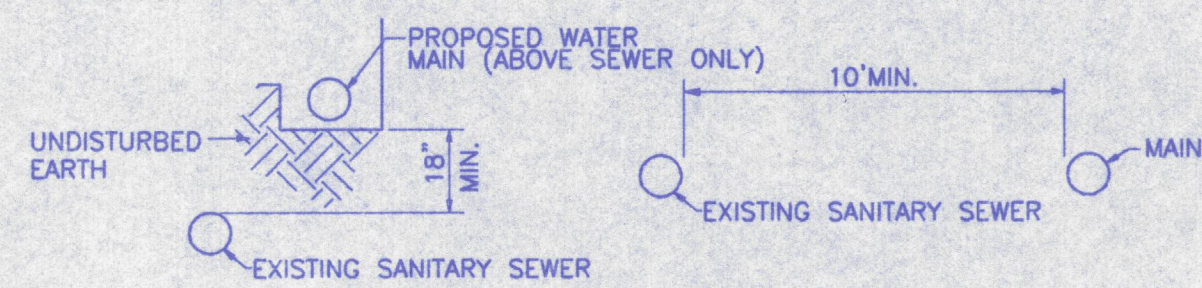


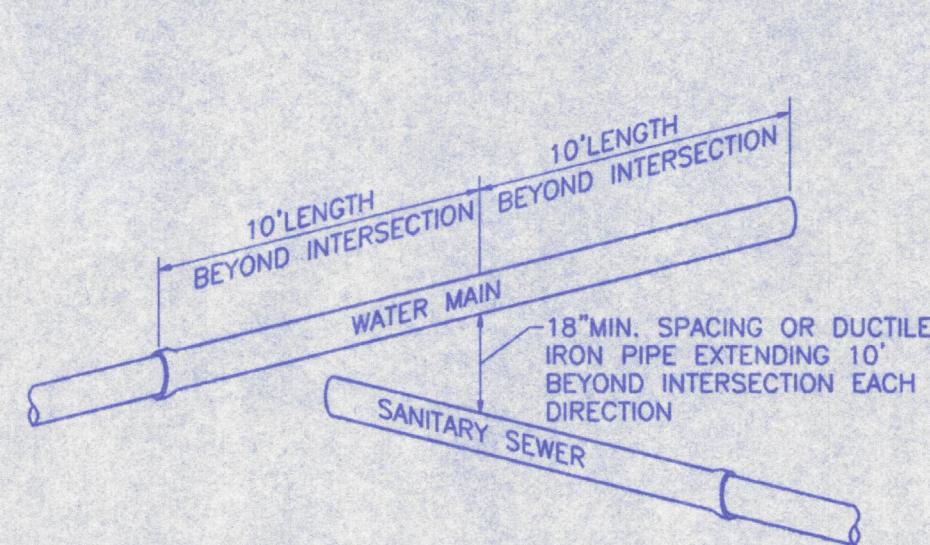
**RESTRAINED JOINTS ON SLIP JOINT PIPE**  
(USING GRIPPING TYPE RETAINERS)

DIA. MAIN	HORIZONTAL ELBOW				VERT. ELBOW	REDUCER
	11 1/4"	22 1/2"	45"	90"	45"	
10"	3'-0"	5'-0"	11'-0"	26'-0"	36'-0"	30'-0"

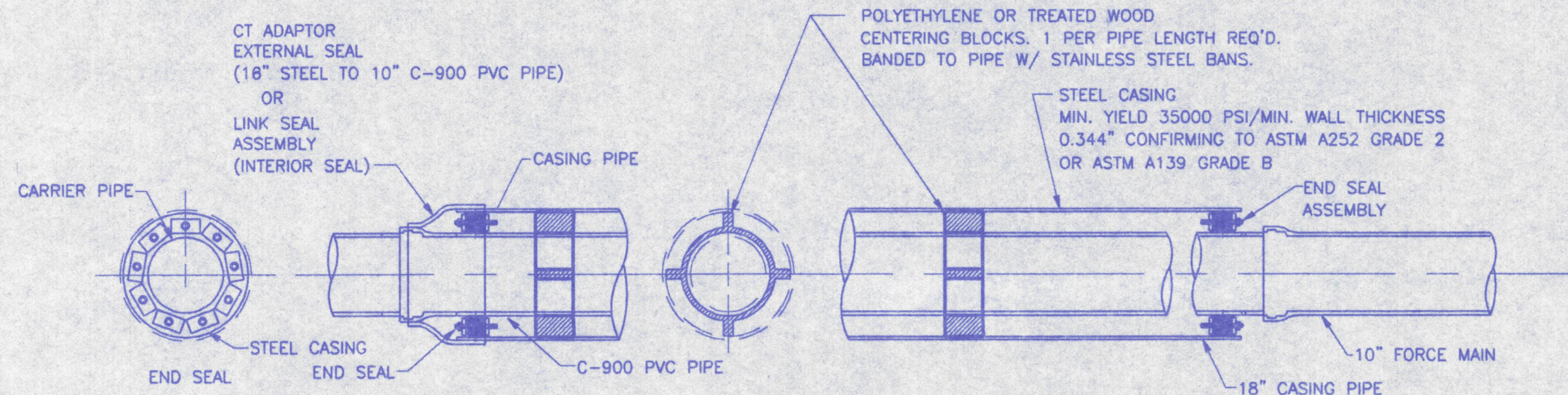
ASSUMES SOIL TYPE ML (UNIFIED), 150 PSI TEST PRESSURE, SAFETY FACTOR OF 1.5, TYPE 5 TRENCH CONDITIONS, & P.V.C. PIPE.



