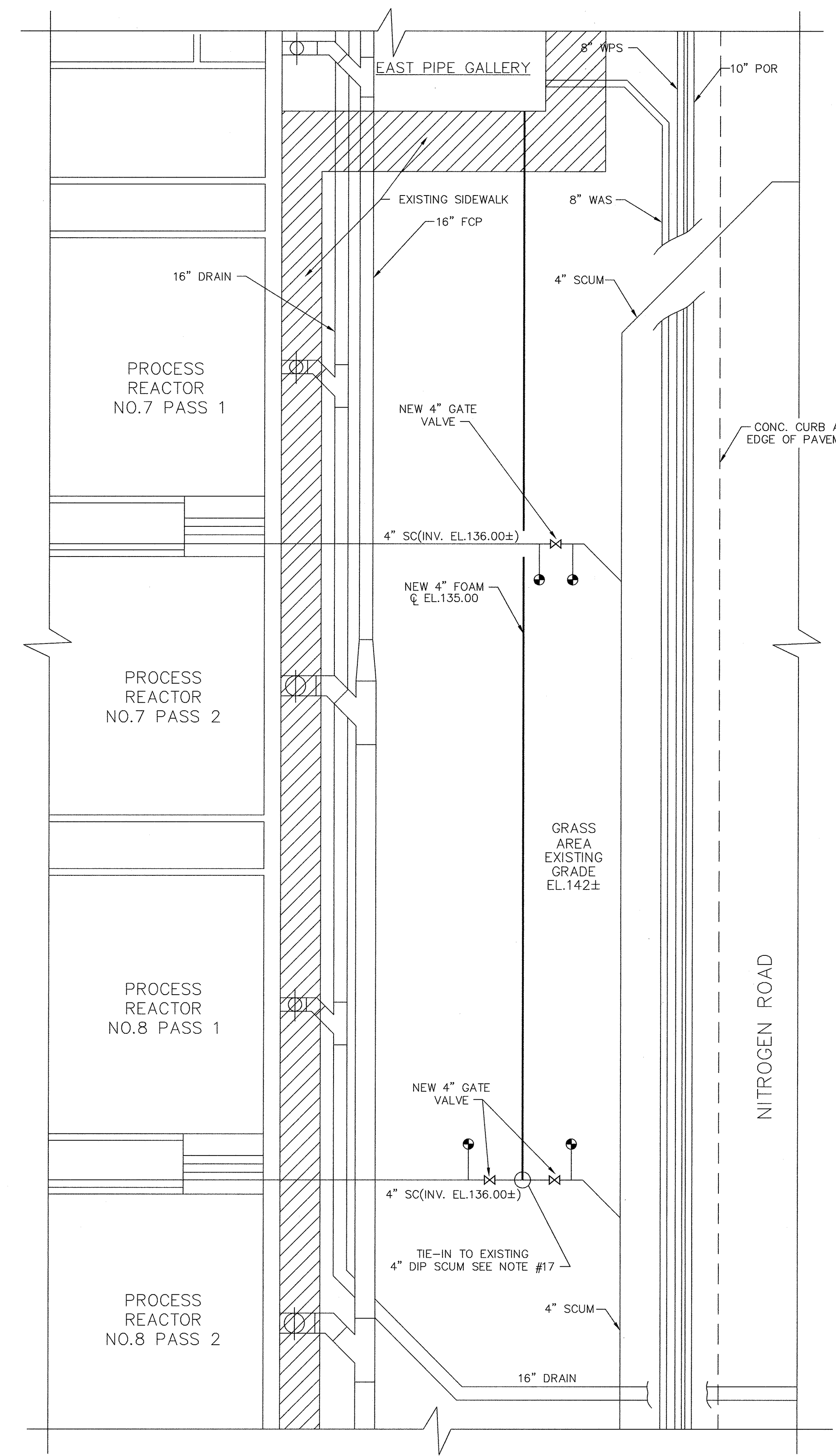
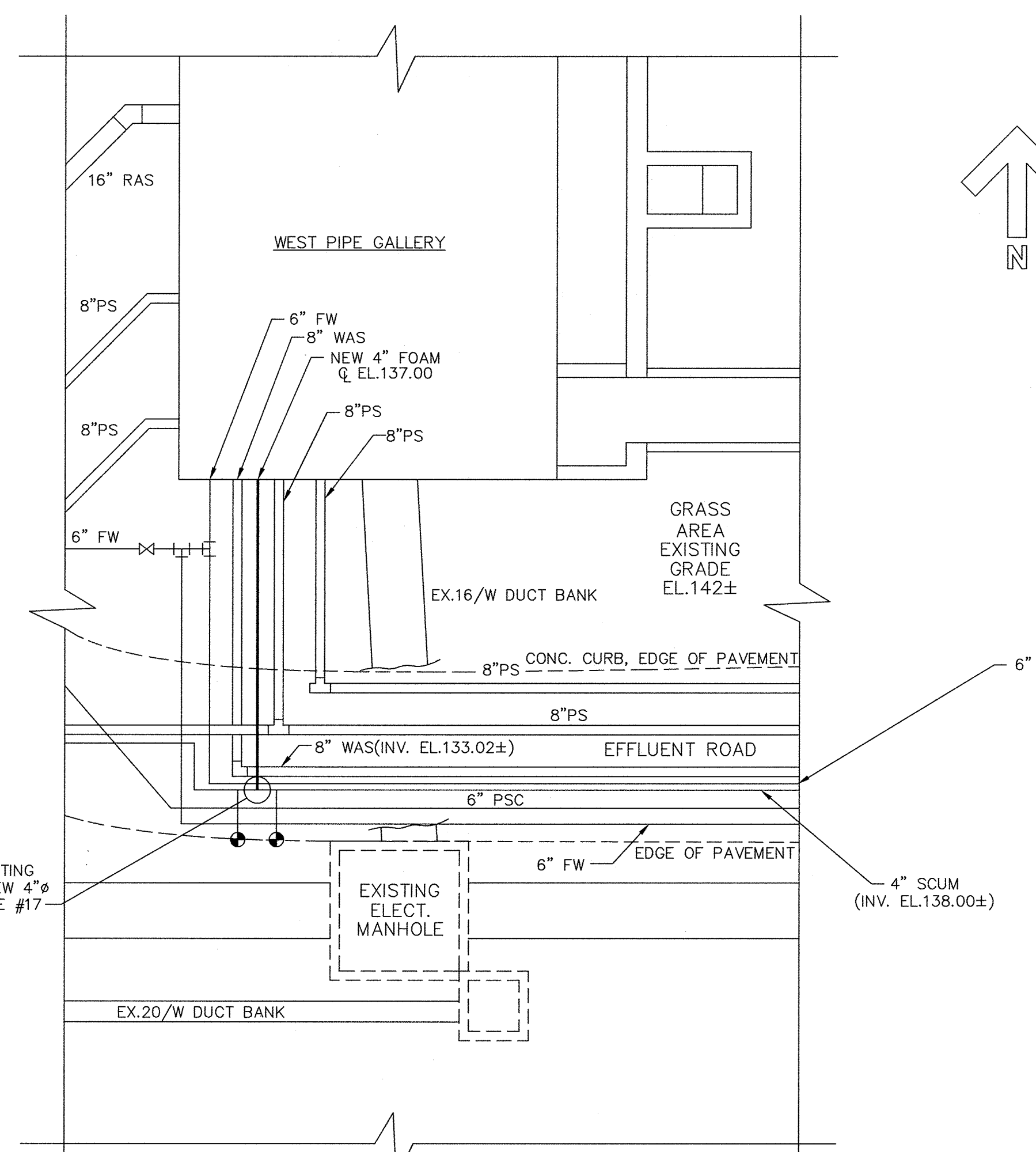
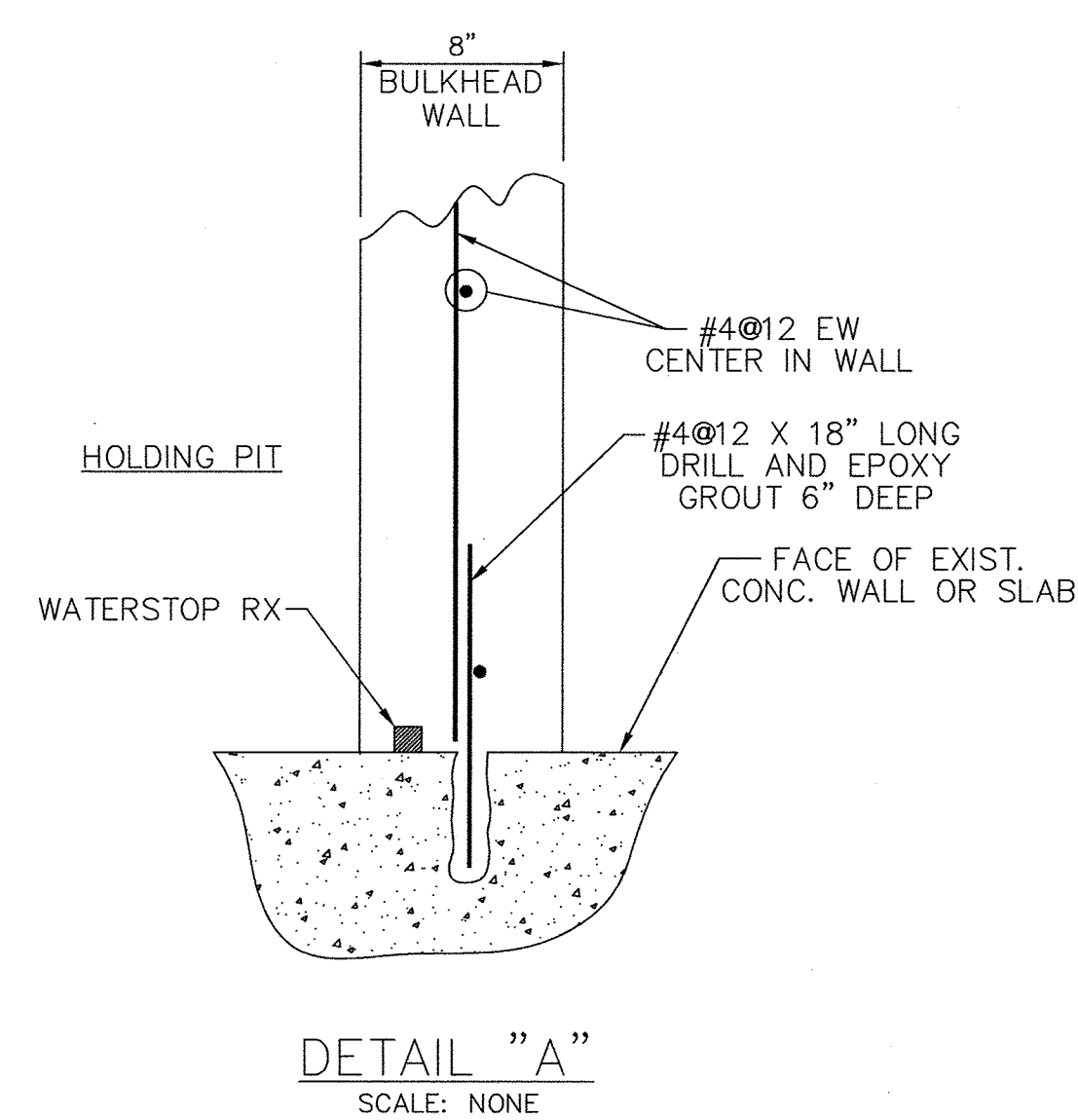
*Sam P. Lee* 10/6/95  
 DIRECTOR OF PUBLIC WORKS DATE  
*John H. Spang* 9/27/95  
 CHIEF, BUREAU OF ENGINEERING DATE  
*Robert B. ...* 9-27-95  
 CHIEF, WATER AND SEWER DESIGN DIV. DATE  
*Robert B. ...* 10-5-95  
 CHIEF, BUREAU OF UTILITIES DATE



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

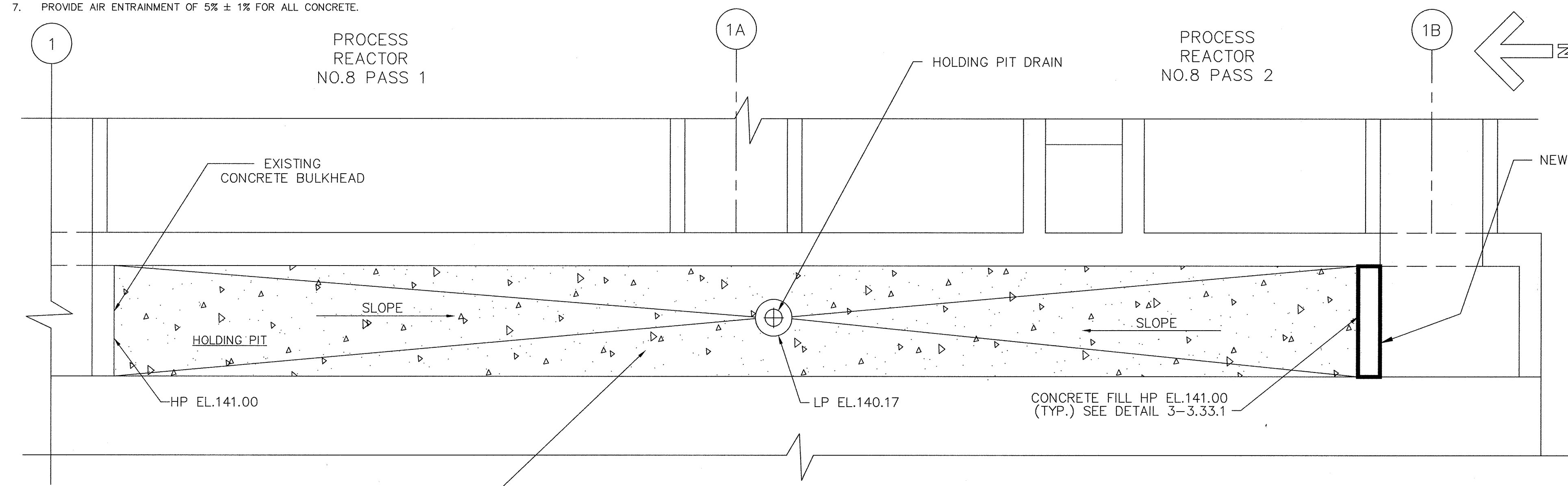
**GENERAL NOTES**

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.



