

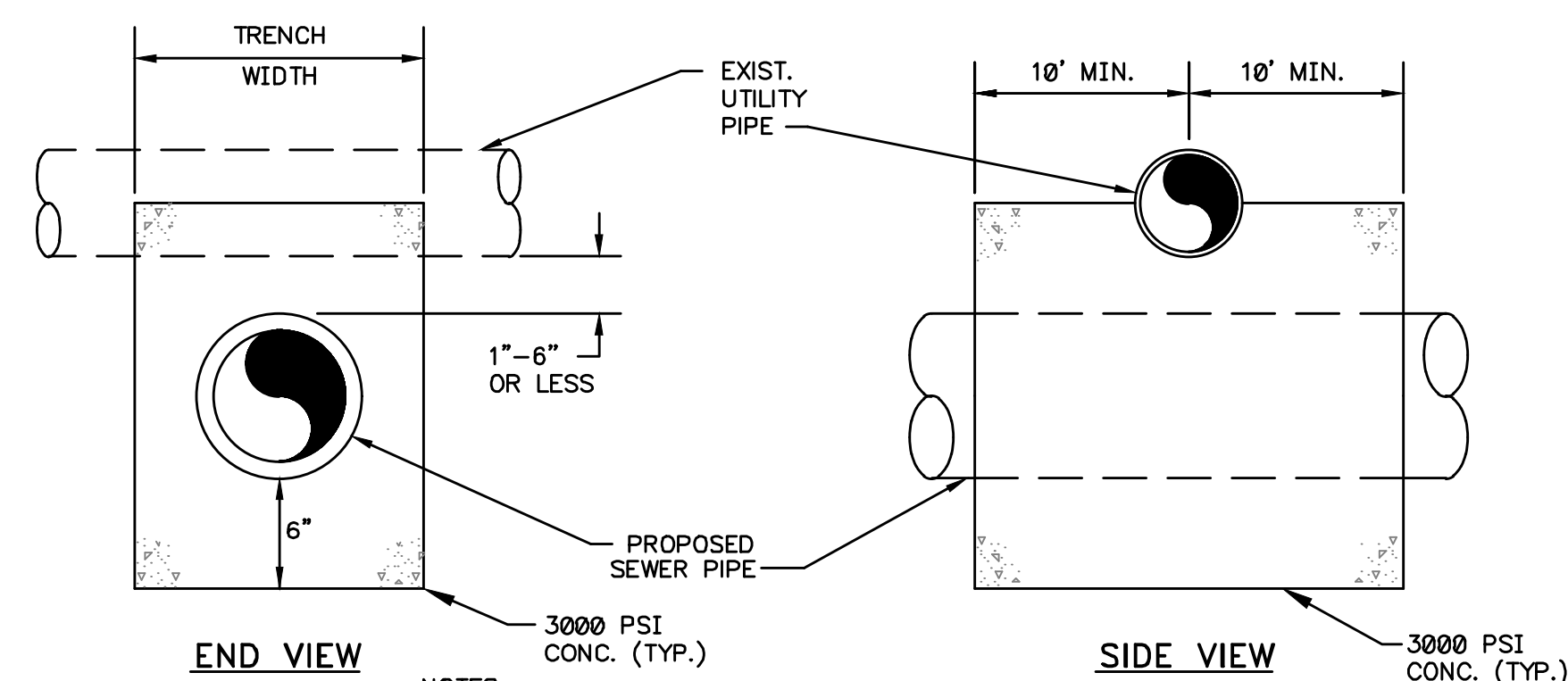
PUMP STATION AND FORCE MAIN STANDARDS

- The use of a wastewater pump station shall be considered only when the area cannot be served by gravity sewers, including reasonable extensions to existing or proposed gravity lines. Multiple small pump stations in lieu of a larger single pump station shall not be permitted.
- Pump station design shall be in accordance with the City of Madisonville Standards Manual, the Recommended Standards for Wastewater Facilities (Ten States Standards), latest edition, and all other applicable rules and regulations. A Professional Engineer licensed in the Commonwealth of Kentucky shall stamp design drawings and specifications.
 - Two-Way Electrical Disconnect and Emergency Power Portable Hookup
 - Telemetry System to meet City of Madisonville standards (see #7)
 - Precast Concrete Components
 - Minimum of two (2) submersible pumps required.
 - Fencing Around Site
 - Landscaping as required
 - Paved Access Road(s) and Turnaround(s)
 - Odor control, if necessary
 - Potable water source with yard hydrant.
- The standard drawings shown are applicable to pump stations with a pumping capacity of 1,000 gallons per minute (GPM) or less. Each pump station shall have the following components:
 - Metal "can" type pump stations are not permitted.

- Pump stations with capacity greater than 1,000 GPM shall have the following additional components:
 - Building
 - Pipe Gallery Vault
 - Mechanically cleaned Bar screen, if influent sewer is 30-inch diameter or larger
 - Flow measurement and recording
 - Emergency Power Generator
 - Concrete, cast-in-place wetwell
 - Minimum of three (3) pumps and pumping compartments
- All pump stations are considered permanent and shall be designed to these standards.
- Force mains shall be sized to maintain a min. velocity of 2 feet per second in the force main. The minimum allowable force main size is 4-inch diameter. All force mains shall be installed with #10 coated copper tracer wire in the trench for locating purposes.
- Telemetry systems shall be provided with the following monitoring points:
 - Pump run for each pump
 - Power Failure
 - High wetwell
 - Telemetry failure
 - Telemetry Panel & Control Panel Intrusion
 - Combustible Gas Detection
 - Overflow
 - Generator Run (If pump station has generator)
 - Building Intrusion (If pump station has building)
- Automatic air/vacuum release valves should be installed at all major high points along the force main routes, and at creek crossings as required.
- PVC (SDR 21) and Ductile Iron (AWWA CLASS 50) pipe shall be allowed for use in force main construction. For special applications, other pipe materials may be allowed by the City of Madisonville.
- Precast concrete sections and appurtenances shall conform to the ASTM Standard specifications for precast reinforced concrete manhole sections, designation C478, latest revision.
- These drawings and specifications represent standards adopted by the City of Madisonville. These drawings are not a substitute for detailed design and engineering. Pump stations and force mains shall be designed in accordance with the Recommended Standards for Wastewater Facilities, 1997 Edition (Ten States Standards). Construction plans and specifications must be approved by the Kentucky Division of Water (DOW). A construction permit must be obtained from DOW before sewers can be installed.