**PARALLEL SEWER/WATER LINES**  
IF 10' MIN. HORIZONTAL SPACING CANNOT BE MAINTAINED, THE WATER LINE MUST SIT ON A SHELF OF UNDISTURBED EARTH A MINIMUM OF 18" VERTICAL DISTANCE FROM THE TOP OF THE SEWER PIPE



**SANITARY SEWER CROSSING**  
CROSSING ARRANGED SO THAT SEWER JOINTS WILL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM WATER MAIN JOINTS



**PIPE CASING DETAIL**

**HIGHWAY CROSSING NOTES**

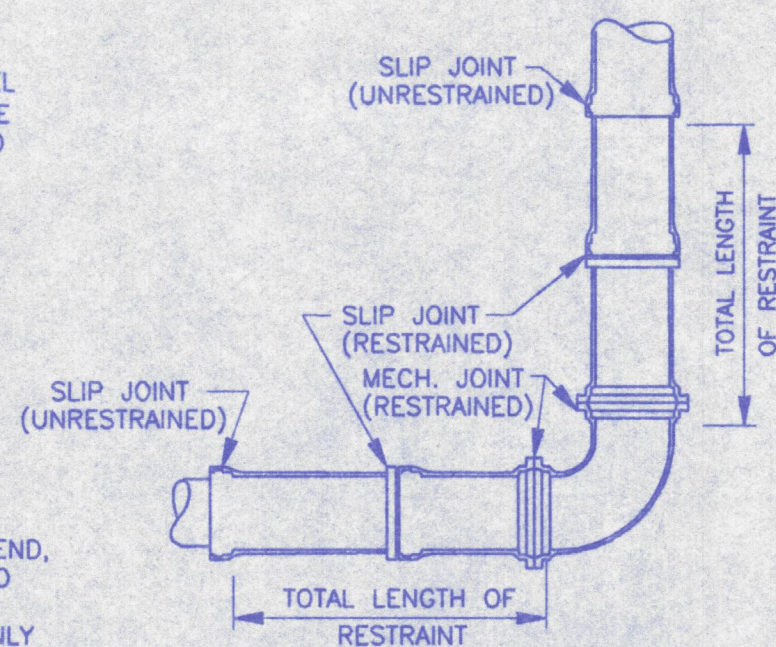
THE FORCE MAIN UNDER THE HIGHWAY CROSSING SHALL BE C-900 PVC PIPE AND ENCASED IN A STEEL CASING. THE STEEL CASING PIPE UNDER HIGHWAY SHALL BE BORED AND/OR JACKED IN PLACE TO THE ELEVATION SHOWN ON THE DRAWINGS. ALL JOINTS BETWEEN LENGTHS SHALL BE SOLIDLY BUTT-WELLED WITH A SMOOTH NON-OBSTRUCTION JOINT INSIDE. THE STEEL CASING SHALL BE INSTALLED WITHOUT BENDS. THE SANITARY SEWER PIPE SHALL BE INSTALLED AFTER THE CASING IS IN PLACE, AND SHALL EXTEND A MINIMUM OF THREE FEET BEYOND EACH END OF THE CASING TO FACILITATE MAKING JOINT CONNECTIONS. THE WATER/SANITARY SEWER PIPE SHALL BE BRACED WITH TREATED WOOD OR POLYETHYLENE CENTERING BLOCKS WITHIN THE COVER PIPE TO ACHIEVE PROPER GRADE AND PRECLUDE POSSIBLE FLOTATION.

HIGHWAY CROSSING MATERIAL AND INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH INDOT SPECIFICATIONS.