**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.



**ABBREVIATIONS LEGEND**

|     |                         |
|-----|-------------------------|
| 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 P. Slavin* 10/6/95  
DIRECTOR OF PUBLIC WORKS

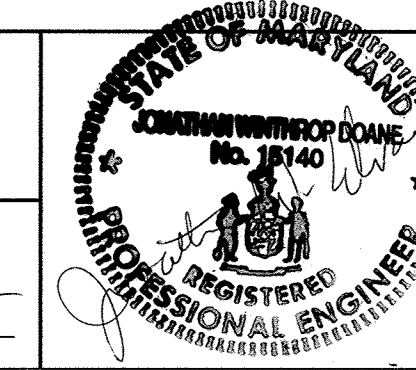
*Robert M. Swain* 10-5-95  
CHIEF, BUREAU OF UTILITIES

*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<br>PROPOSED PIPE AND EQUIPMENT           |        |        |
|              | EXISTING PIPE TO BE REMOVED   |        |        |
|              | INSULATION PIPE: 2"DIA. & SMALLER<br>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                  |        |       |
|                      | EXCENTRIC REDUCER                   |        |       |

**GENERAL NOTES**

1. 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.
2. UNLESS OTHERWISE INDICATED, LIQUID PIPING SHALL HAVE 3/4" LOW POINT DRAINS AND 3/4" HIGH POINT VENTS.
3. IN-LINE INSTRUMENTATION SHALL BE PROVIDED WITH ISOLATED PRESSURE TAPS.
4. THE CONTRACTOR SHALL MAKE ALL REQUIRED FIELD MEASUREMENTS TO VERIFY EXISTING AND CONTRACT INTERFACE DIMENSIONS, LOCATIONS, ELEVATIONS, AND OTHER CONDITIONS.
5. 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.
6. SMALL PIPING (SAMPLE, SERVICE WATER, ETC.) IS SHOWN DIAGRAMMATICALLY: FIELD-ROUTING SUBJECT TO APPROVAL OF THE ENGINEER.
7. 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.
8. SLEEVE OR SPLIT COUPLINGS ARE TO BE USED AS SHOWN.
9. ALL FLEXIBLE CONNECTORS, INCLUDING EXPANSION JOINTS AND SLEEVE COUPLINGS SHALL BE RESTRAINED AS INDICATED ON STANDARD DETAIL 15-4.17.1.
10. ALL PIPE PENETRATIONS THROUGH INTERIOR AND EXTERIOR WALLS AND FLOORS SHALL BE SEALED WATERTIGHT, PER STANDARD DETAIL 15-4.2.6.
11. 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.
12. ALL EXISTING PIPING TO BE MODIFIED IS DUCTILE IRON. ALL NEW PIPING IS TO BE CLASS 53 DUCTILE IRON PER SPECIFICATION SECTION 02615.
13. 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.
14. 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

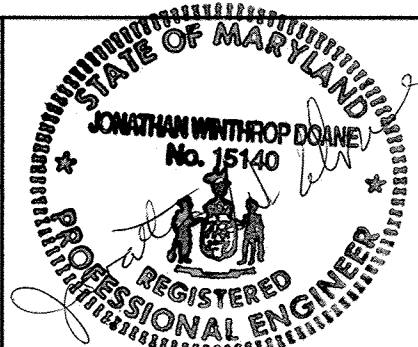
*Robert M. Seay*  
CHIEF, BUREAU OF UTILITIES DATE

*Paul J. Eppm* 9/27/95  
CHIEF, BUREAU OF ENGINEERING DATE

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

**M&E** Metcalf & Eddy

*Jonathan W. Dowe* 8/27/95  
REGISTERED PROFESSIONAL ENGINEER DATE



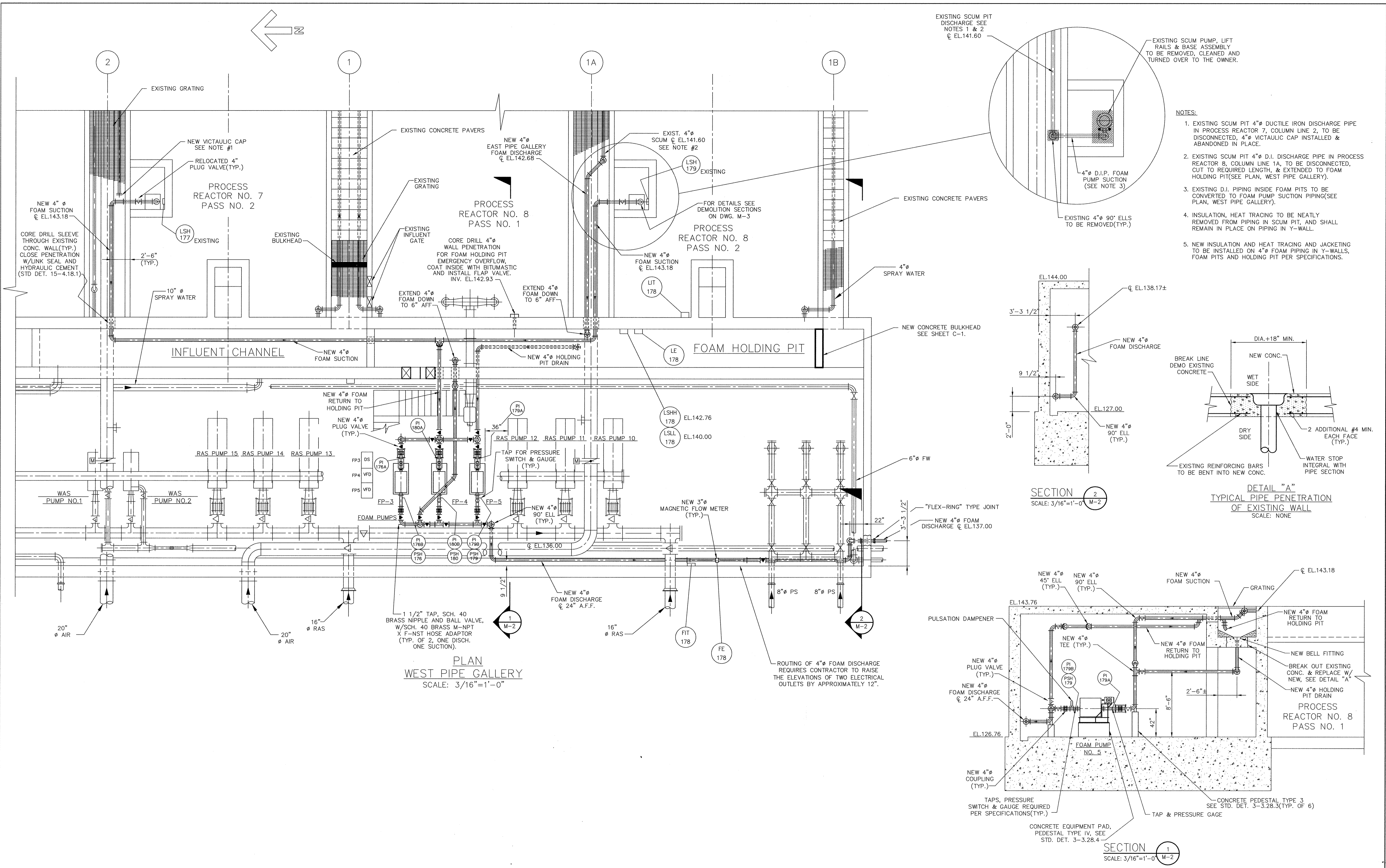
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|------|---------|----------|------|--|--|
| DES  | C.dB.   |          |      |  |  |
| DRN  | M.J.C.  |          |      |  |  |
| CHK  | J.E.H.  |          |      |  |  |
| DATE | 5/23/95 |          |      |  |  |
| BY   | NO.     | REVISION | DATE |  |  |

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 8, 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.

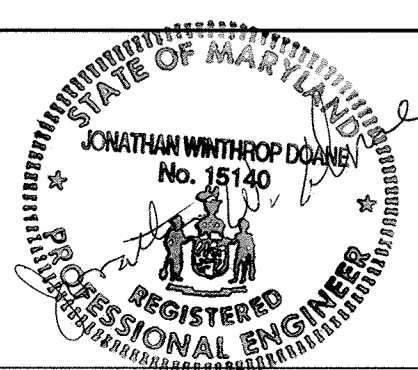
**DEPARTMENT OF PUBLIC WORKS**  
HOWARD COUNTY, MARYLAND

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

*Robert A. Beninger* 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**

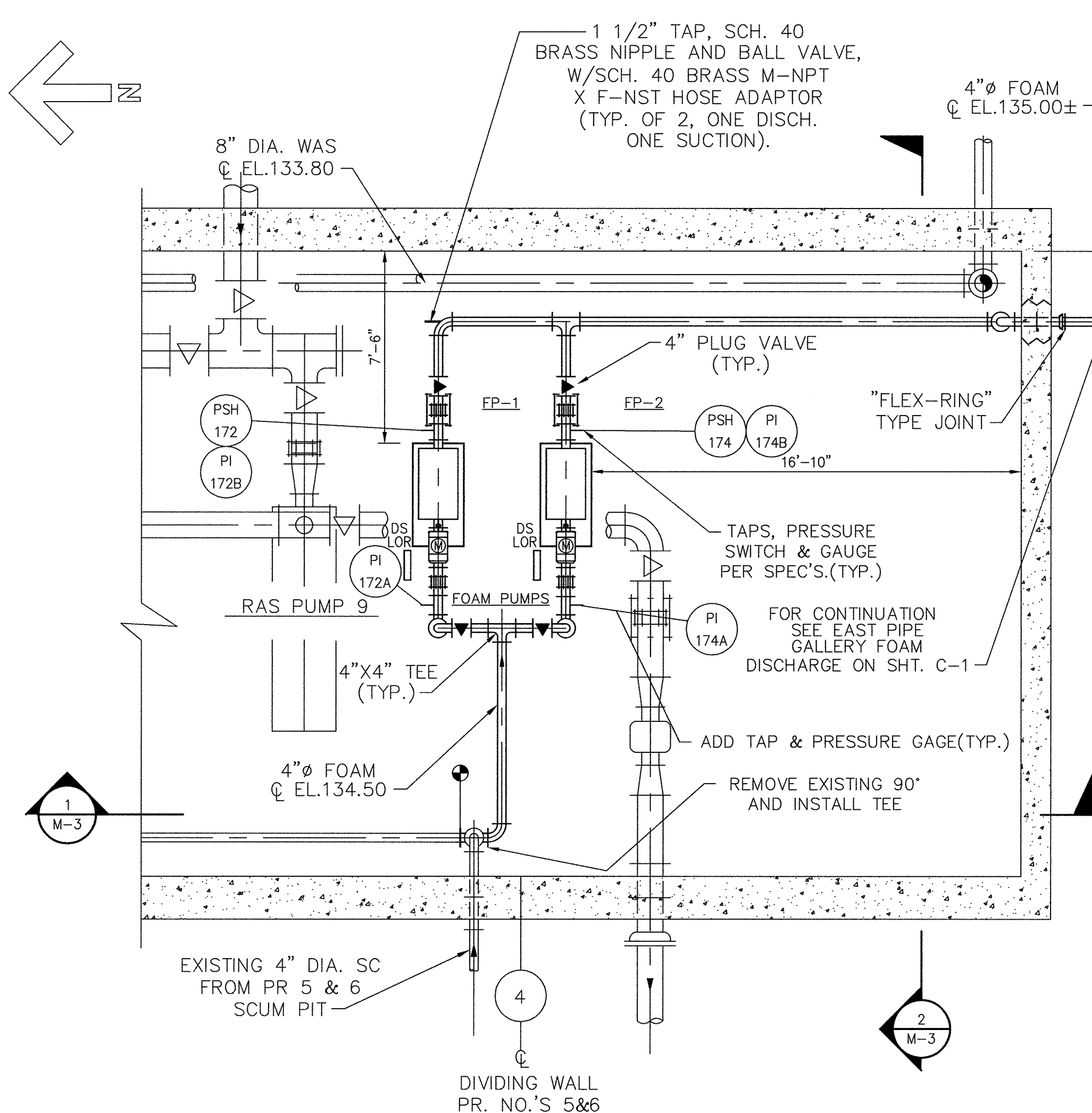
**LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATIONS**  
CAPITAL PROJECT S-6153