TESTING REQUIREMENTS

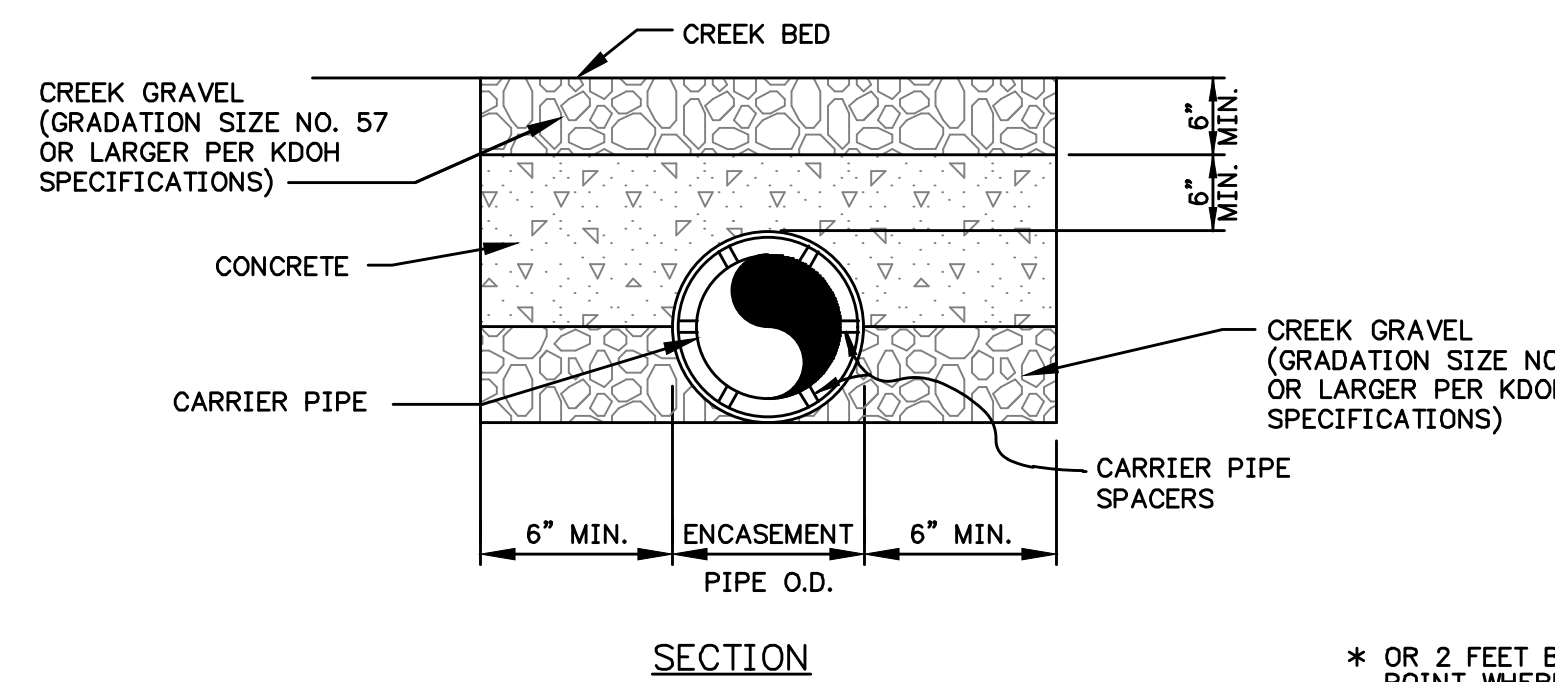
- Force Main piping shall be pressure tested at 150 psi for a duration of four (4) hours. The test pressure must not fall more than 5 percent during the 4-hour period. All tests must be witnessed and recorded by City of Madisonville personnel.
- Each wet well shall be tested without water for a 24-hour period to ensure the structure is watertight. The wet well shall also be leakage tested by filling with water up to the invert elevation of the lowest gravity influent pipe. The wet well must show no appreciable leakage over a 24-hour period.
- The Owner/Developer shall provide a pump performance test by the pump manufacturer's representative. City of Madisonville personnel must witness and record all tests. City of Madisonville representatives will also perform a draw down test for each pump installed.



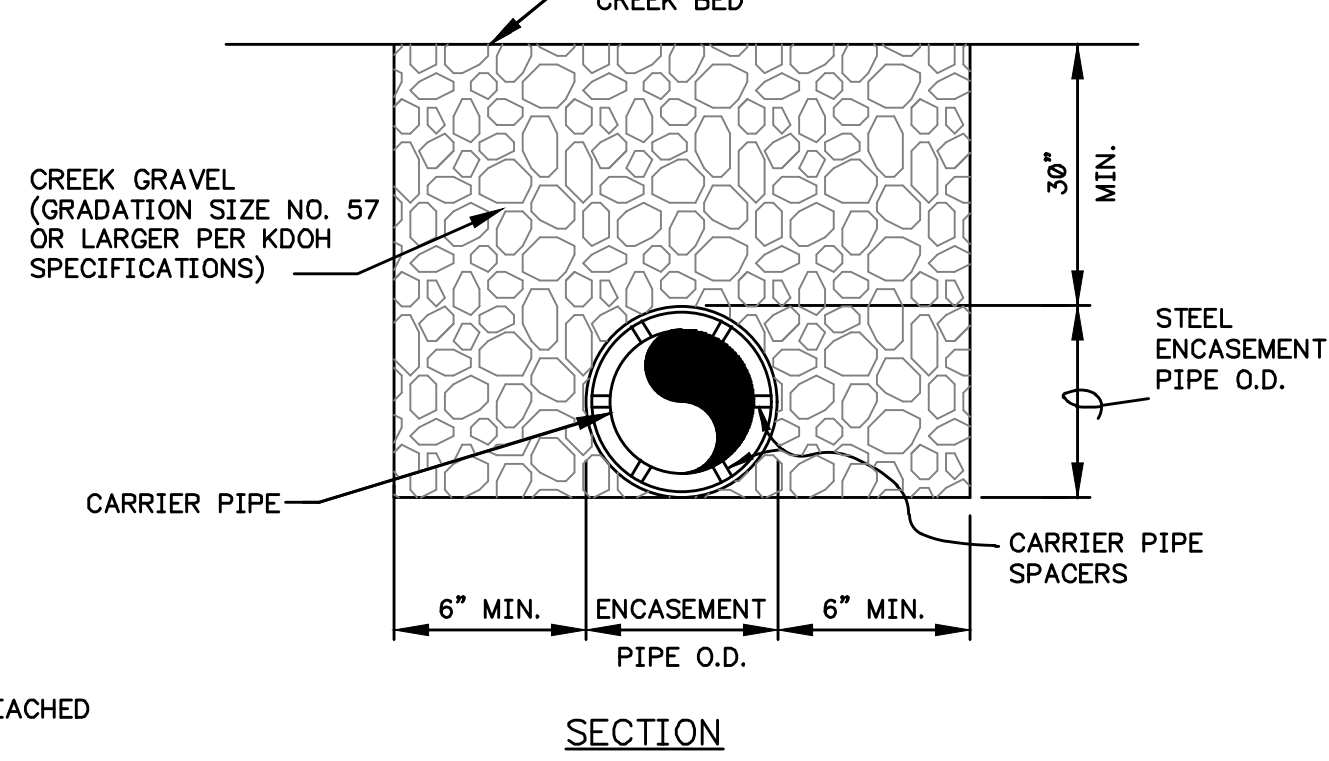
- NOTES:**
- CONCRETE ENCASEMENT SHALL BE USED WHEN CLEARANCE BETWEEN FORCE MAIN AND UTILITY PIPE IS 1'-6" OR LESS.
 - "UTILITY PIPE" INCLUDES UNDERGROUND WATER, NATURAL GAS, TELEPHONE, ELECTRICAL CONDUITS, STORM SEWER OR TYPICALLY NON-CONTAMINATING FACILITIES.
 - PROPOSED SEWER FORCE MAIN TO BE FULLY ENCASED WHETHER ABOVE OR BELOW EXISTING UTILITY PIPE.