**CASING PIPE**

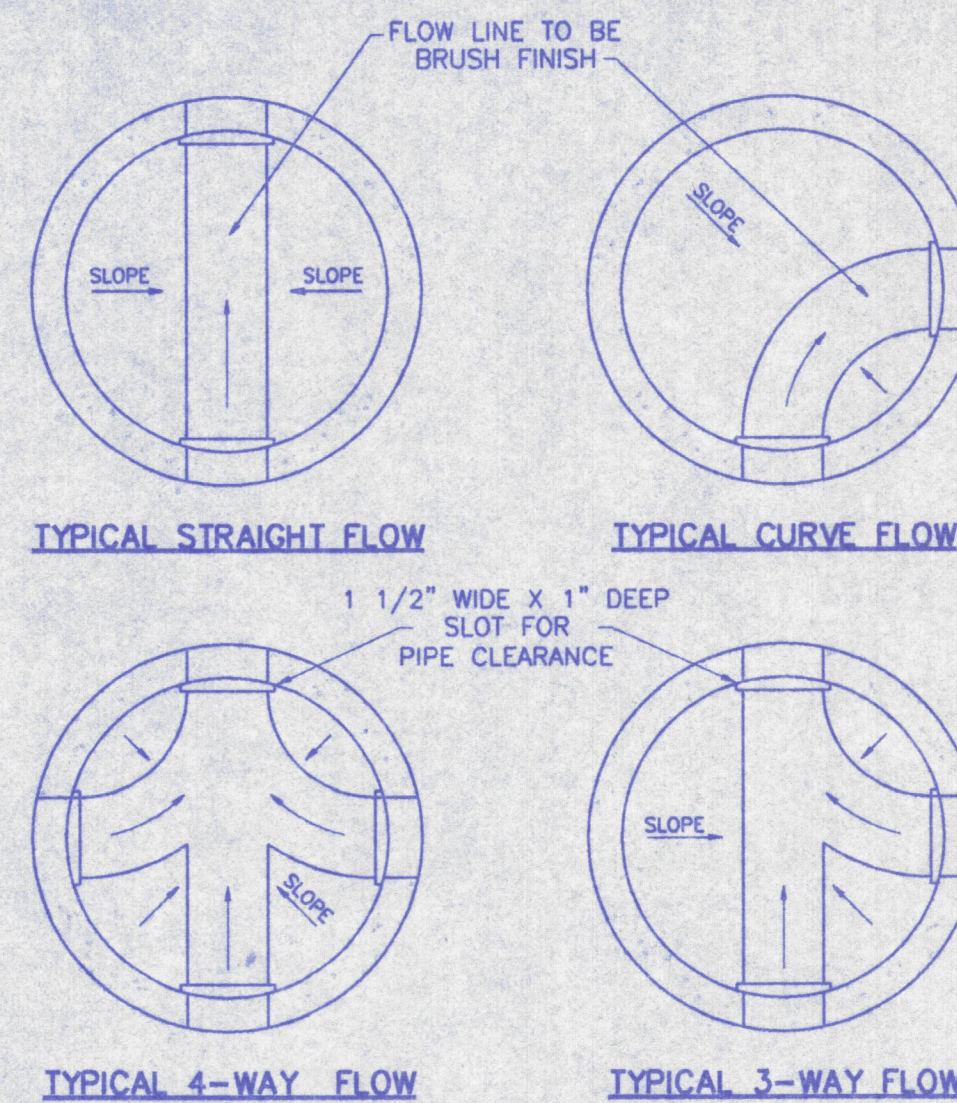
CASING PIPE TO ENCASE WATER OR SEWER LINES CROSSING UNDER HIGHWAY SHALL BE STEEL PLAIN END, UNCOATED AND UNWRAPPED, HAVE A MINIMUM YIELD POINT STRENGTH OF 36,000 PSI AND CONFORM TO ASTM A252 GRADE 2 OF ASTM A139 GRADE B WITHOUT HYDROSTATIC TEST. THE STEEL CASING PIPE SHALL HAVE WELDED JOINTS AND BE IN AT LEAST 20 FOOT LENGTHS. USED PIPE WILL BE ALLOWED ONLY IF INSPECTED AND APPROVED BY I.N.D.O.T.

THE WALL THICKNESS OF THE STEEL CASING SHALL BE A MINIMUM OF 0.407 INCHES. THE INSIDE DIAMETER SHALL BE AS SHOWN ON THE DRAWINGS OR A MINIMUM OF 2 INCHES LARGER THAN THE MAXIMUM OUTSIDE DIAMETER OF THE JOINTS ON THE CARRIER PIPE.