CONTRACT NO. 20-3405  
HOWARD COUNTY, MARYLAND

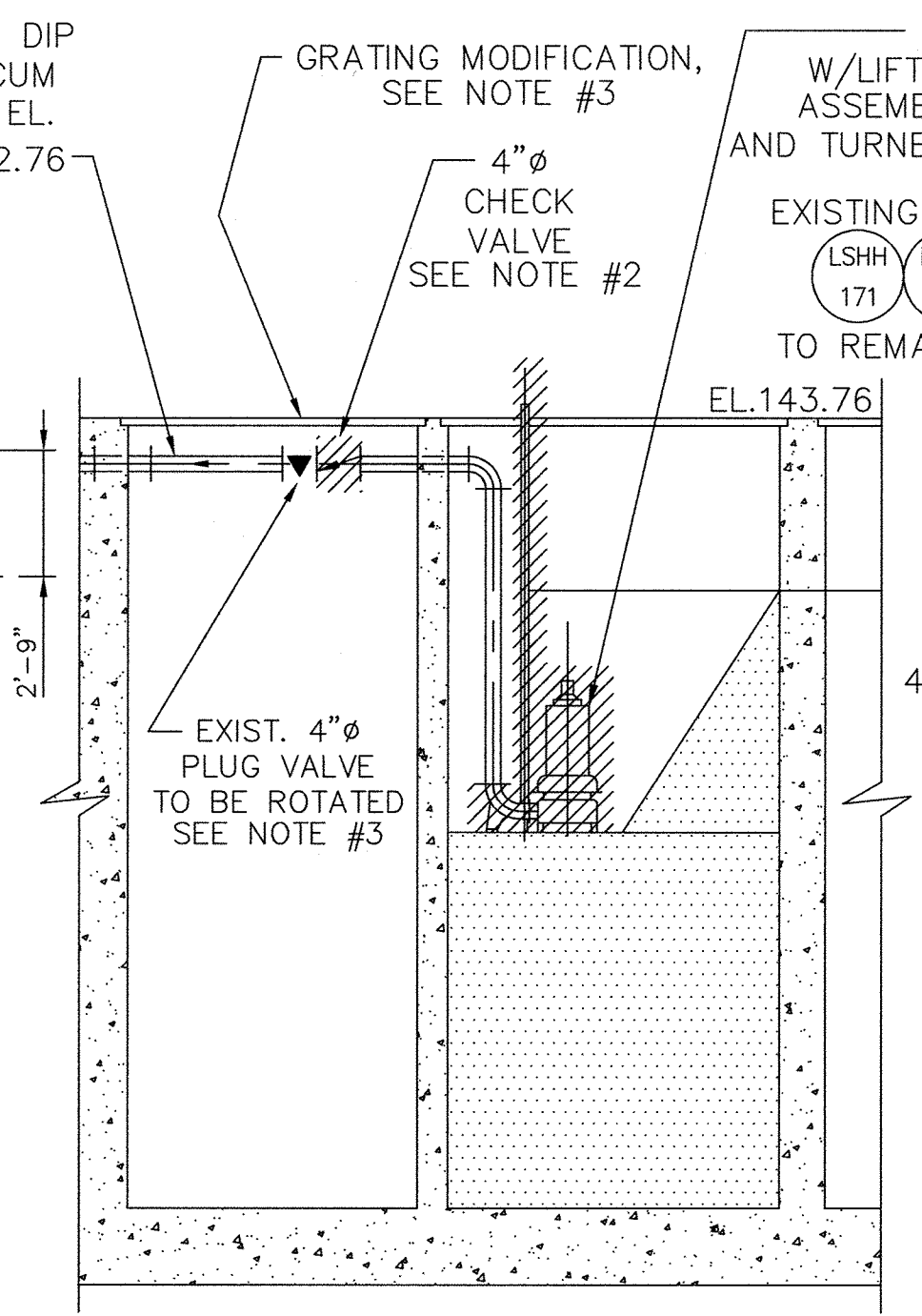
SCALE AS SHOWN

SHEET 4 OF 12

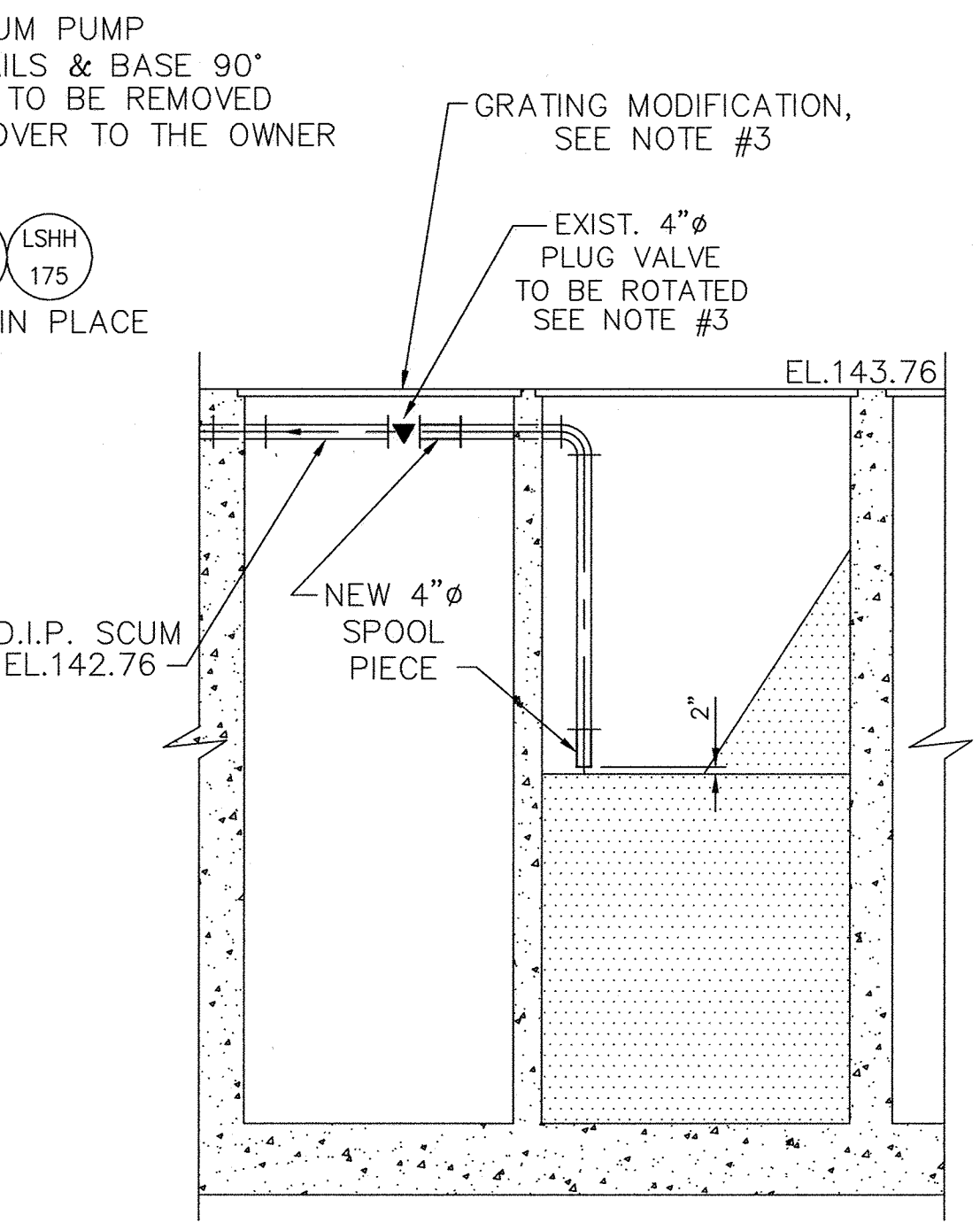
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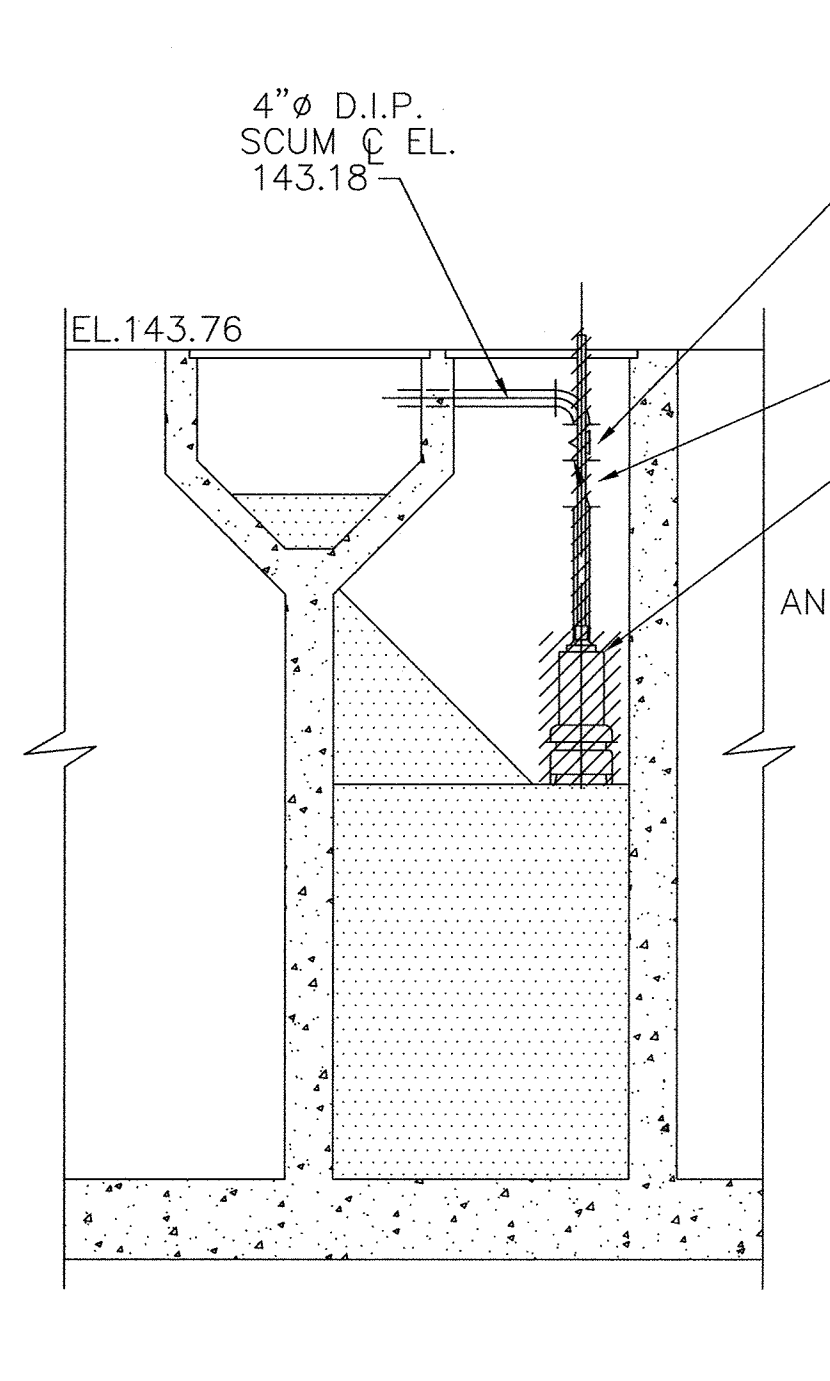
EAST PIPE GALLERY PLAN  
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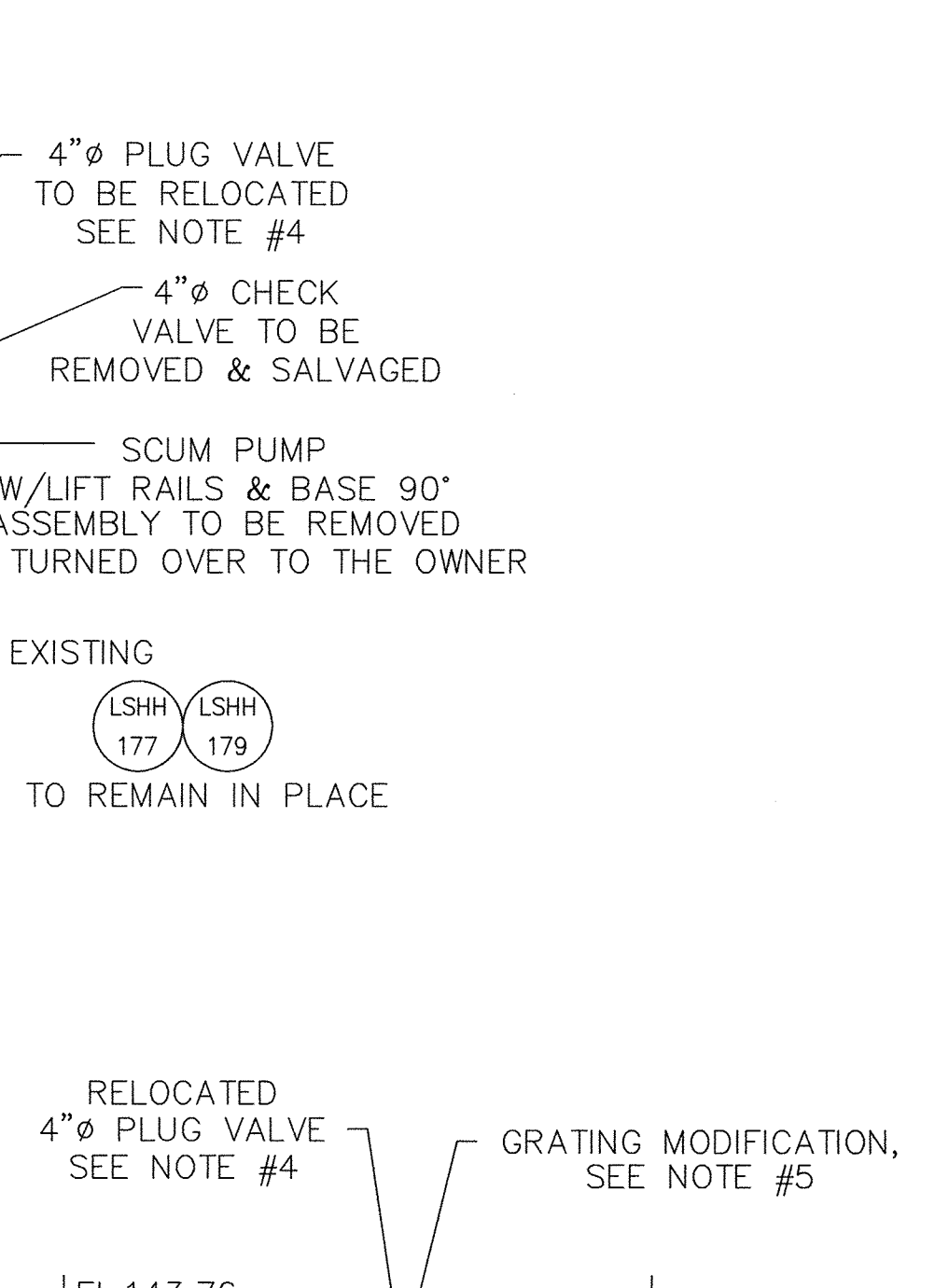
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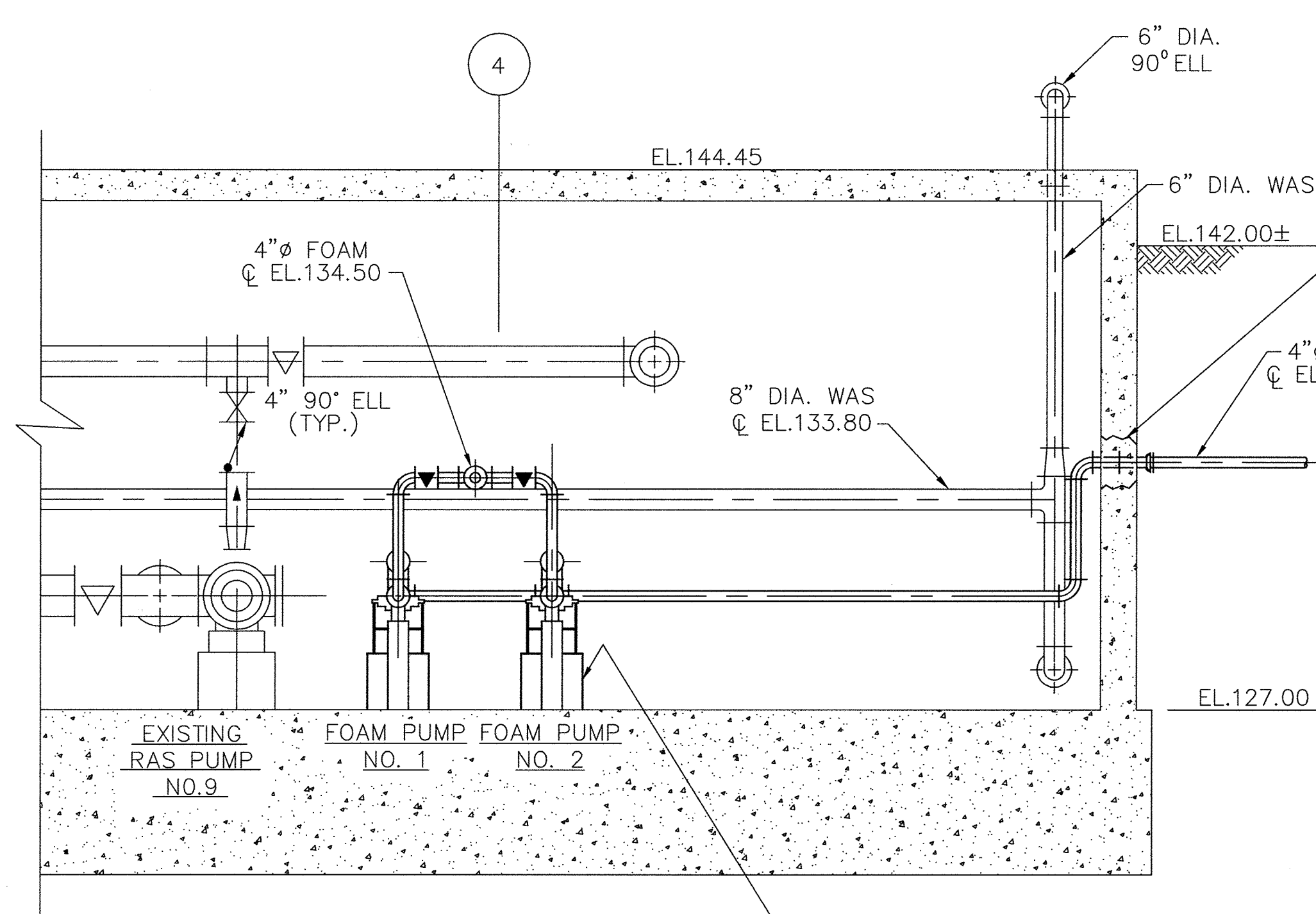
EXISTING EAST SIDE SCUM PIT MODIFICATIONS SECTION TYPICAL OF THREE  
SCALE: 1/4"=1'-0"



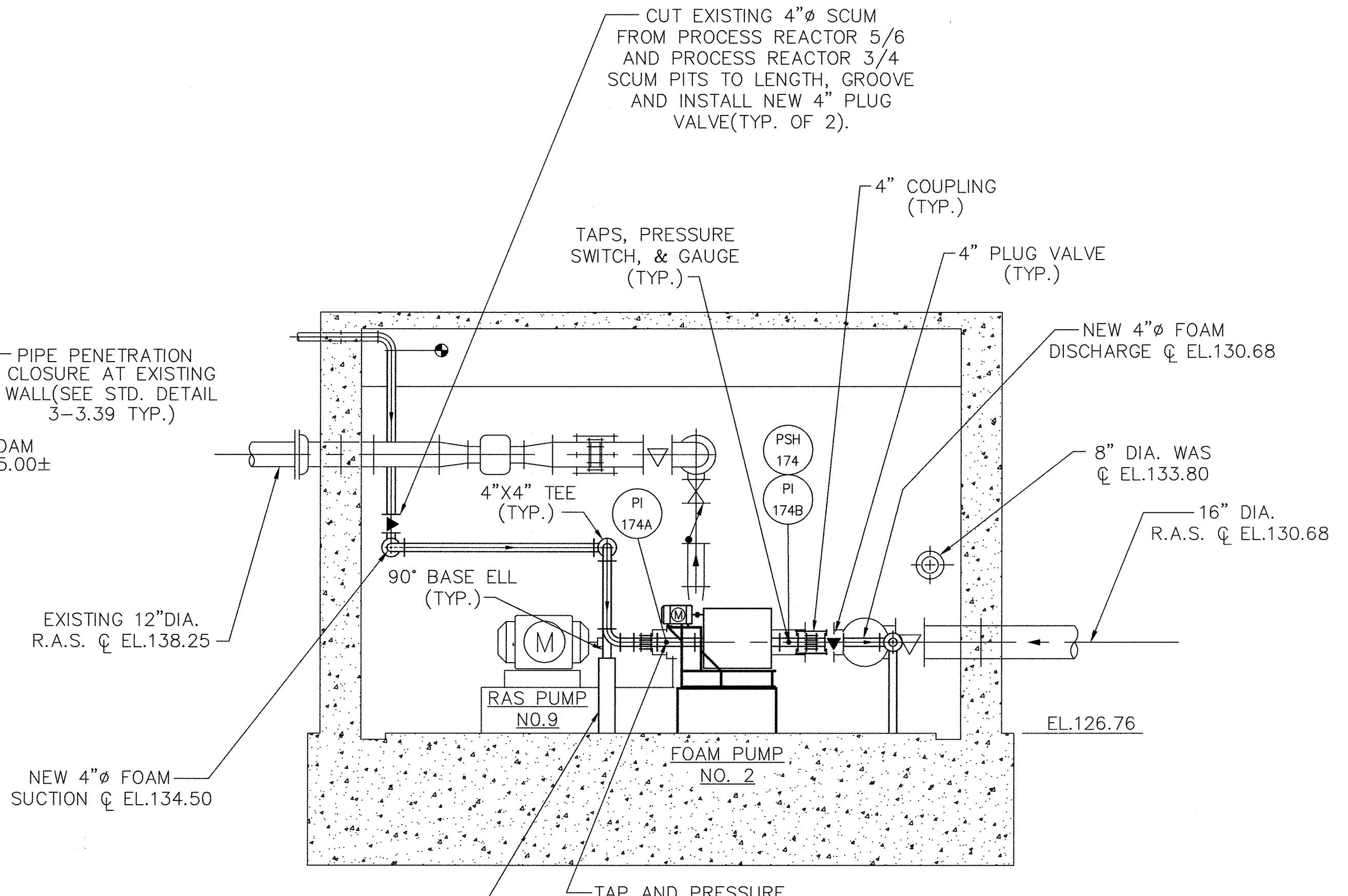
EXISTING WEST SIDE SCUM PIT MODIFICATIONS TYPICAL OF TWO DEMOLITION SECTION  
SCALE: 1/4"=1'-0"



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

M&E Metcalf & Eddy

*Jonathan W. Egan* 8/17/95  
REGISTERED PROFESSIONAL ENGINEER

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   |

### 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     |

### 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 |  |                            |

### 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   |
|  | STATUS INDICATION   |  | INTERLOCK LOGIC  |

FUNCTIONAL IDENTIFICATION (SEE LEGEND TABLE) → HS 24 (CP) (F) → ON/OFF ← MODIFIER  
 LOOP IDENTIFICATION NUMBER → 24 (CP) (F) ← INSTRUMENT LOCATION  
 INSTRUMENT SUPPLIER ← (F)