**UTILITY CROSSING FOR SEWER FORCE MAIN INSTALLATION
CONCRETE ENCASEMENT**

N.T.S.

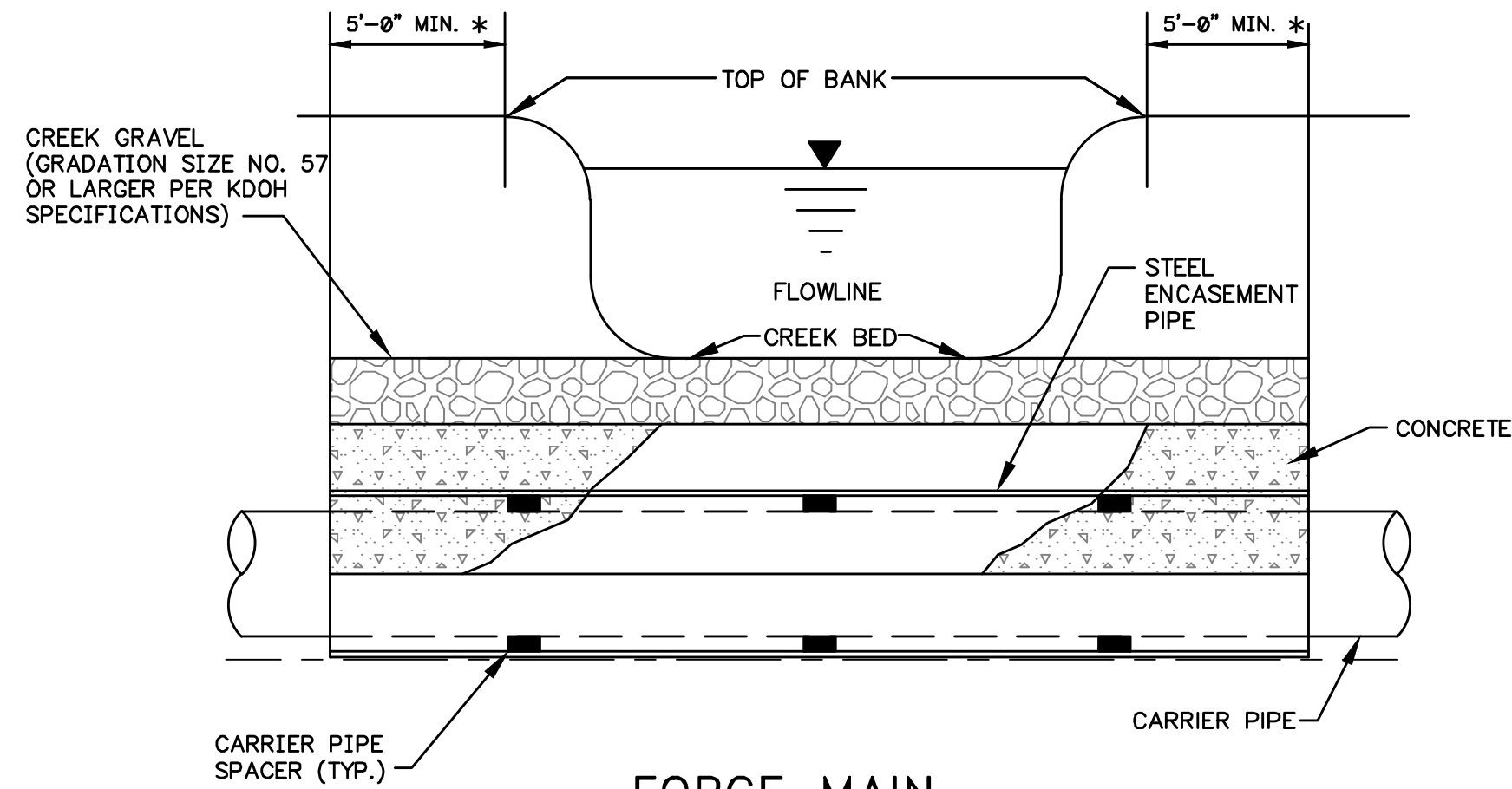


SECTION



SECTION

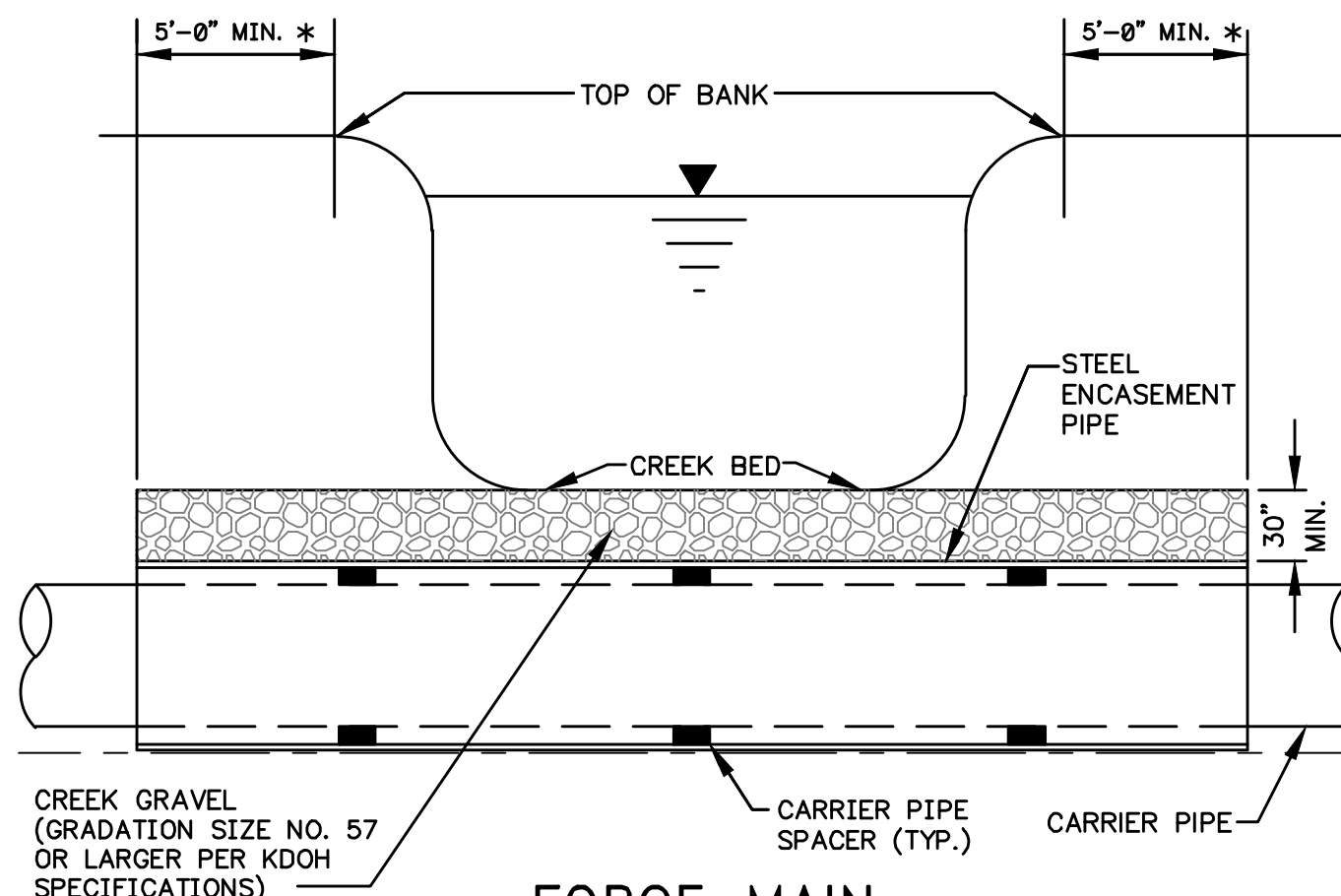
* OR 2 FEET BEYOND POINT WHERE 36-INCH DEPTH OF COVER IS REACHED