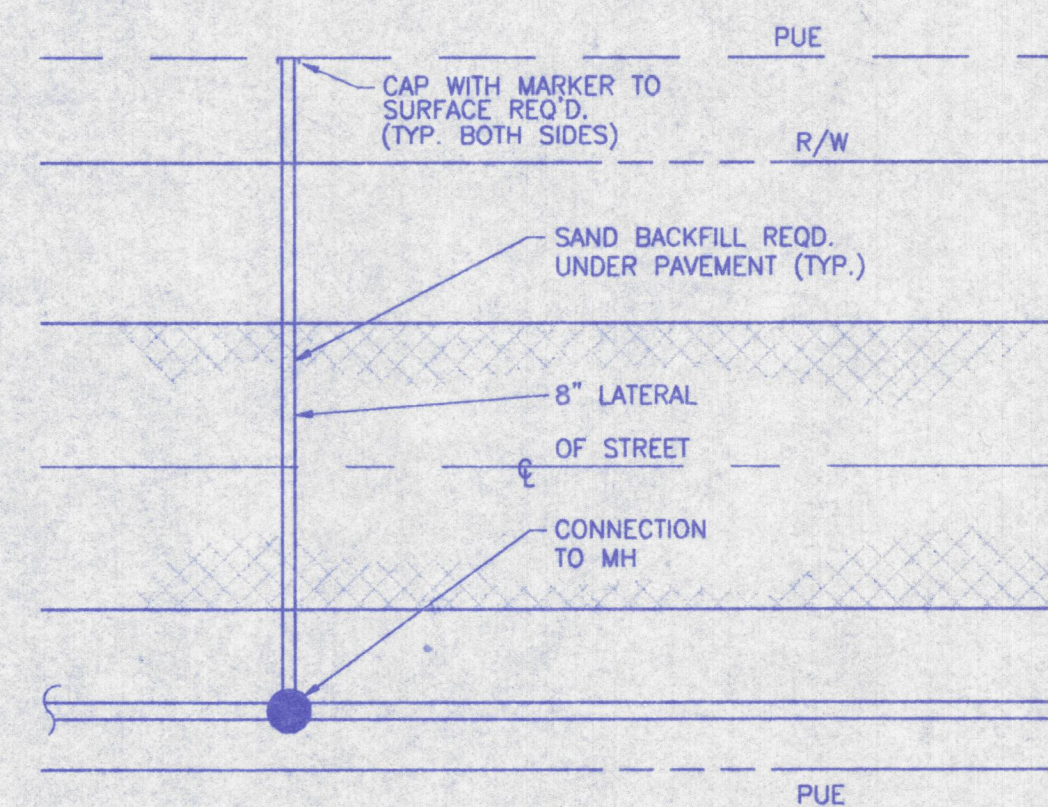
**RESTRAINT OF ELBOWS**

SEE CHART THIS SHEET FOR MIN. FOOTAGE OF RESTRAINED PIPE (THRUST BLOCKING MAY BE REQUIRED IF THE REQUIRED LENGTHS ARE UNATTAINABLE ON EXISTING LINE)