24 → SPECIFIC LOOP NUMBER  
 21 → DUPLICATE LOOP IDENTIFICATION SYMBOL  
 21 → REFERENCE LOOP NUMBER

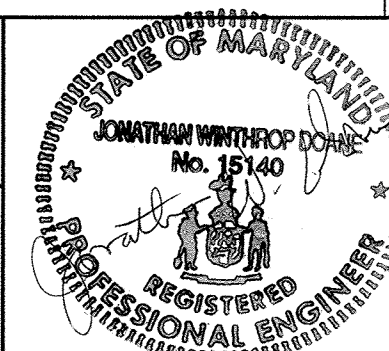
### COMPUTER INPUT/OUTPUT SYMBOLS

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

↑ ISA FIRST LETTER  
 F 24 A  
 ↓ LOOP IDENTIFICATION NUMBER

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

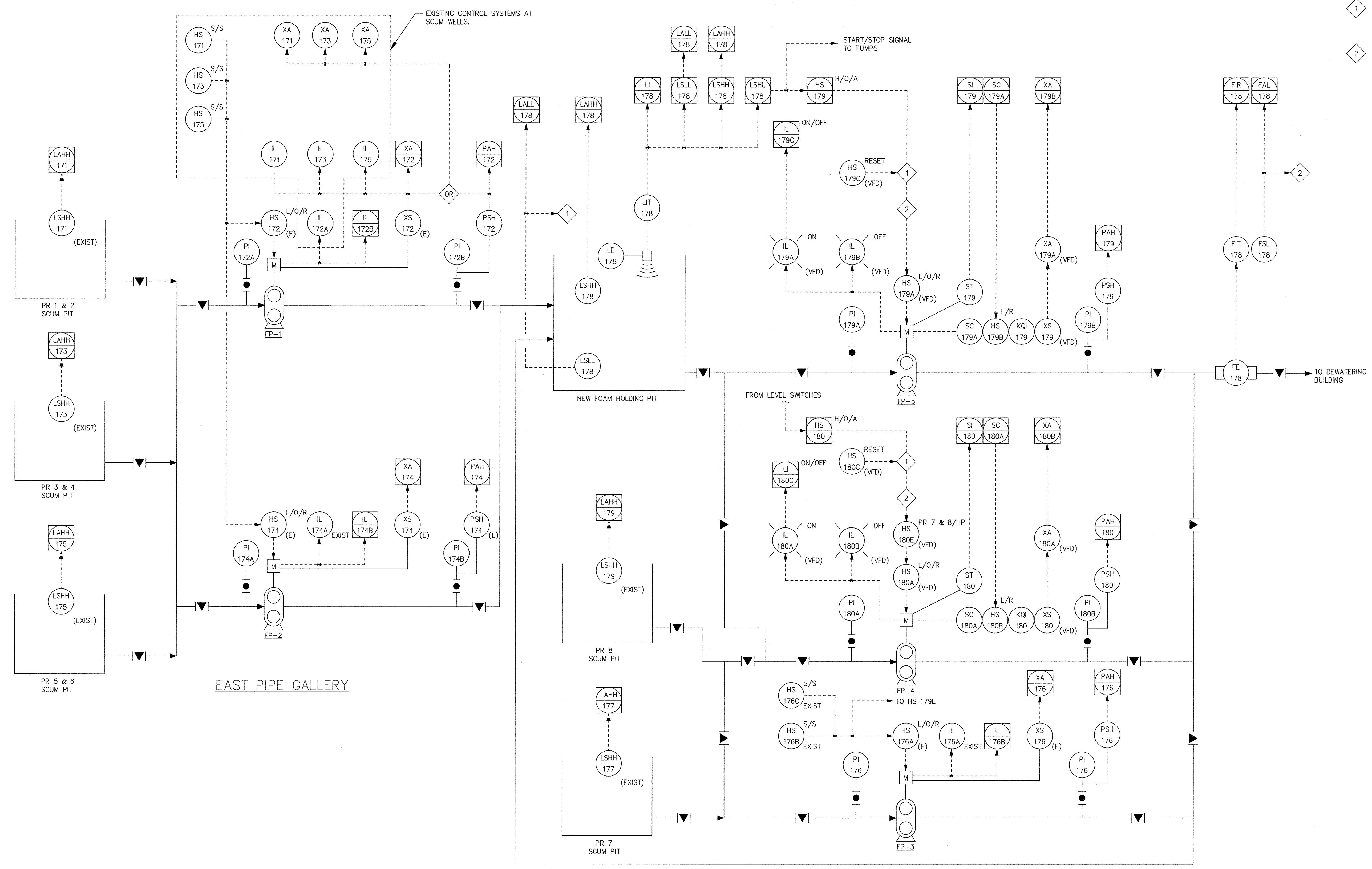
LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATIONS  
 CAPITAL PROJECT S-6153

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

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND

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

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

**M&E** Metcalf & Eddy

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



|               |     |     |          |      |
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| CHK: F.B.     |     |     |          |      |
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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

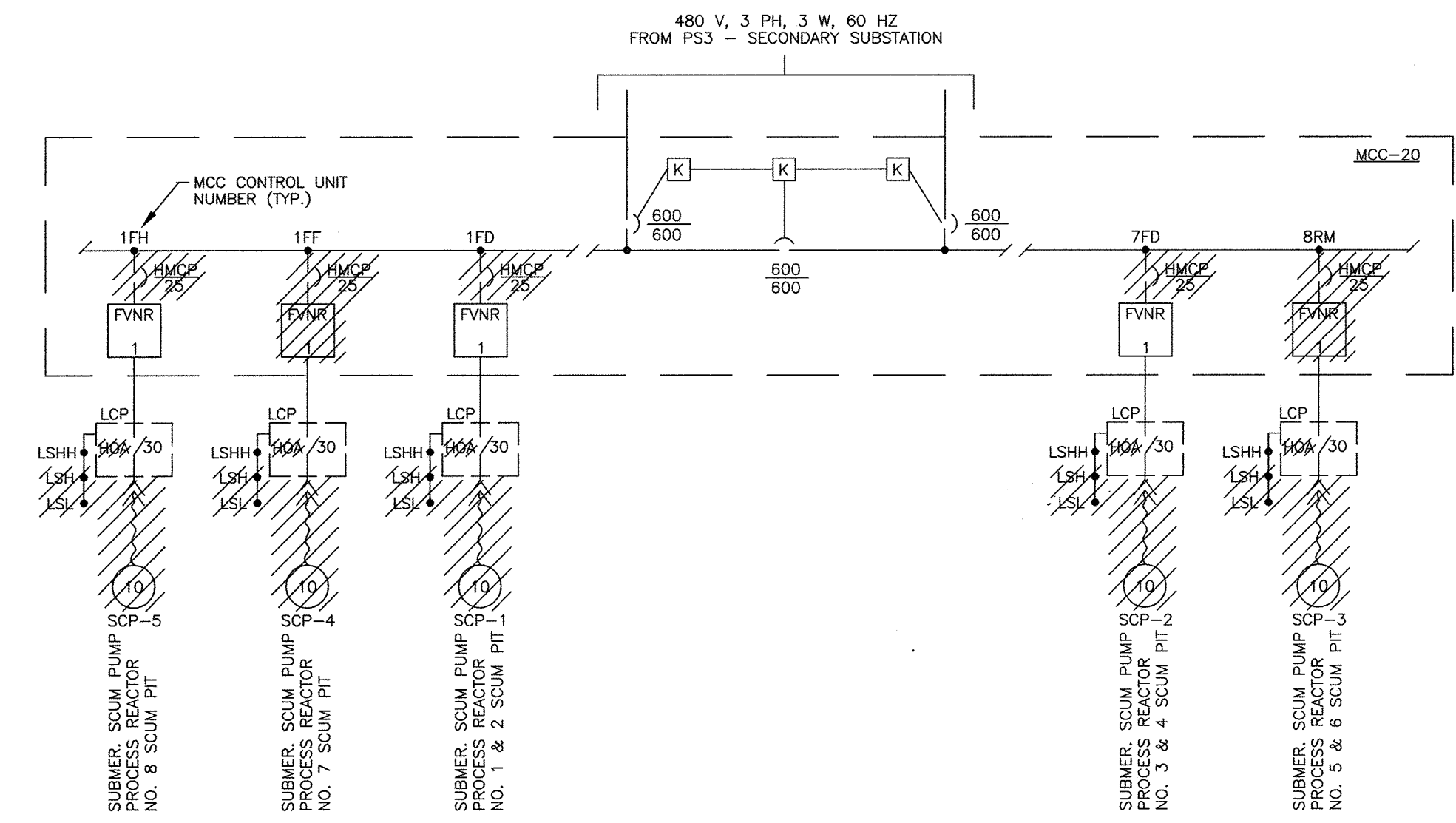
- SPECIAL PURPOSE RECEPTACLE, TYPE AND AMPERE RATING AS INDICATED ON PLAN
- MAGNETIC MOTOR STARTER
- MAGNETIC MOTOR STARTER AND DISCONNECT SWITCH
- DISCONNECT SWITCH
- PANELBOARD
- POWER DISTRIBUTION PANEL
- MOTOR - FOR HORSEPOWER RATING, SEE PANELBOARD SCHEDULE OR SINGLE LINE DIAGRAM
- JUNCTION BOX
- GROUND ROD - TYPE AND SIZE AS INDICATED ON PLAN
- CONTROL STATION
- EXPLOSIONPROOF SEALING FITTING
- 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
- 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
- SV SOLENOID VALVE
- CWS CONDUIT WALL ENTRANCE SEAL
- P.B. PULL BOX
- CTB = CONTROL WIRING TERMINAL BOX
- STB = SIGNAL WIRING TERMINAL BOX

FOR SINGLE LINE DIAGRAMS

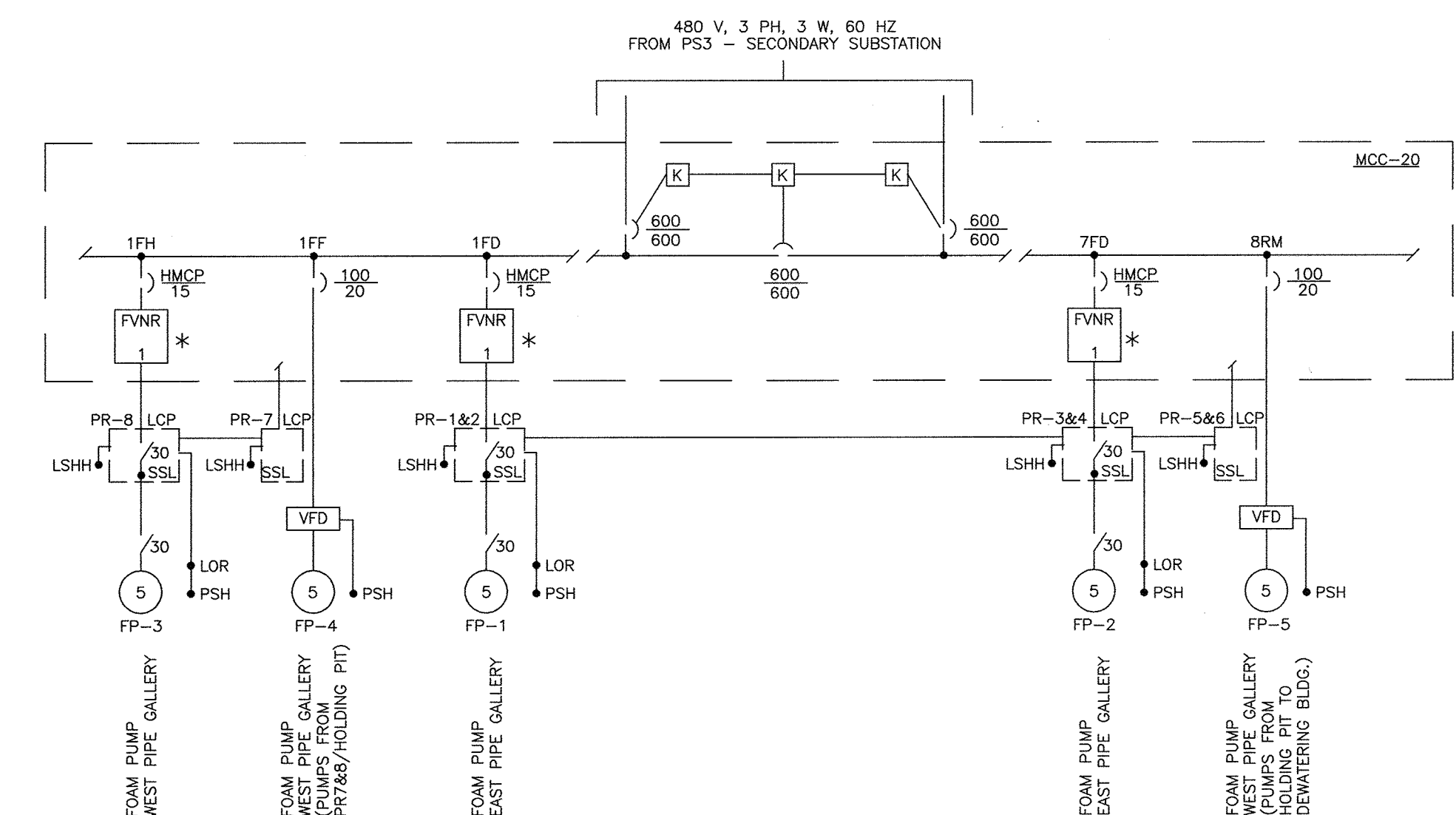
- MOLDED CASE CIRCUIT BREAKER, THERMAL MAGNETIC TRIP, WITH CURRENT LIMITING FUSES, 3-POLE UNLESS OTHERWISE NOTED. UPPER NUMERAL INDICATES FRAME SIZE, LOWER NUMERAL INDICATES TRIP SETTING.
- MOLDED CASE CIRCUIT BREAKER, THERMAL MAGNETIC TRIP, 3-POLE UNLESS OTHERWISE NOTED, UPPER NUMERAL INDICATES FRAME SIZE, LOWER NUMERAL INDICATES TRIP SETTING.
- MOTOR CIRCUIT PROTECTOR, NUMERAL INDICATES CONTINUOUS CURRENT RATING. MCP = WITH CURRENT LIMITING FUSES. HMCP = HIGH INTERRUPTING CAPACITY MCP.
- UNFUSED DISCONNECT SWITCH. NUMERAL DENOTES AMPERE RATING.
- 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
  - RTS = REDUCED VOLTAGE TWO SPEED
  - 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 BRM:
  - 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