FORCE MAIN

CREEK CROSSING DETAIL (NON-ERODIBLE BOTTOM)

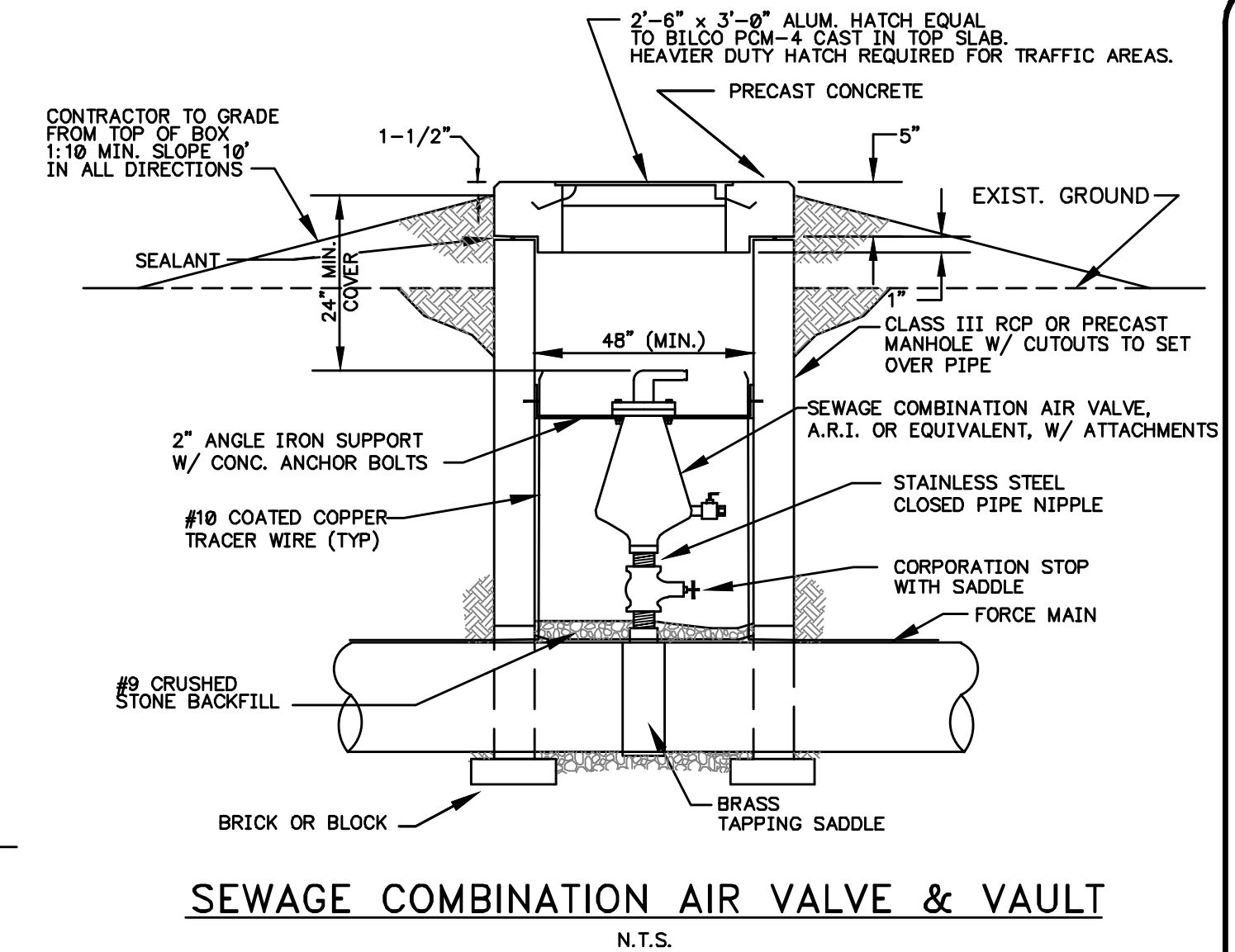
N.T.S.



FORCE MAIN

CREEK CROSSING DETAIL (ERODIBLE BOTTOM)

N.T.S.



SEWAGE COMBINATION AIR VALVE & VAULT

N.T.S.