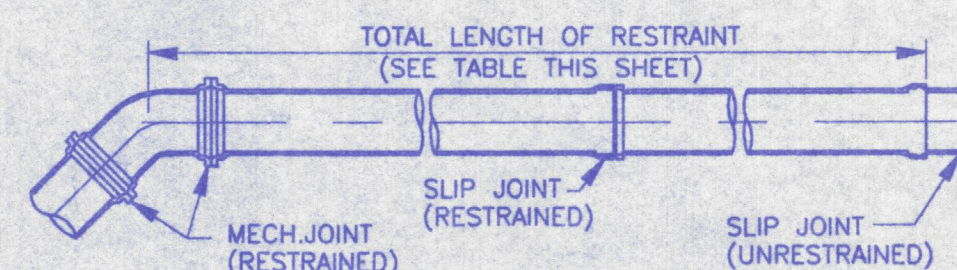


**CROSS SECTION OF 3-WAY FLOW**

**MANHOLE BASE DETAIL**  
Not To Scale

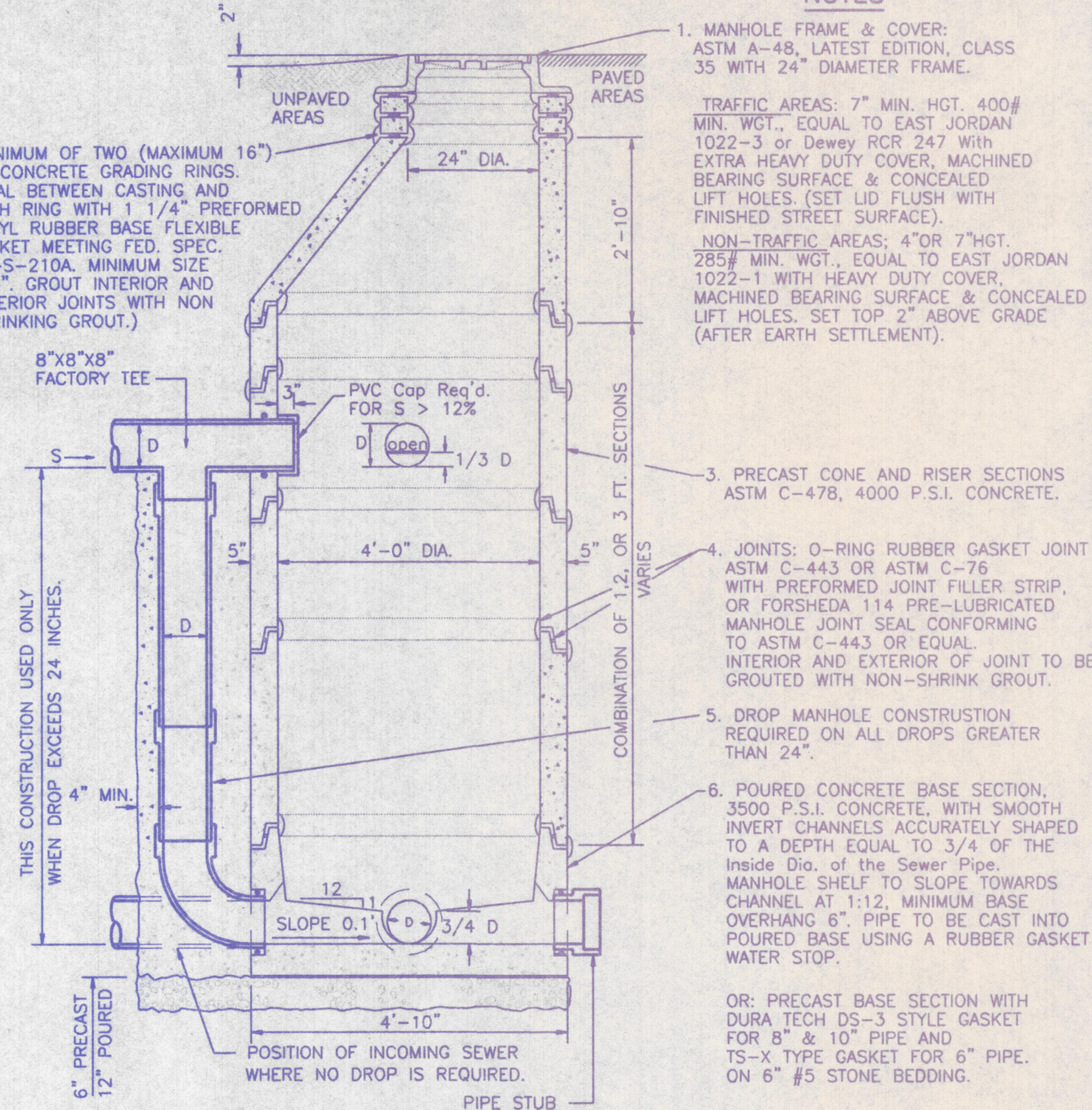


**SEWER LATERAL DETAIL**  
Not To Scale



**RESTRAINT OF BENDS**

SEE CHART THIS SHEET FOR MIN. FOOTAGE OF RESTRAINED PIPE



**PRECAST CONCRETE DROP MANHOLE DETAIL**

Not To Scale

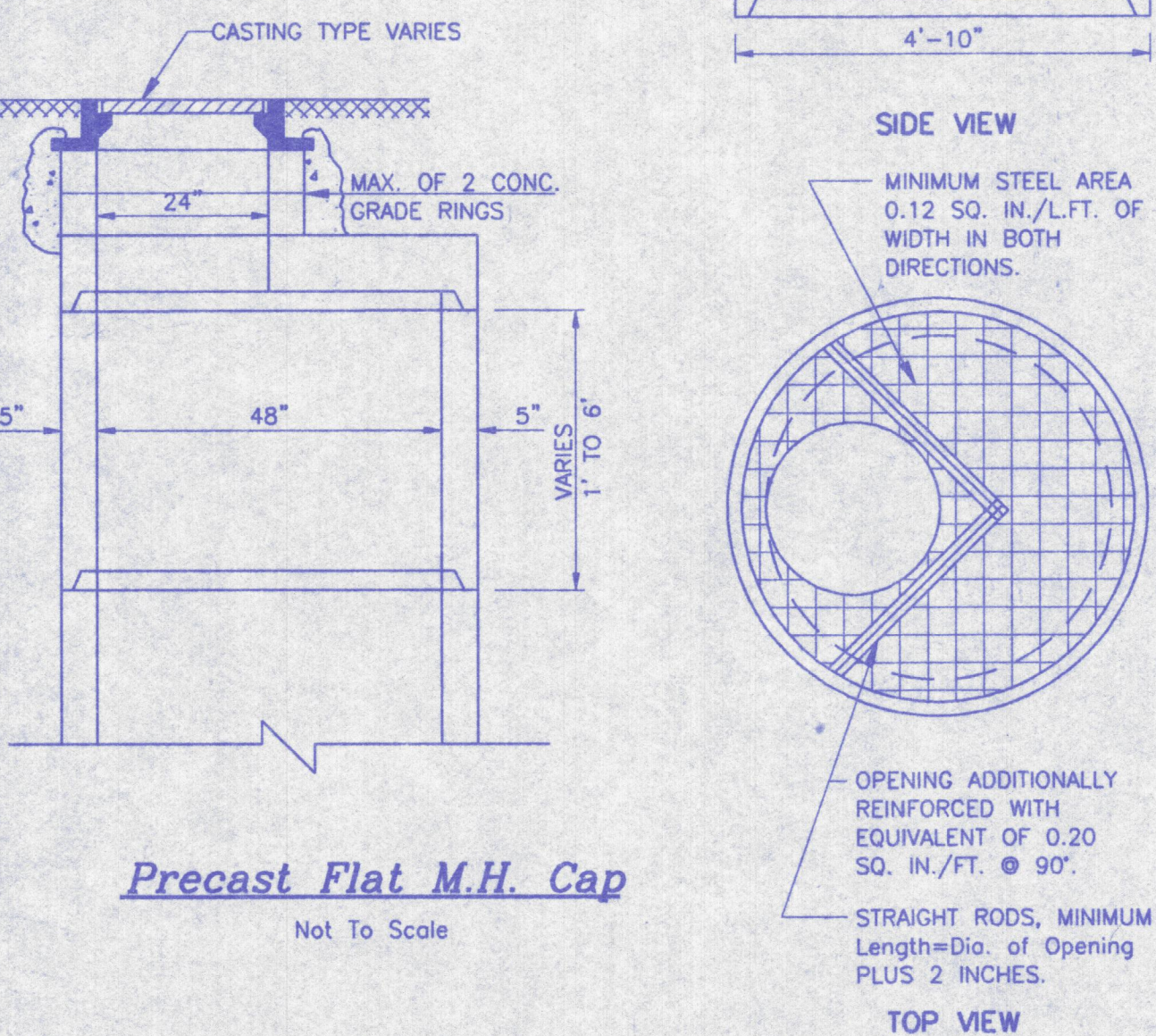
**NOTES**

- MANHOLE FRAME & COVER: ASTM A-48, LATEST EDITION, CLASS 35 WITH 24" DIAMETER FRAME.
- TRAFFIC AREAS: 7" MIN. HGT. 400# MIN. WGT., EQUAL TO EAST JORDAN 1022-3 OR DEWEY RCR 247 WITH EXTRA HEAVY DUTY COVER, MACHINED BEARING SURFACE & CONCEALED LIFT HOLES. (SET LID FLUSH WITH FINISHED STREET SURFACE).
- NON-TRAFFIC AREAS: 4" OR 7" HGT. 285# MIN. WGT., EQUAL TO EAST JORDAN 1022-1 WITH HEAVY DUTY COVER, MACHINED BEARING SURFACE & CONCEALED LIFT HOLES. SET TOP 2" ABOVE GRADE (AFTER EARTH SETTLEMENT).