PART ONE LINE DIAGRAM - MCC-20 MODIFICATIONS

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

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.

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

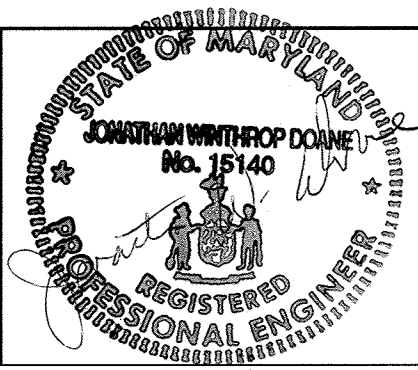
MCC-20 PARTIAL FRONT ELEVATION  
SCALE: NONE

|            |            |           |             |
|------------|------------|-----------|-------------|
| 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

M&E Metcalf & Eddy



|      |          |          |      |  |  |
|------|----------|----------|------|--|--|
| 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

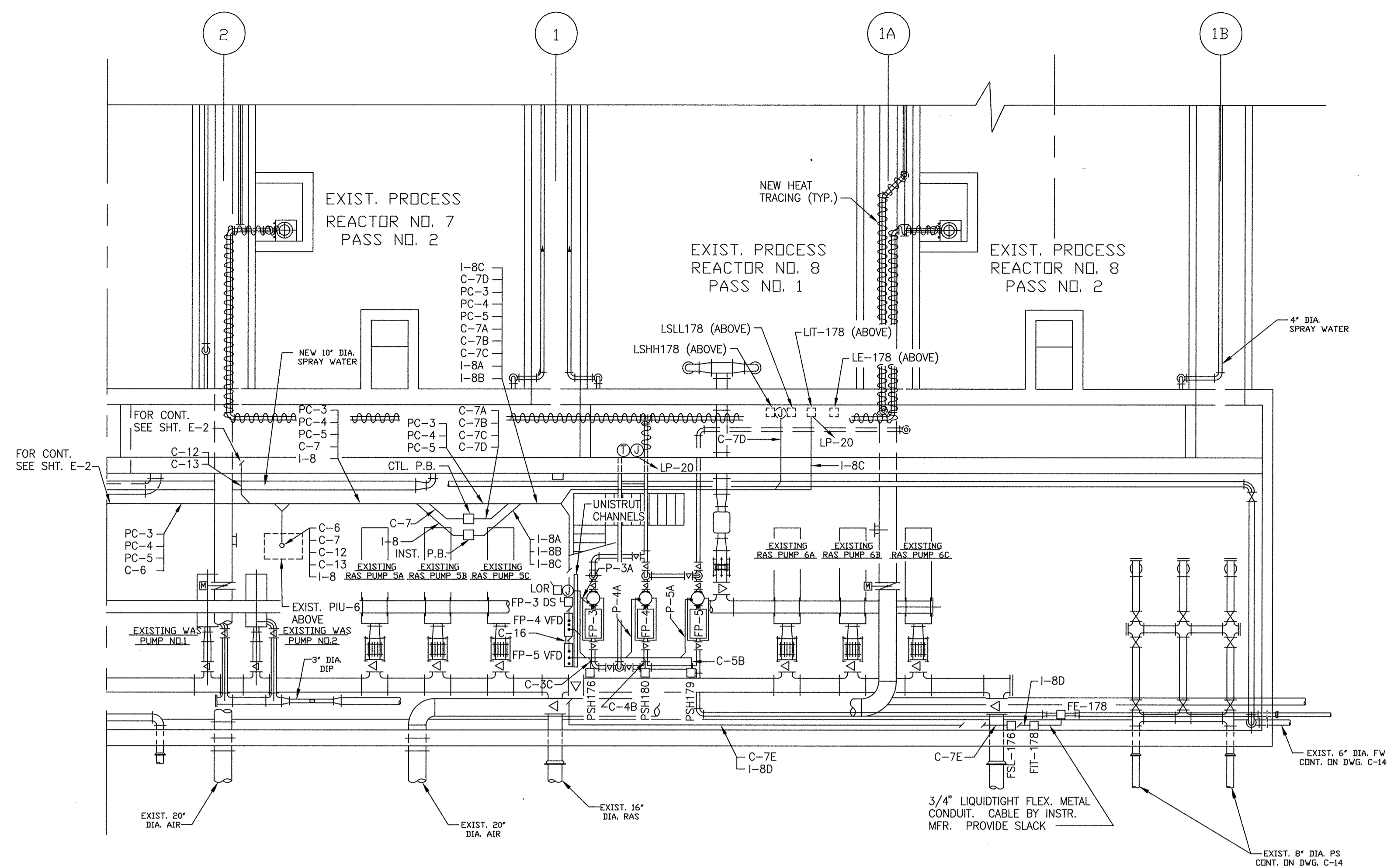
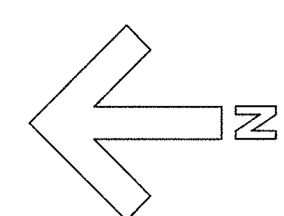
LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATION  
CAPITAL PROJECT S-6153

CONTRACT NO. 20-3082  
HOWARD COUNTY, MARYLAND

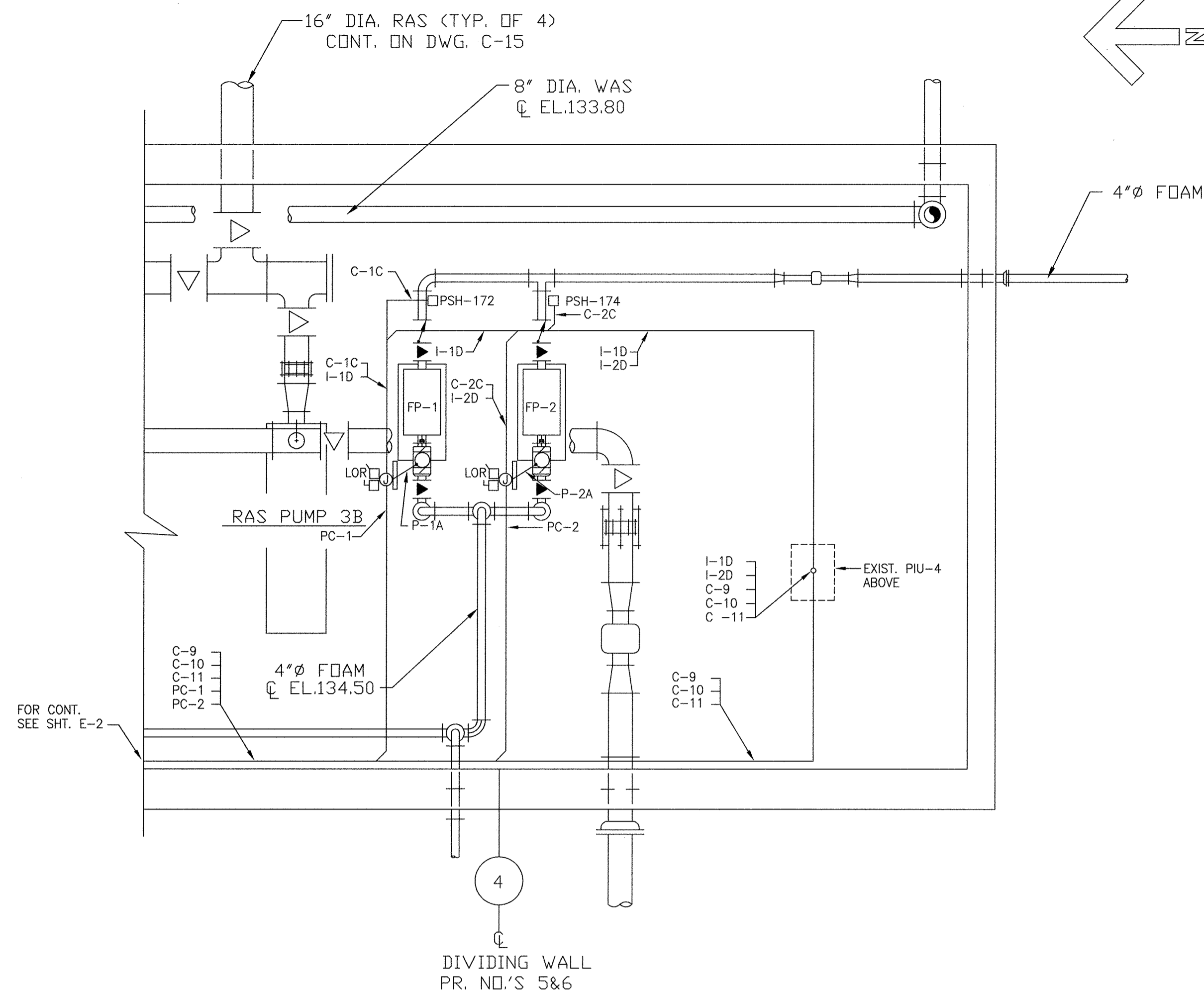
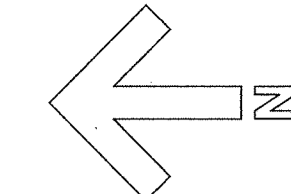
SCALE AS SHOWN  
SHEET 8 OF 12  
E-1