TEES												
SIZE	2"	3"	4"	6"	8"	10"	12"	14"	24"	30"	36"	
D	6"	6"	6"	6"	6"	6"	6"	6"	X	X	X	X
L	4"	6"	8"	10"	21"	30"	30"	X	X	X	X	X

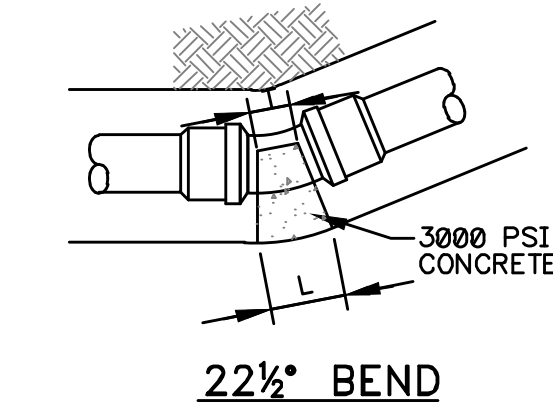
PLUGS												
SIZE	2"	3"	4"	6"	8"	10"	12"	14"	24"	30"	36"	
D	6"	6"	6"	6"	6"	6"	6"	6"	12"	24"	28"	32"
L&W	14"	18"	18"	20"	22"	24"	24"	24"	24"	30"	72"	85"

(11 1/4) THIRTY-SECOND BENDS												
SIZE	2"	3"	4"	6"	8"	10"	12"	14"	24"	30"	36"	
D	6"	6"	6"	6"	6"	6"	6"	6"	12"	12"	18"	28"
L	15"	18"	21"	24"	27"	30"	34"	34"	52"	70"	80"	
T	10"	12"	14"	16"	18"	20"	22"	28"	46"	72"	90"	

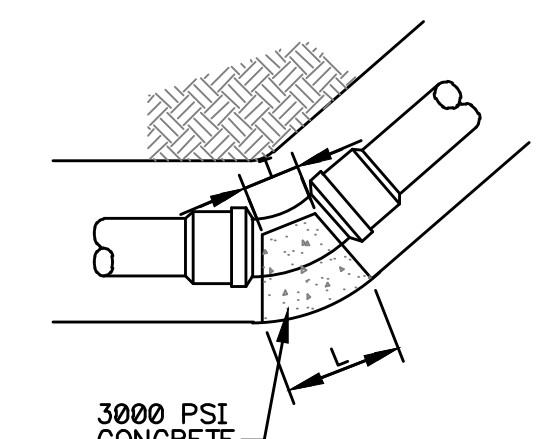
(22 1/2) SIXTEENTH BENDS												
SIZE	2"	3"	4"	6"	8"	10"	12"	14"	24"	30"	36"	
D	6"	6"	6"	6"	6"	6"	6"	6"	12"	12"	18"	28"
L	15"	18"	21"	24"	27"	30"	34"	34"	52"	70"	80"	
T	10"	12"	14"	16"	18"	20"	22"	28"	46"	72"	90"	

(45) EIGHTH BENDS												
SIZE	2"	3"	4"	6"	8"	10"	12"	14"	24"	30"	36"	
D	6"	6"	6"	6"	6"	6"	6"	6"	12"	12"	18"	28"
L	15"	18"	21"	24"	27"	30"	34"	34"	52"	70"	80"	
T	10"	12"	14"	16"	18"	20"	22"	28"	46"	72"	90"	

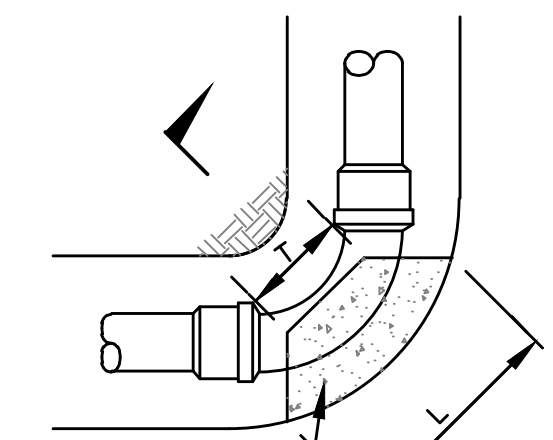
(90) QUARTER BENDS												
SIZE	2"	3"	4"	6"	8"	10"	12"	14"	24"	30"	36"	
D	6"	6"	6"	6"	6"	6"	6"	6"	12"	12"	18"	28"
L	15"	18"	21"	24"	27"	30"	34"	34"	52"	70"	80"	
T	10"	12"	14"	16"	18"	20"	22"	28"	46"	72"	90"	