- MINIMUM OF TWO (MAXIMUM 16") OF CONCRETE GRADING RINGS. (SEAL BETWEEN CASTING AND EACH RING WITH 1 1/4" PREFORMED BUTYL RUBBER BASE FLEXIBLE GASKET MEETING FED. SPEC. SS-S-210A. MINIMUM SIZE 3/4" GROUT INTERIOR AND EXTERIOR JOINTS WITH NON SHRINKING GROUT.)
- PRECAST CONE AND RISER SECTIONS ASTM C-478, 4000 P.S.I. CONCRETE.
- JOINTS: O-RING RUBBER GASKET JOINT ASTM C-443 OR ASTM C-76 WITH PREFORMED JOINT FILLER STRIP, OR FORSHEDA 114 PRE-LUBRICATED MANHOLE JOINT SEAL CONFORMING TO ASTM C-443 OR EQUAL. INTERIOR AND EXTERIOR OF JOINT TO BE GROUTED WITH NON-SHRINK GROUT.
- DROP MANHOLE CONSTRUCTION REQUIRED ON ALL DROPS GREATER THAN 24".
- POURED CONCRETE BASE SECTION, 3500 P.S.I. CONCRETE, WITH SMOOTH INVERT CHANNELS ACCURATELY SHAPED TO A DEPTH EQUAL TO 3/4 OF THE INSIDE DIA. OF THE SEWER PIPE. MANHOLE SHELF TO SLOPE TOWARDS CHANNEL AT 1:12. MINIMUM BASE OVERHANG 8" PIPE TO BE CAST INTO POURED BASE USING A RUBBER GASKET WATER STOP.