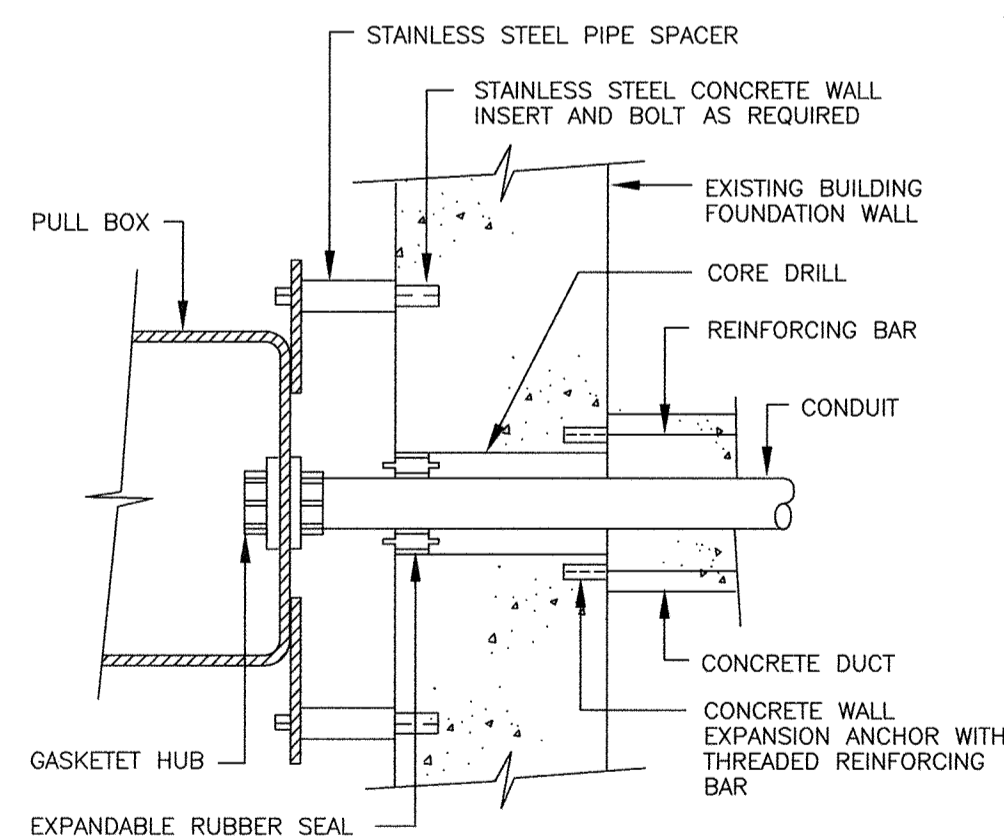




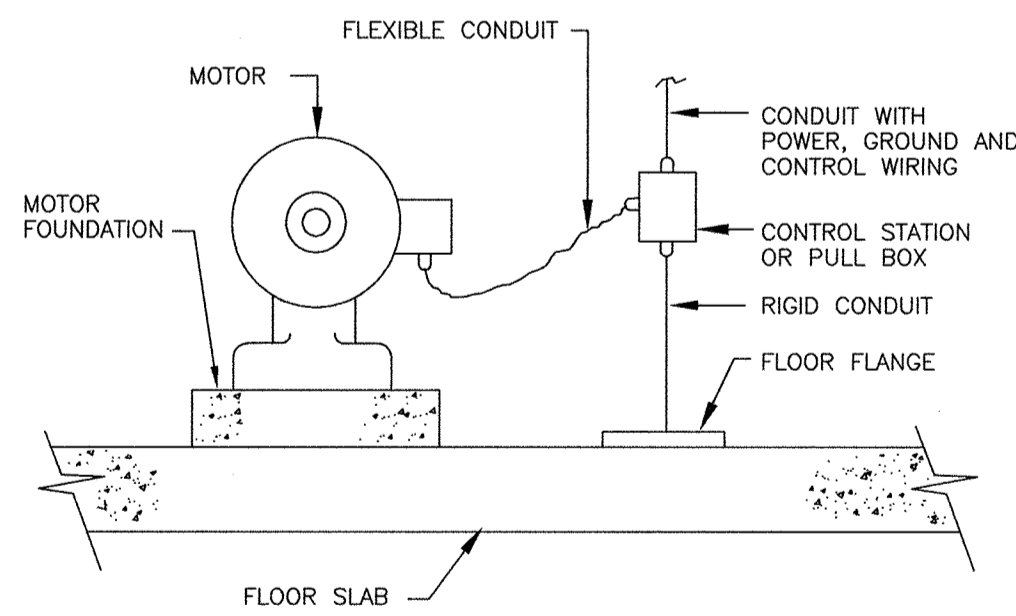
PART PLAN -  
WEST PIPE GALLERY  
SCALE: 1/8"=1'-0"



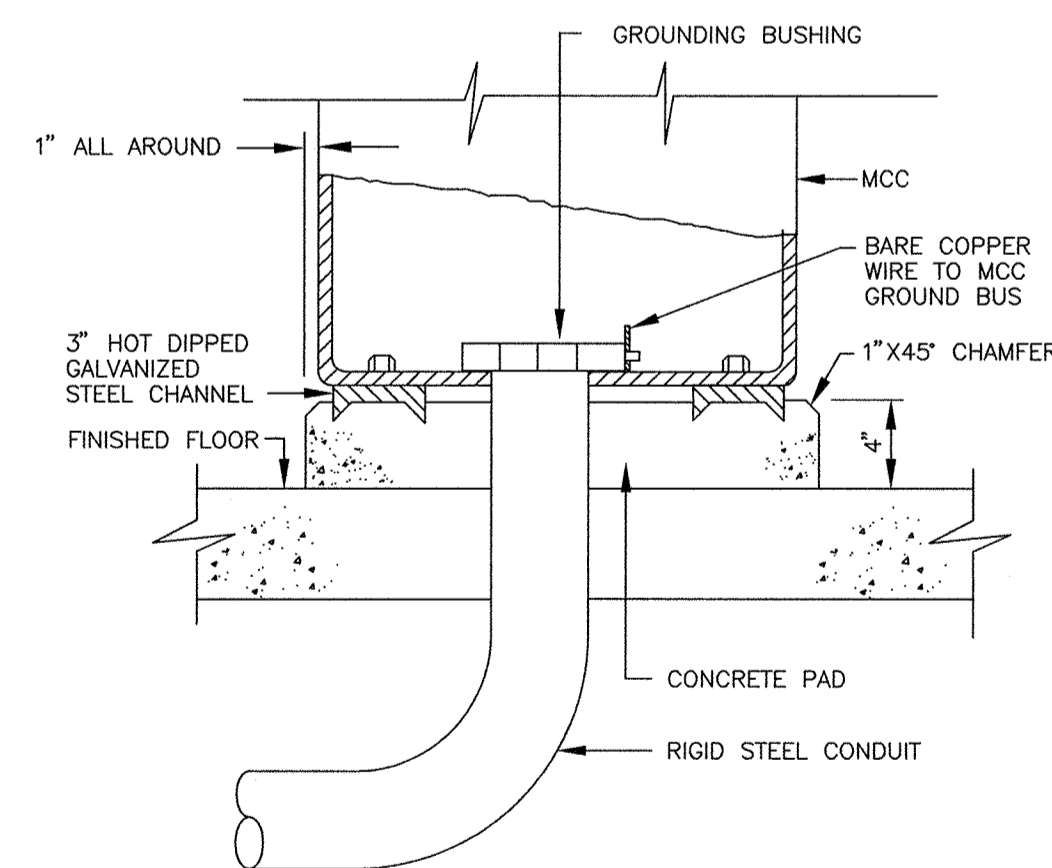
PART PLAN -  
EAST PIPE GALLERY  
SCALE: 1/4"=1'-0"



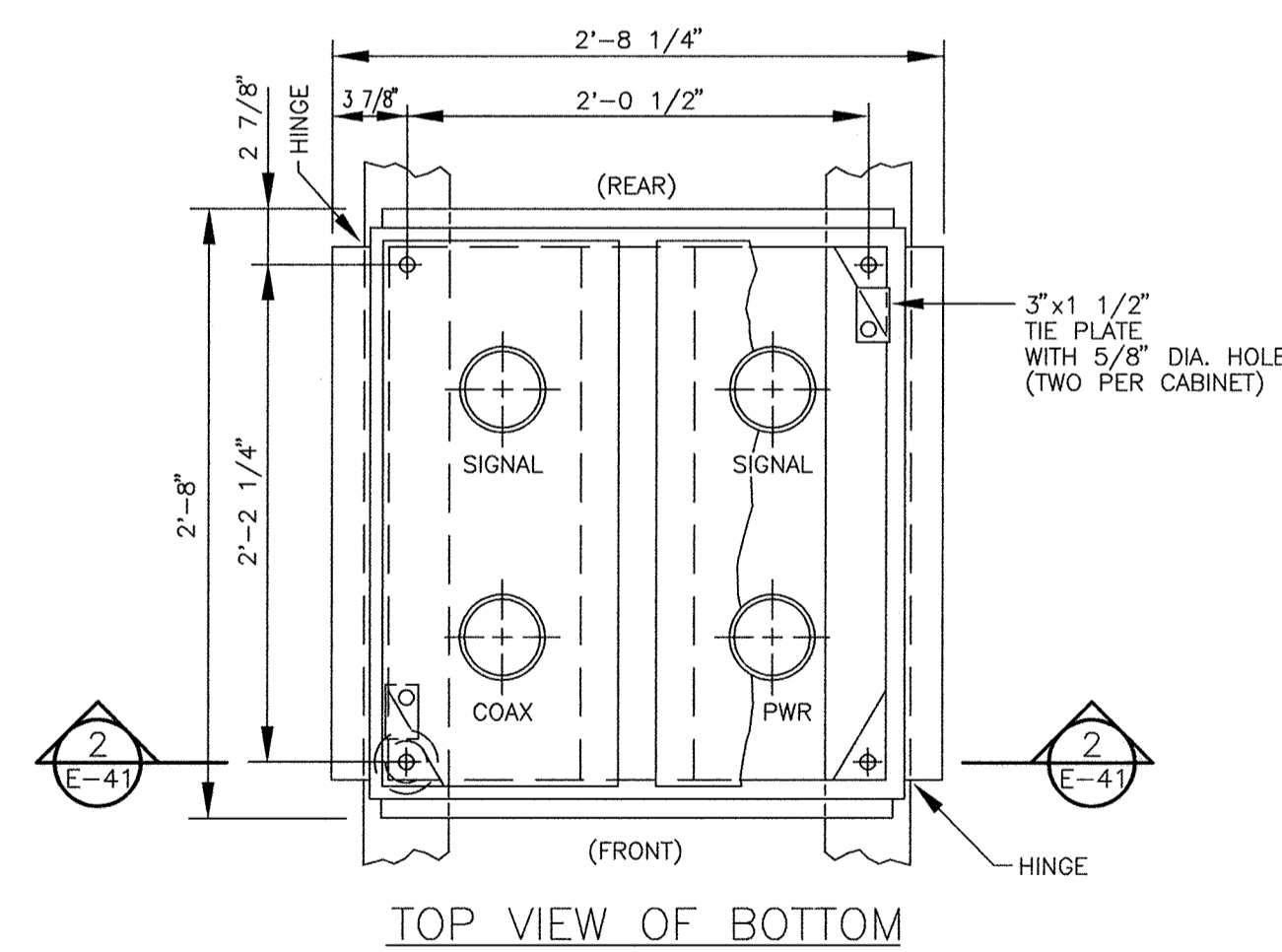
EXISTING BUILDING  
CONDUIT WALL ENTRANCE SEAL  
NO SCALE



TYPICAL HORIZONTAL FEEDER DETAIL  
NO SCALE

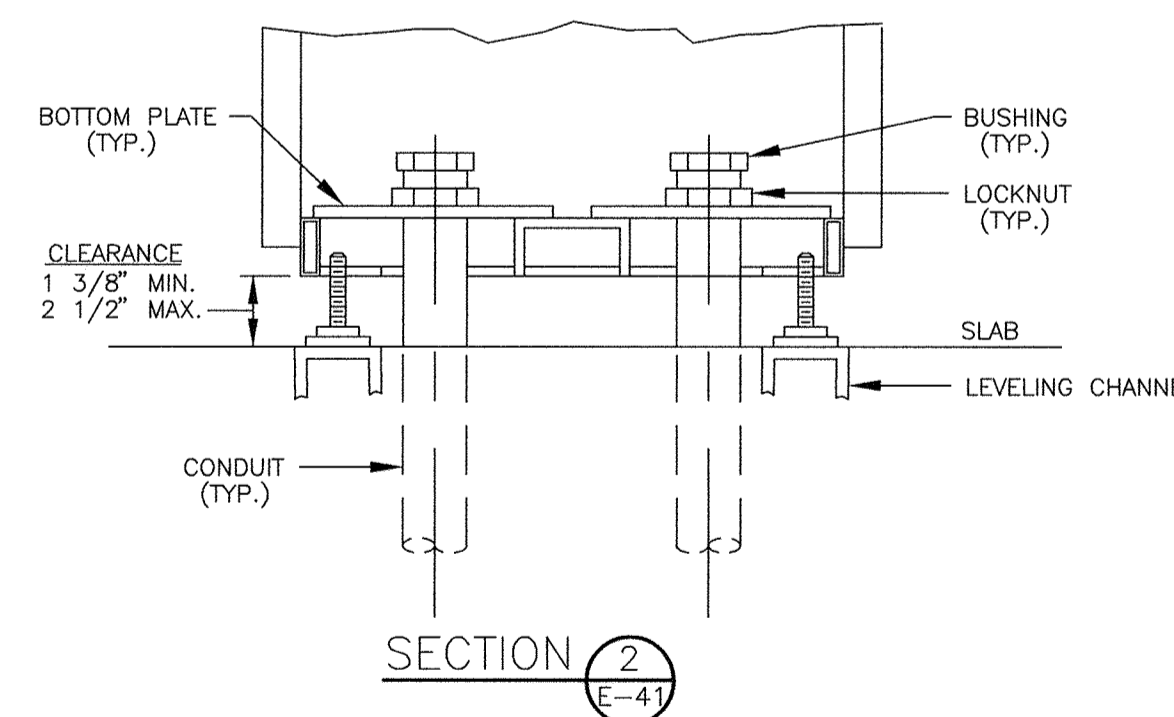


M.C.C. CONDUIT ENTRANCE FROM BELOW  
NO SCALE



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



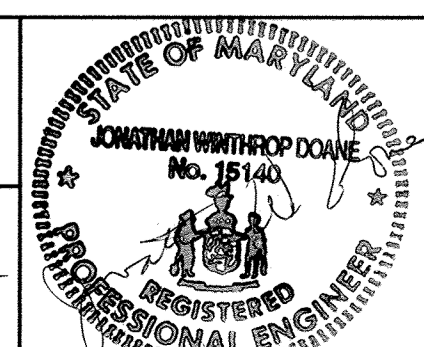
SECTION 2  
E-41

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

*James J. Blum* 10/6/95  
DIRECTOR OF PUBLIC WORKS  
*Robert J. Benjy* 10-5-95  
CHIEF, BUREAU OF UTILITIES