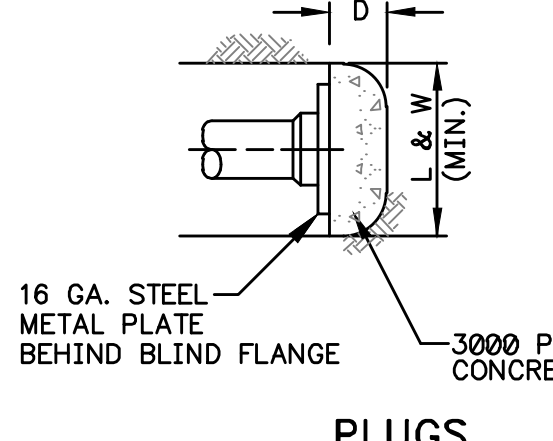
22 1/2° BEND



45° BEND

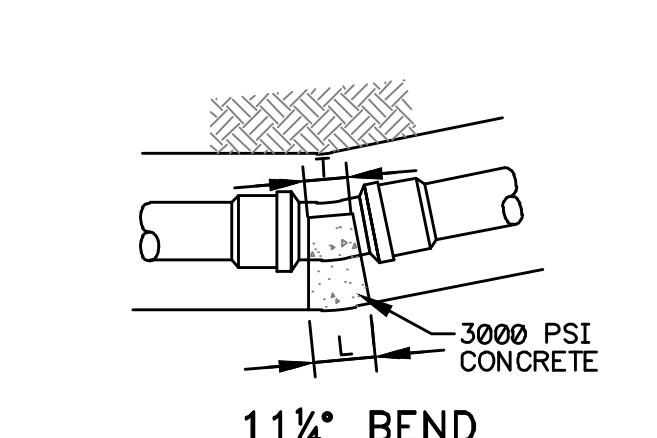


90° BEND

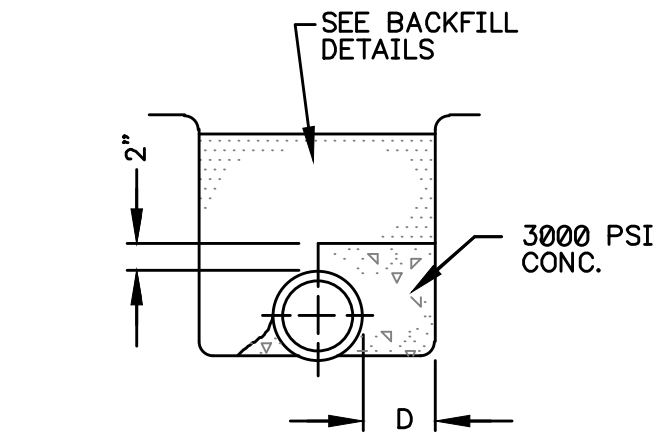


PLUGS

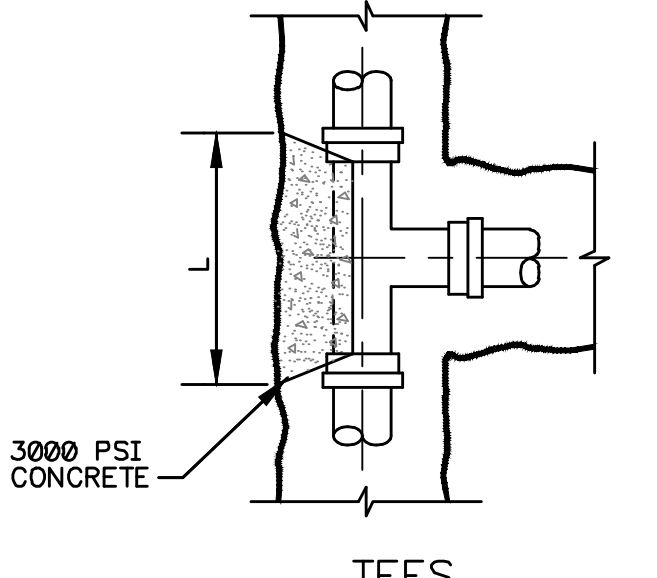
THRUST BLOCK SCHEDULE



11 1/4° BEND



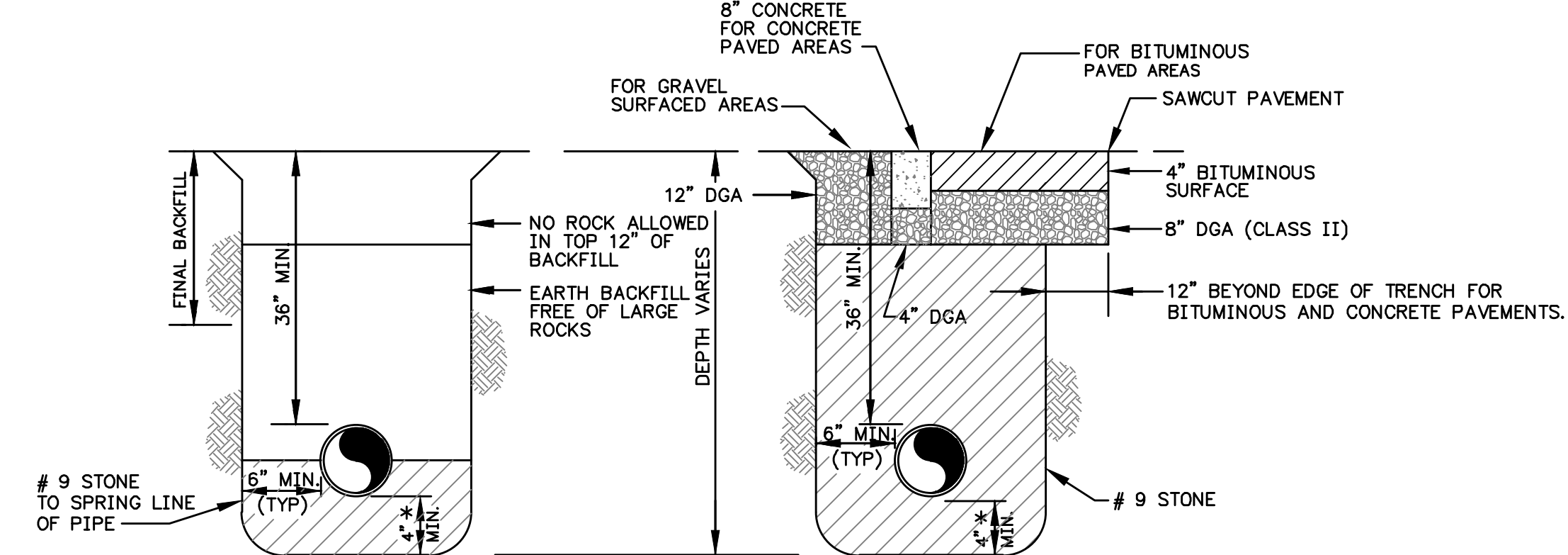
TEES



SECTION A-A

CONCRETE THRUST BLOCKS FOR FORCE MAINS

N.T.S.



- NOTES:**
- TRENCHES SHALL BE SHORED, SLOPED, OR SHIELDED AS NECESSARY TO PROTECT WORKERS AND CONFORM TO OSHA REGULATIONS.
 - DENSE GRADED AGGREGATE (DGA) SHALL BE CLASS II AS DEFINED BY THE KENTUCKY DEPT. OF HIGHWAYS STANDARD SPECIFICATIONS.
 - ALL FORCE MAINS SHALL BE INSTALLED WITH #10 COATED COPPER TRACER WIRE FOR LOCATING.

**FORCE MAIN
TRENCHING AND BACKFILLING DETAILS**

N.T.S.

**CITY OF
MADISONVILLE, KENTUCKY
ENGINEERING DEPARTMENT**



SCALE: AS NOTED

DATE: MAR 2010

JOB NO.:

DESIGNED: PEJ

DRAWN: WMJ

CHECKED: WMJ

Q/C:

OWNER APPROVAL:

BY:

TITLE:

REVISIONS:

NO.:

DATE:

DRAWING:

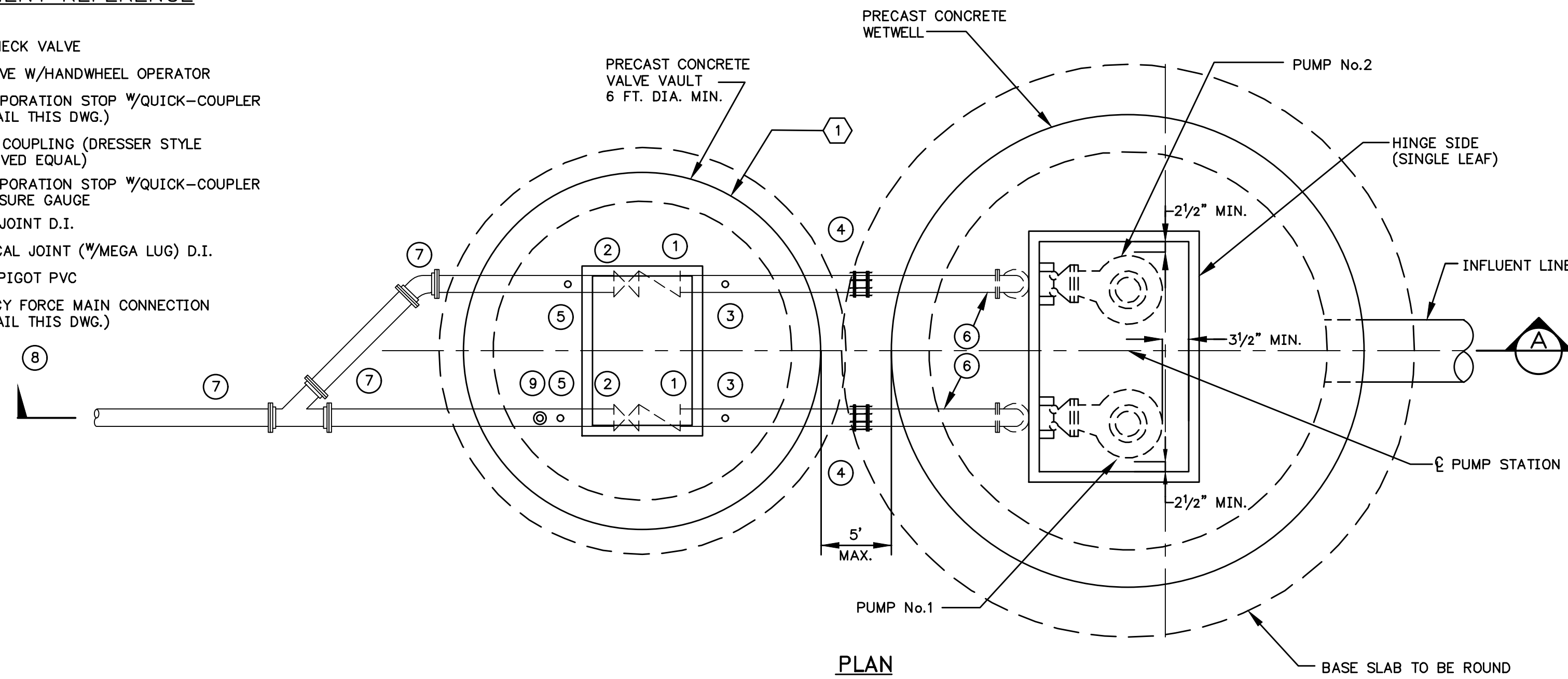
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OF