OR: PRECAST BASE SECTION WITH DURA TECH DS-3 STYLE GASKET FOR 8" & 10" PIPE AND TS-X TYPE GASKET FOR 6" PIPE. ON 6" #5 STONE BEDDING.

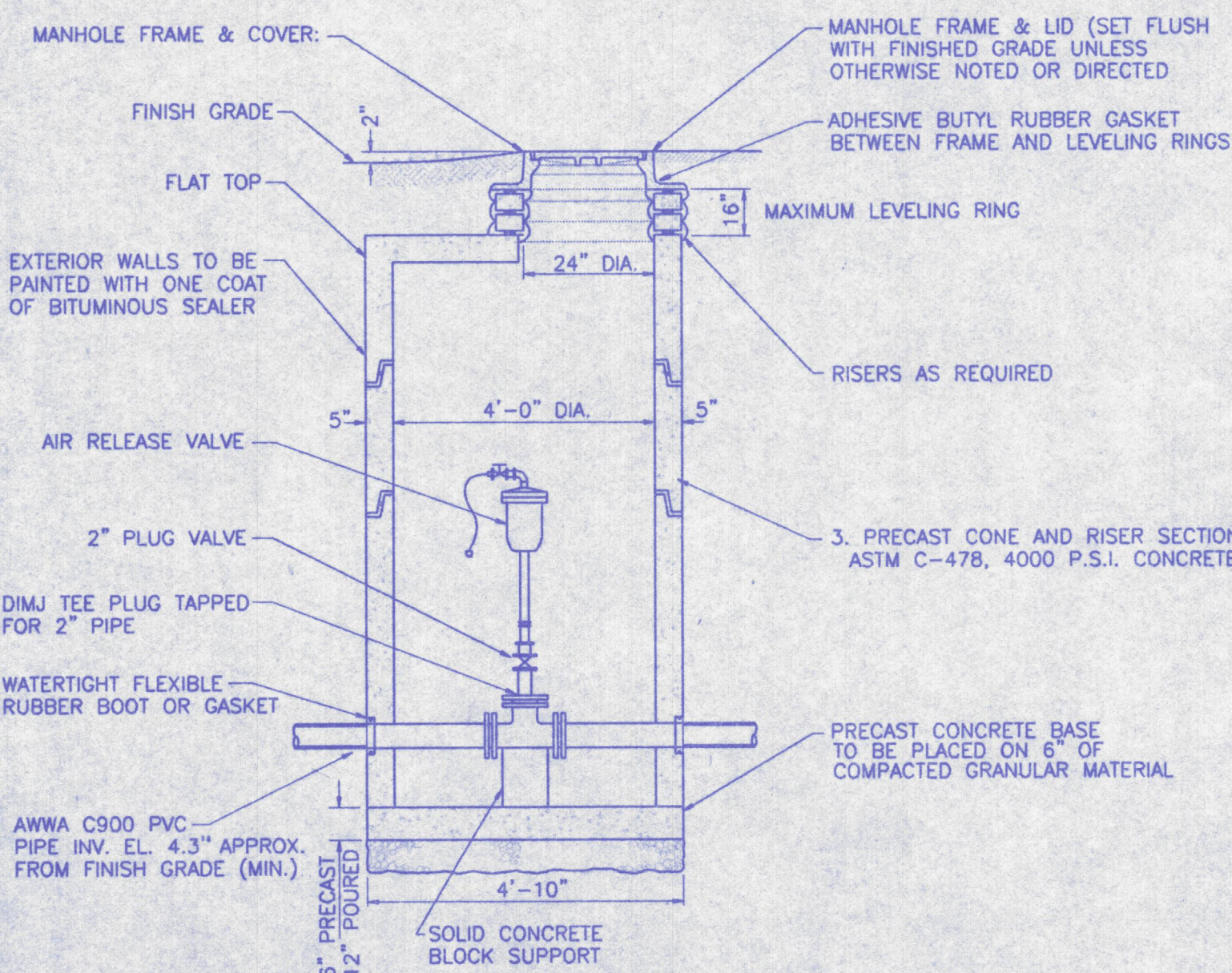
**PRECAST CONC. SANITARY SEWER MANHOLE**