**M&E** Metcalf & Eddy

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



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

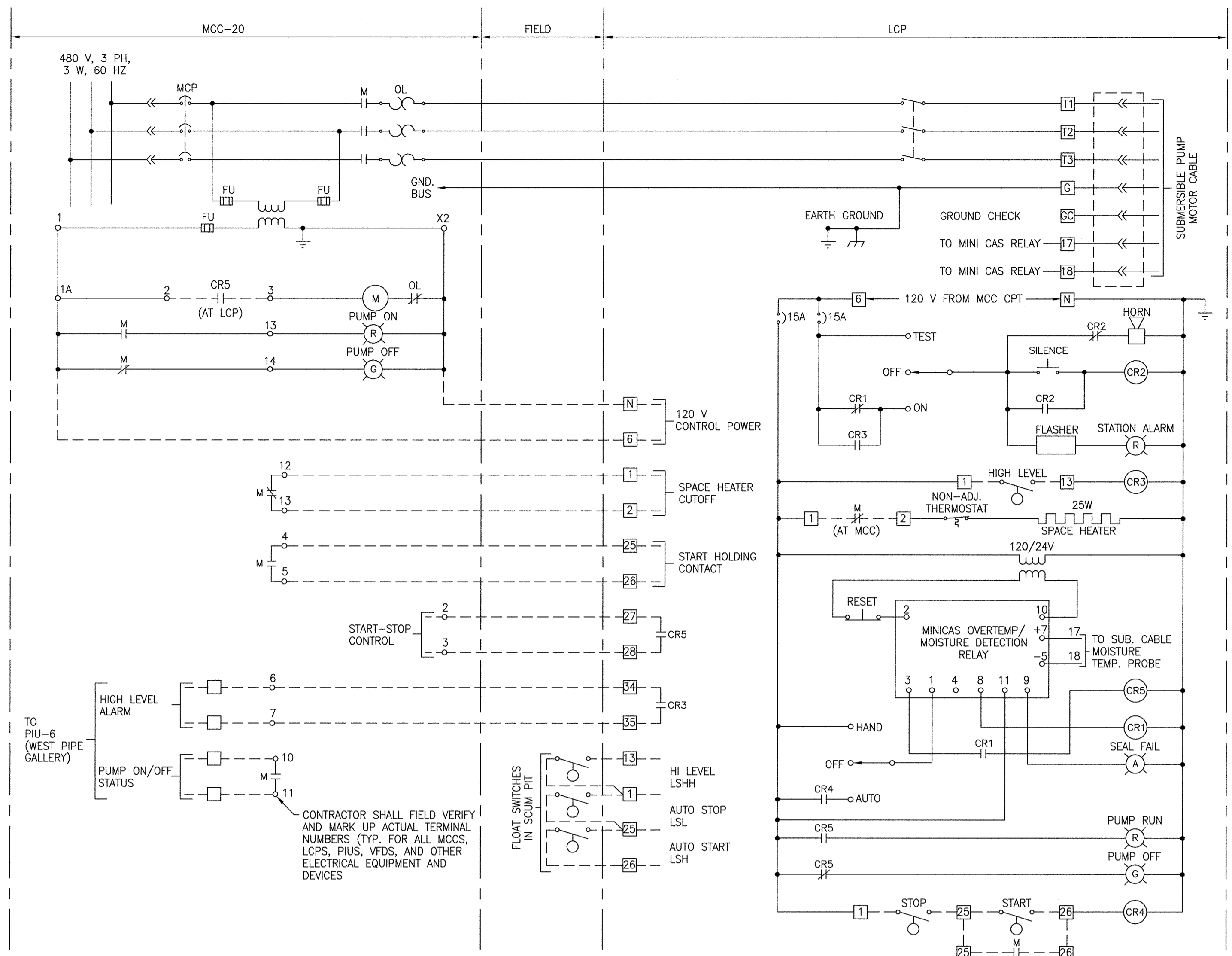
ELECTRICAL

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

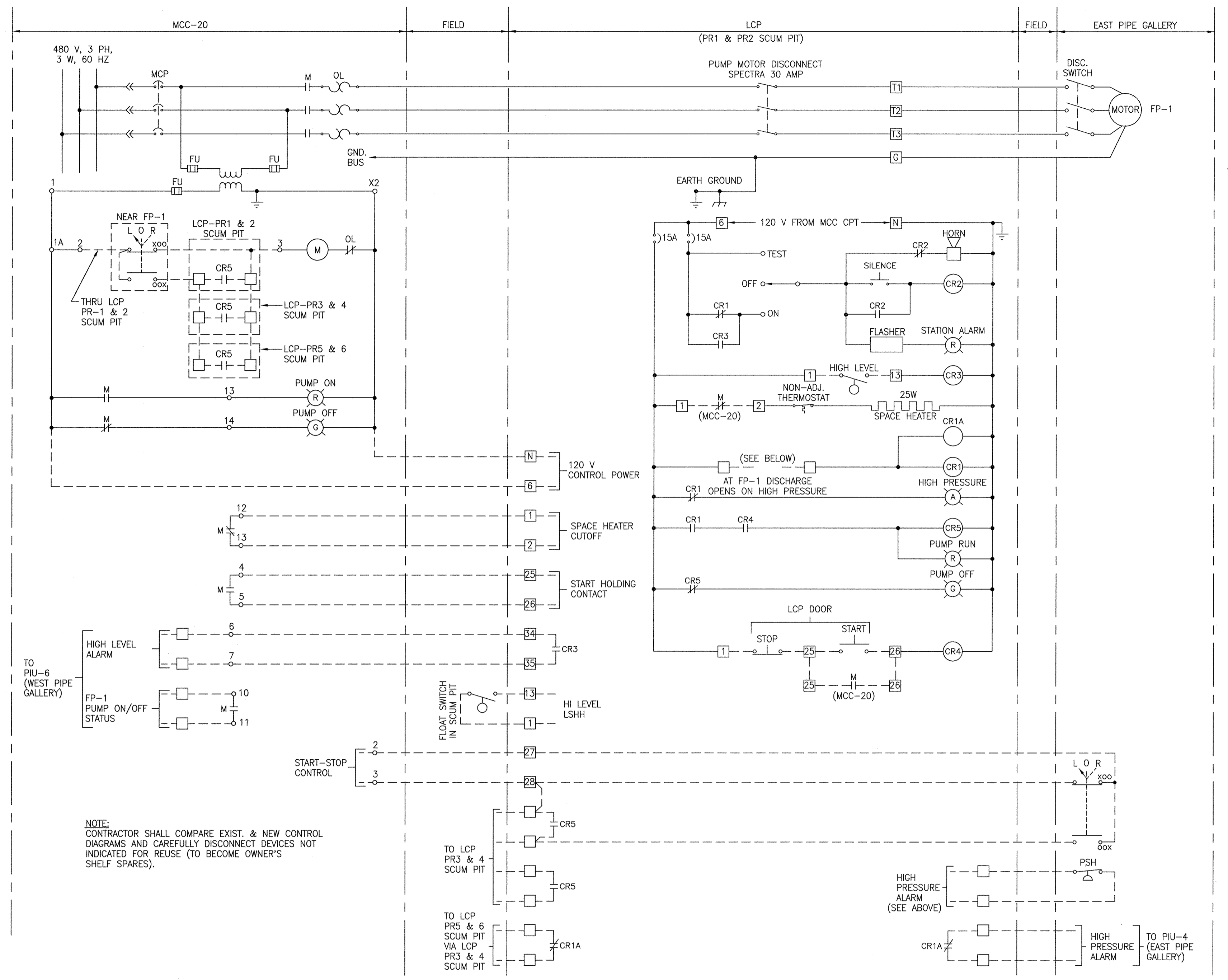
LITTLE PATUXENT WATER RECLAMATION PLANT MODIFICATION  
CAPITAL PROJECT S-6153

CONTRACT NO. 20-3082  
HOWARD COUNTY, MARYLAND

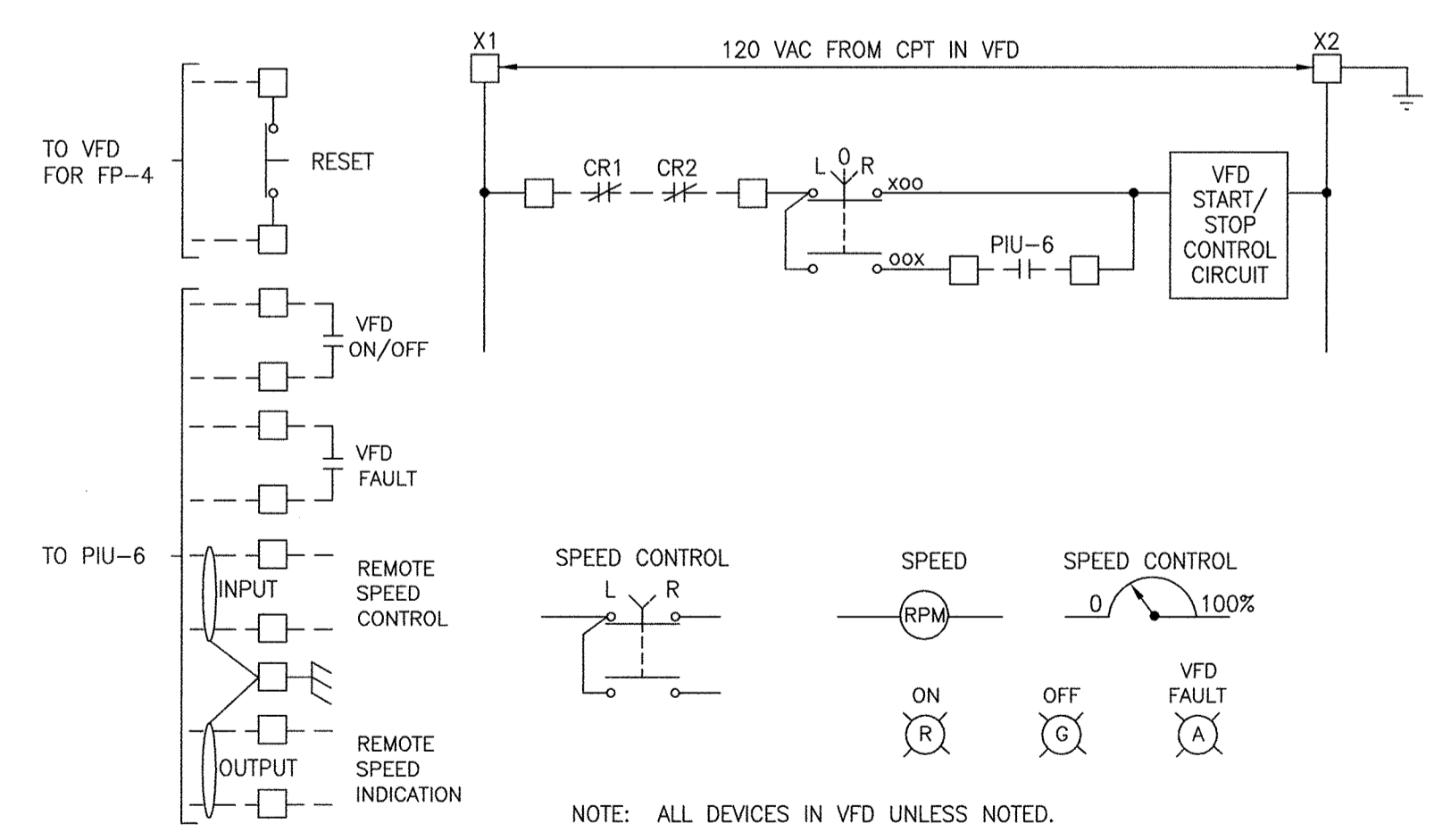
SCALE  
AS  
SHOWN  
SHEET  
10 OF 12  
E-3



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.