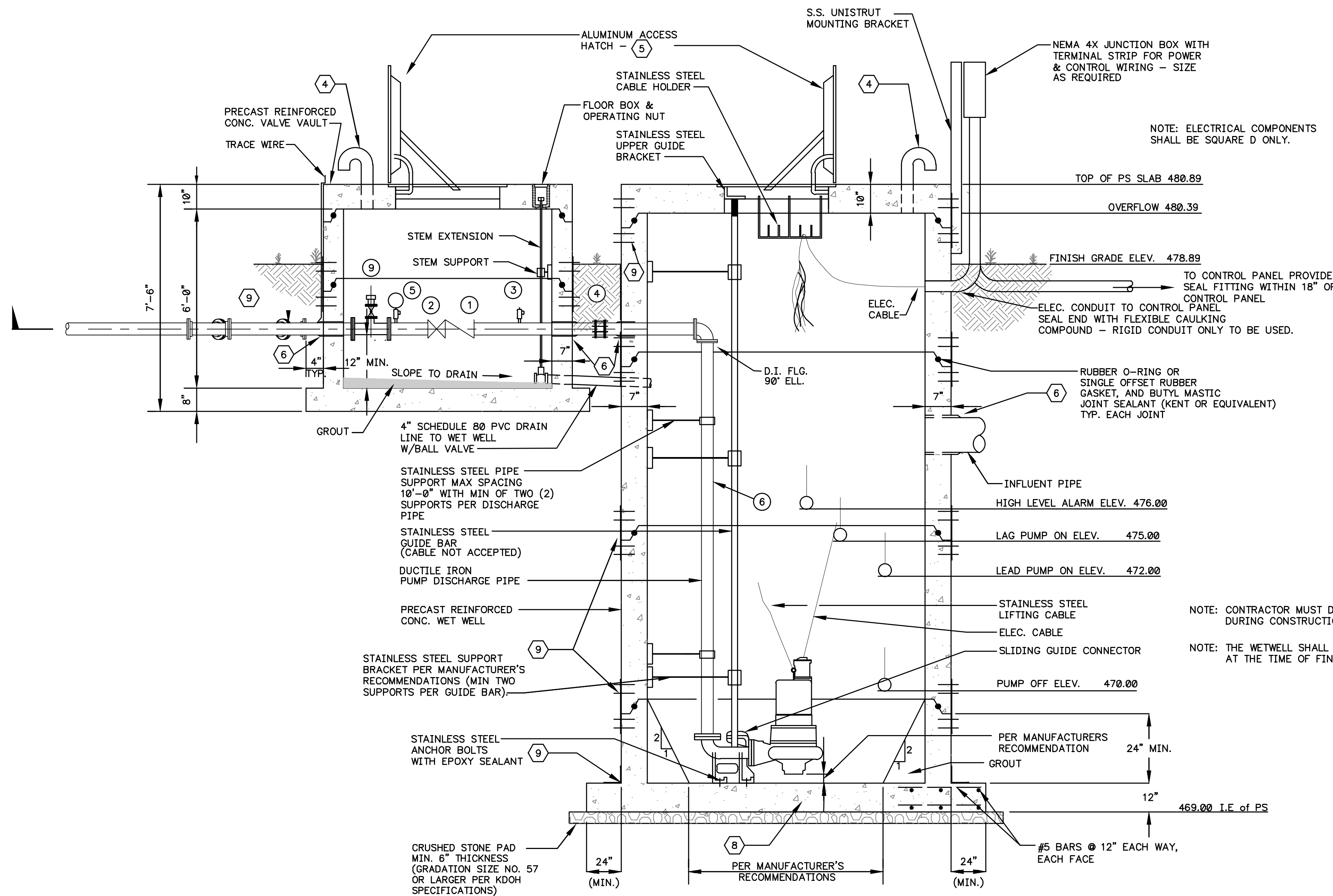
STANDARD DETAILS - PUMP STATIONS AND FORCE MAINS

EQUIPMENT REFERENCE

- 1 - SWING CHECK VALVE
- 2 - GATE VALVE W/HANDWHEEL OPERATOR
- 3 - 3/4" CORPORATION STOP W/QUICK-COUPLER (SEE DETAIL THIS DWG.)
- 4 - FLEXIBLE COUPLING (DRESSER STYLE OR APPROVED EQUAL)
- 5 - 3/4" CORPORATION STOP W/QUICK-COUPLER AND PRESSURE GAUGE
- 6 - FLANGED JOINT D.I.
- 7 - MECHANICAL JOINT (MEGA LUG) D.I.
- 8 - BELL & SPIGOT PVC
- 9 - EMERGENCY FORCE MAIN CONNECTION (SEE DETAIL THIS DWG.)