Not To Scale



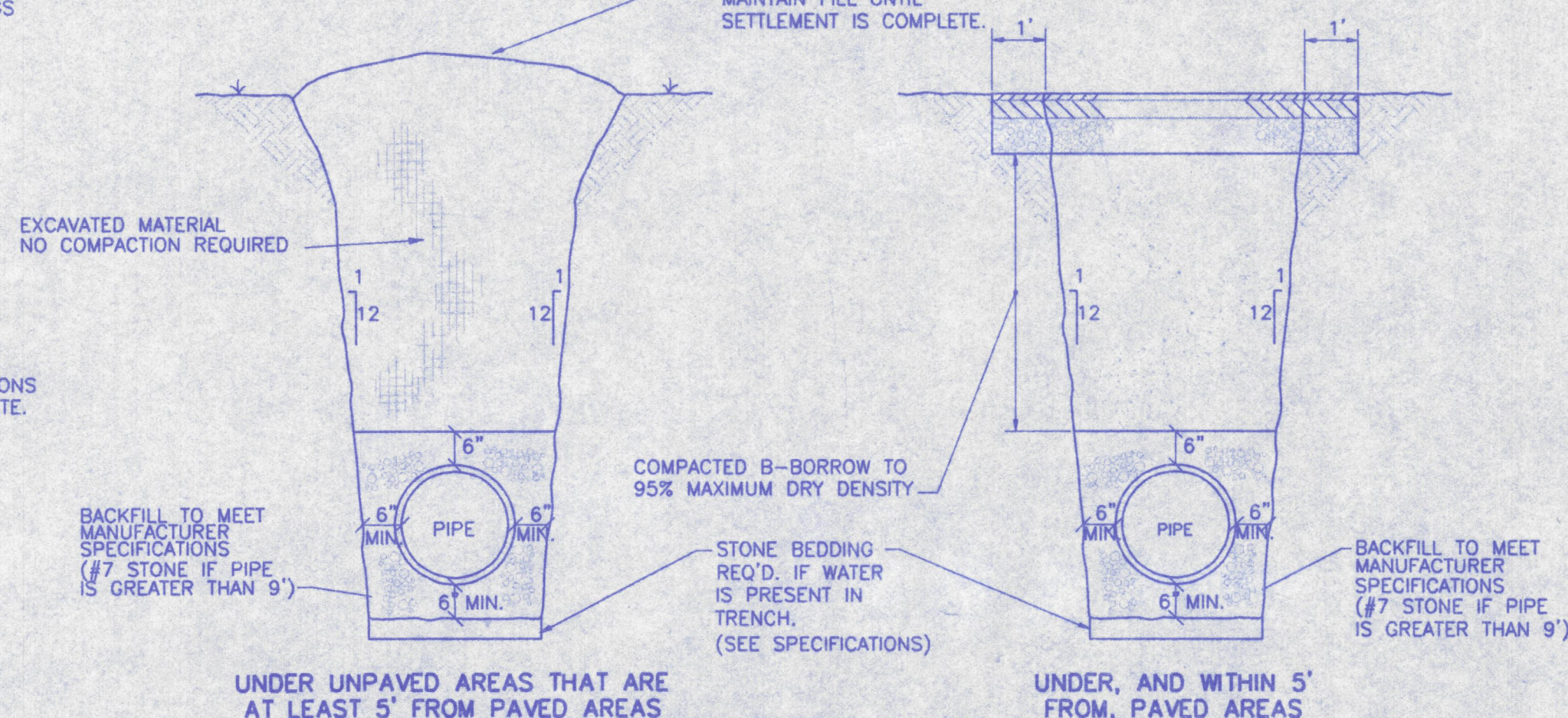
**Precast Flat M.H. Cap**

Not To Scale



**SANITARY FORCE MAIN AIR RELEASE VALVE**

Not To Scale



**PIPE BEDDING DETAIL**

Not To Scale

**VANDEBURGH INDUSTRIAL PARK**  
SANITARY SEWER DETAILS  
EVANSVILLE INDUSTRIAL FOUNDATION  
VANDERBURGH COUNTY, INDIANA

Prepared by: **BERNARDIN LOCHMUELLER & ASSOC., INC.**  
Planners • Engineers • Surveyors

DATE: 9/8/99  
PROJECT NO.: 199-0077 OPD  
ISSUED: FOR CONSTRUCTION

Professional Engineer Seal: **KEVIN M. NODWICK**, No. 19900505, STATE OF INDIANA

REVISION NO. DATE