PLAN



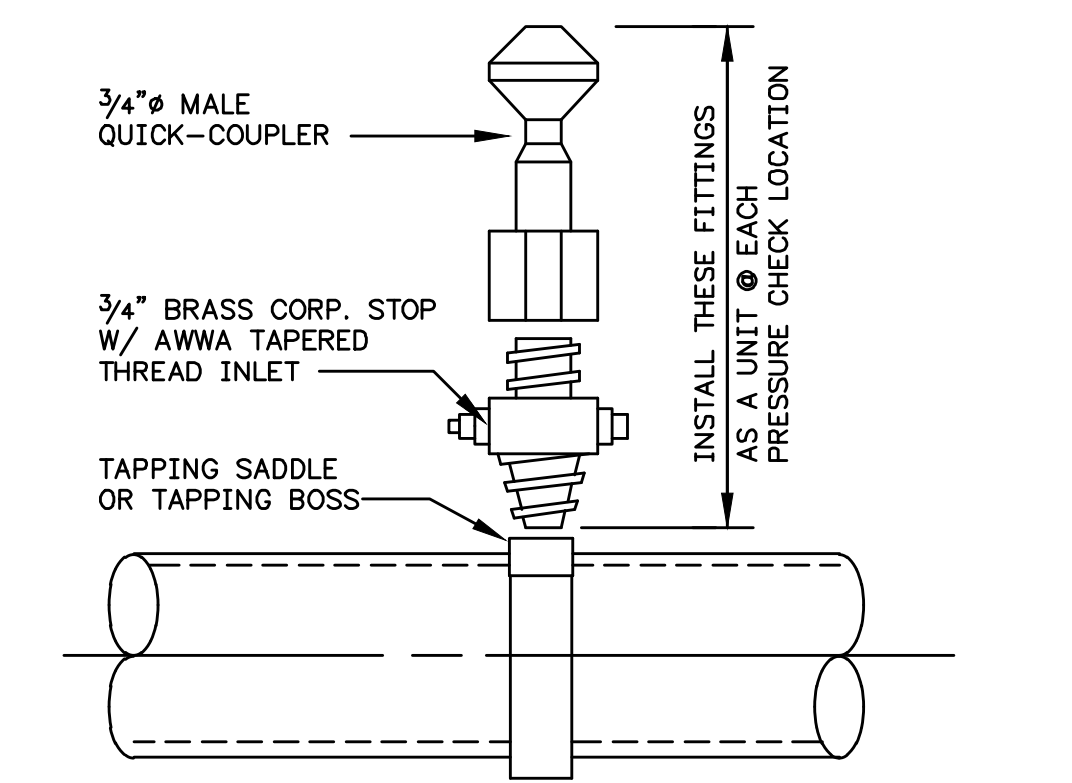
SECTION A

SUBMERSIBLE WASTEWATER PUMP STATION (1,000 GPM OR LESS)

N.T.S.

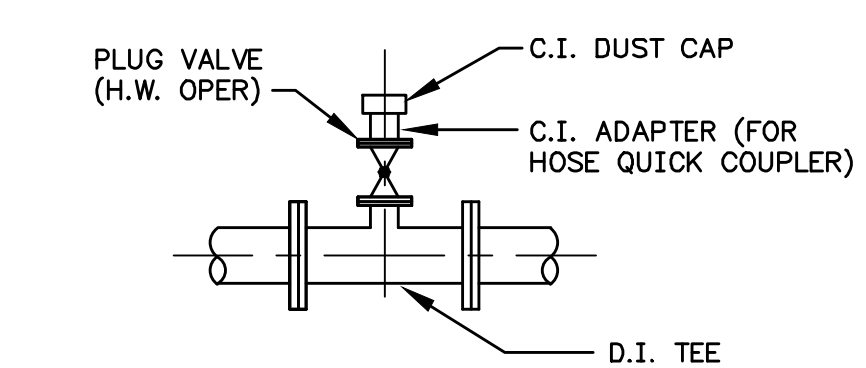
GENERAL NOTES

- 1 THE VALVE VAULT SHALL BE LOCATED OUTSIDE THE WET WELL EXCAVATION, BUT NO MORE THAN 5 FEET FROM THE WET WELL. IF THE VALVE VAULT IS PLACED ON EXCAVATED MATERIALS, BACKFILL SHALL BE COMPACTED IN 8" BASE LIFTS TO 95% STANDARD PROCTOR DENSITY.
- 2 ALL ANCHOR BOLTS AND HARDWARE SHALL BE 306 OR 316 STAINLESS STEEL.
- 3 DISCHARGE PIPING IN WET WELL AND VALVE VAULT SHALL BE FLANGED CLASS 350 DUCTILE IRON.
- 4 WETWELL VENT TO BE 6" D.I. PIPE WITH RETURN BEND AND STAINLESS STEEL INSECT SCREEN (AS SHOWN).
- 5 ALUMINUM ACCESS HATCH FOR VALVE VAULT TO BE 24 INCHES BY 36 INCHES MINIMUM. HATCH FOR WET WELL TO BE SIZED BY PUMP MANUFACTURER. MANUFACTURER SHALL BE BILCO OR EQUAL. HATCHES TO BE PROVIDED W/SAFETY NETS (NOT SHOWN).
- 6 THROUGH WALLED CONNECTIONS SHALL BE MADE WATER TIGHT WITH FACTORY INSTALLED FLEXIBLE RUBBER BOOT TO PREVENT INFILTRATION.
- 7 BASE SLAB WITH FLANGES AND BOTTOM SECTION SHALL BE MONOLITHIC AND PRECAST. WET WELL SECTIONS MUST BE TIED TOGETHER TO PREVENT SEPARATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
- 8 PRECAST BASE SECTION.
- 9 PROVIDE 4 - 2" W x 1"-7" x 3/8" THK. S.S. STRAPS AT EACH JOINT. USE FOUR (4) 1/2" S.S. BOLTS WITH EACH STRAP. POSITION BOLTS IN FULL THICKNESS OF WET WELL WALL.
- 10 EACH PUMP STATION SHALL BE CONSTRUCTED WITH A NEMA 4X (WATERTIGHT, DUST TIGHT, AND CORROSION RESISTANT) CONTROL PANEL. THE CONTROL PANEL SHALL BE STAINLESS STEEL, HENNESSEY OR APPROVED EQUIVALENT. THE COMPLETED PANEL SHALL HAVE TWO (2) HINGED DOORS, WITH THE OUTSIDE DOOR FULLY GASKETED AND SEALED TO NEMA 4X STANDARDS. THE OUTER DOOR SHALL HAVE PROVISIONS FOR PADLOCKING IN THE CLOSED POSITION.



PRESSURE GAUGE CONNECTION DETAIL

N.T.S.



EMERGENCY FORCE MAIN CONNECTION DETAIL

N.T.S.

NOTE: DURING EMERGENCY OPERATION, THE UTILITY WILL PROVIDE AN APPROPRIATE SIZED CHECK VALVE BETWEEN THE PLUG VALVE AND THE EMERGENCY PUMP.

CITY OF
MADISONVILLE, KENTUCKY
 ENGINEERING DEPARTMENT
 STANDARD DETAILS - PUMP STATIONS AND FORCE MAINS



SCALE:	AS NOTED
DATE:	March 2010
JOB NO.:	
DESIGNED:	PEJ
DRAWN:	PEJ
CHECKED:	WMJ
Q/C:	

OWNER APPROVAL:
 BY:
 TITLE:

REVISIONS:
 NO.: DATE: