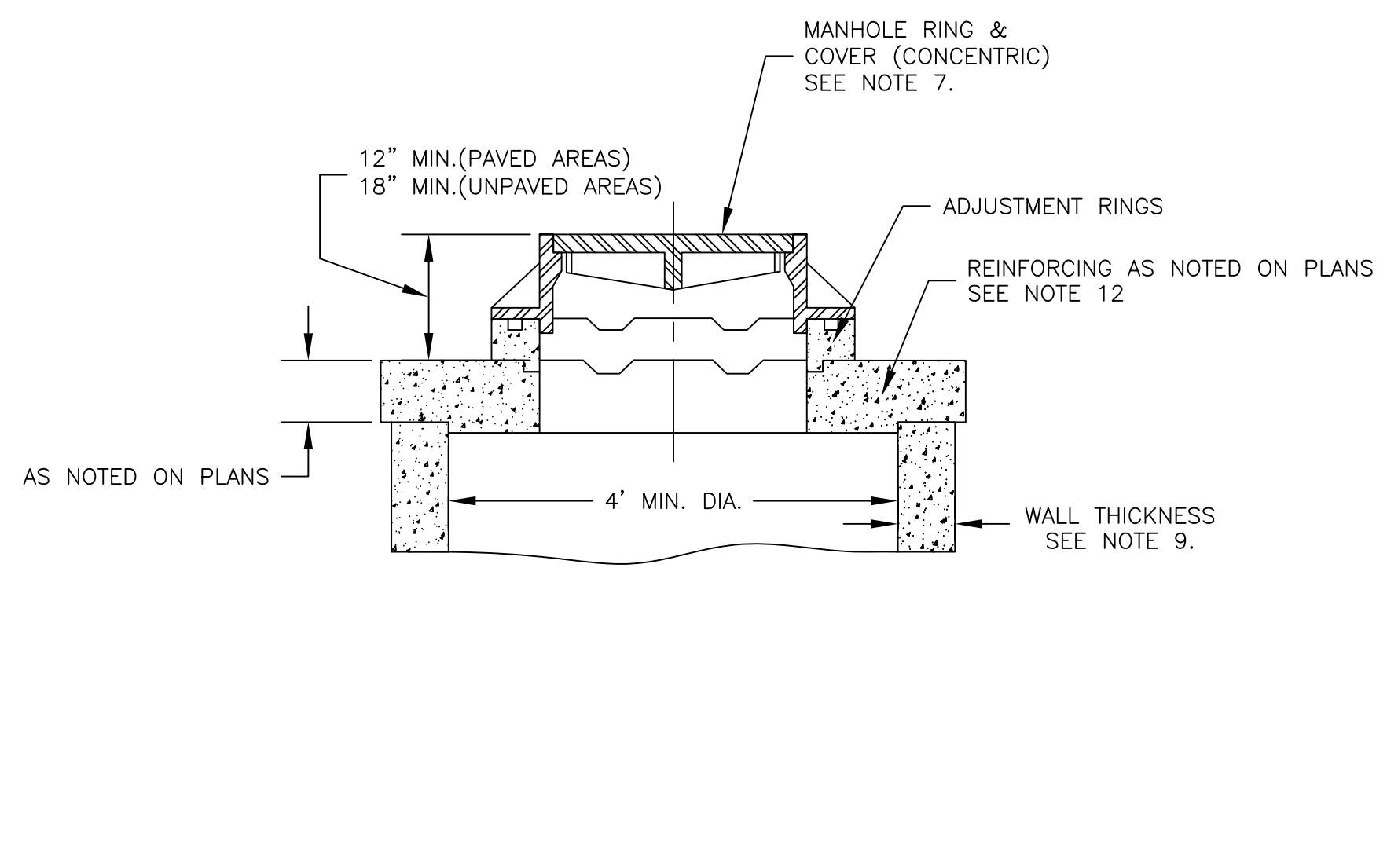
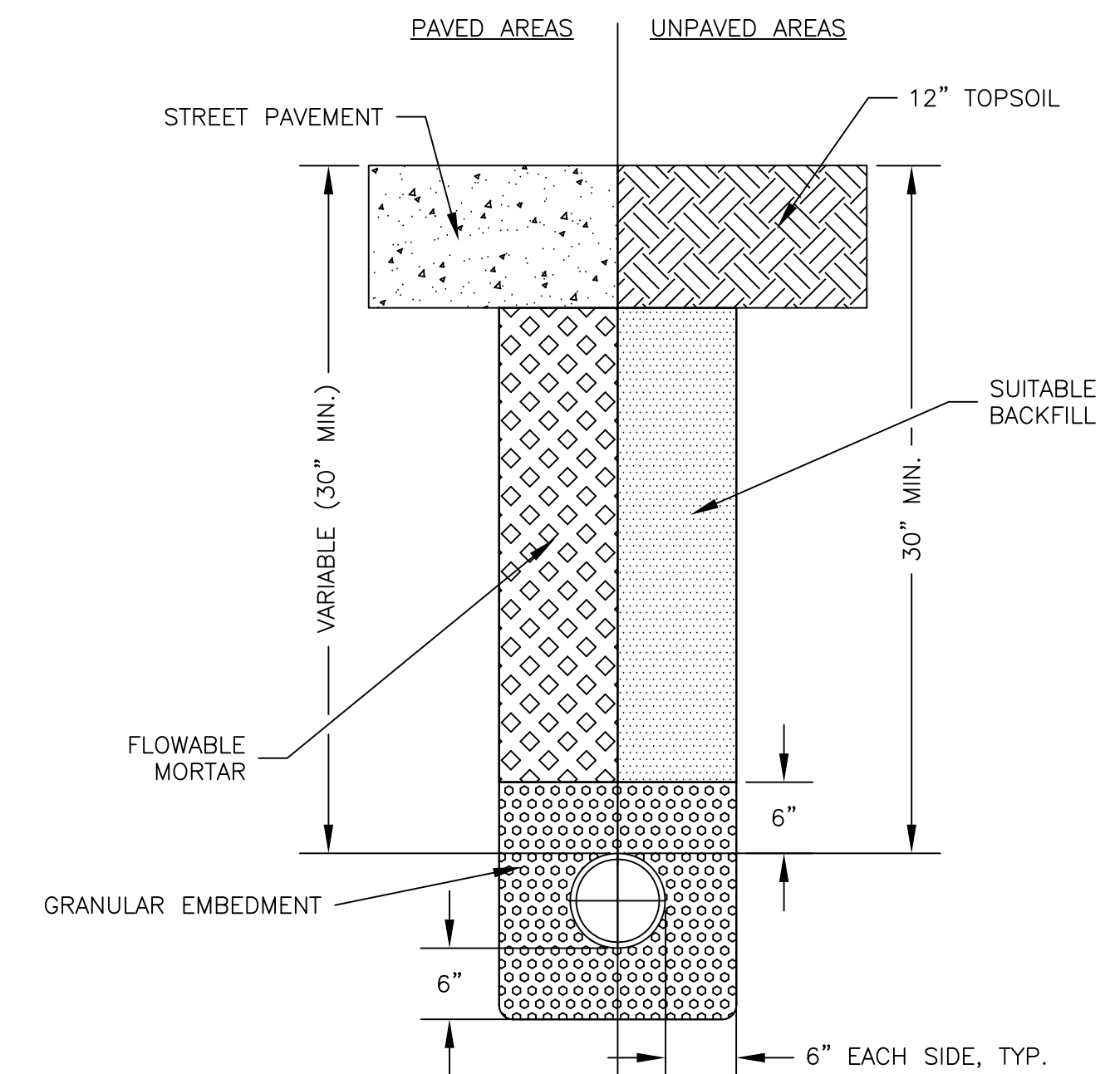


**STANDARD DOGHOUSE MANHOLE**  
N.T.S.



**STANDARD PRECAST MANHOLE (SHALLOW TYPE)**  
N.T.S.

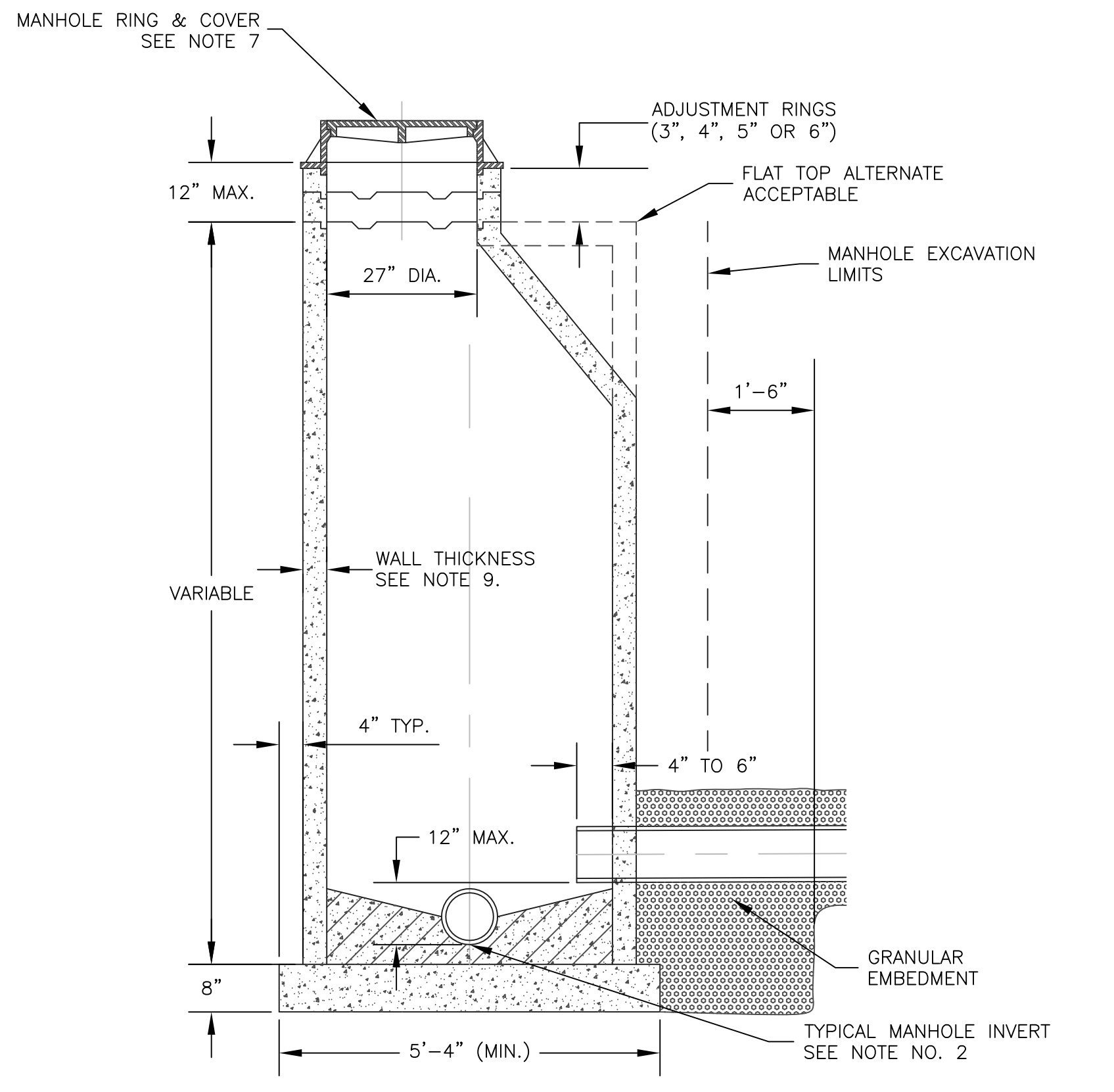


LIMITS OF FLOWABLE MORTAR SHALL CONFORM TO SECTION 2507.3 OF THE CITY OF LAWRENCE CONSTRUCTION AND MATERIAL SPECIFICATIONS SECTION 2500 - SANITARY SEWER (8" TO 18" MAINS).  
SUITABLE BACKFILL MATERIAL IS DEFINED AS ANY MATERIAL FREE OF DEBRIS, ROOTS, VEGETATION, FOREIGN MATERIAL, ROCKS, STONES OR CLODS. IF SUITABLE BACKFILL MATERIAL IS NOT FOUND DURING TRENCH EXCAVATION, IT IS THE CONTRACTOR'S RESPONSIBILITY TO HAUL IN SUITABLE BACKFILL MATERIAL.  
SUITABLE BACKFILL SHALL BE COMPACTED TO 90% MAXIMUM DENSITY AT PLUS OR MINUS 2% MOISTURE CONTENT.

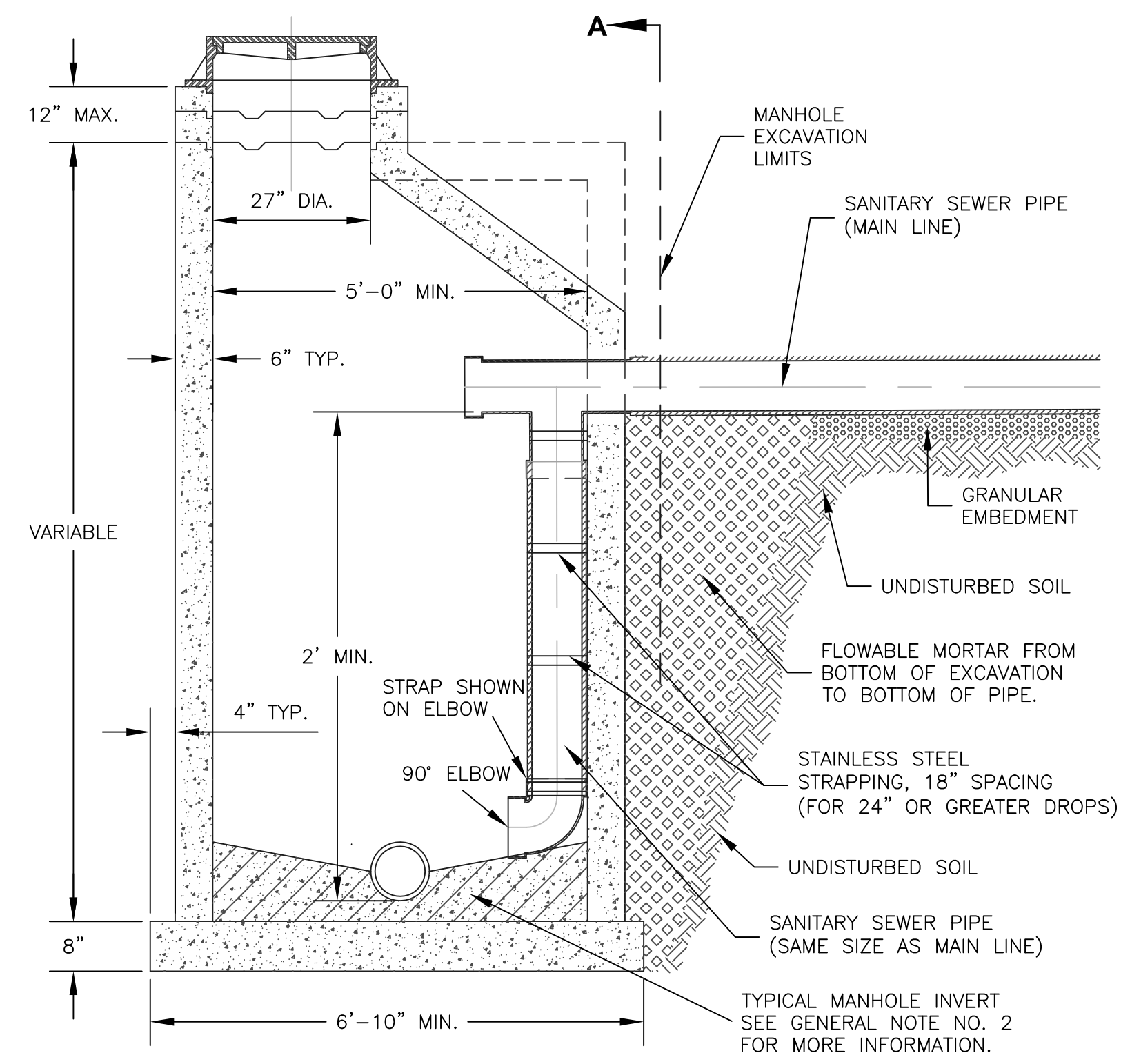
**SANITARY SEWER TRENCH DETAILS**  
N.T.S.

**NOTES**

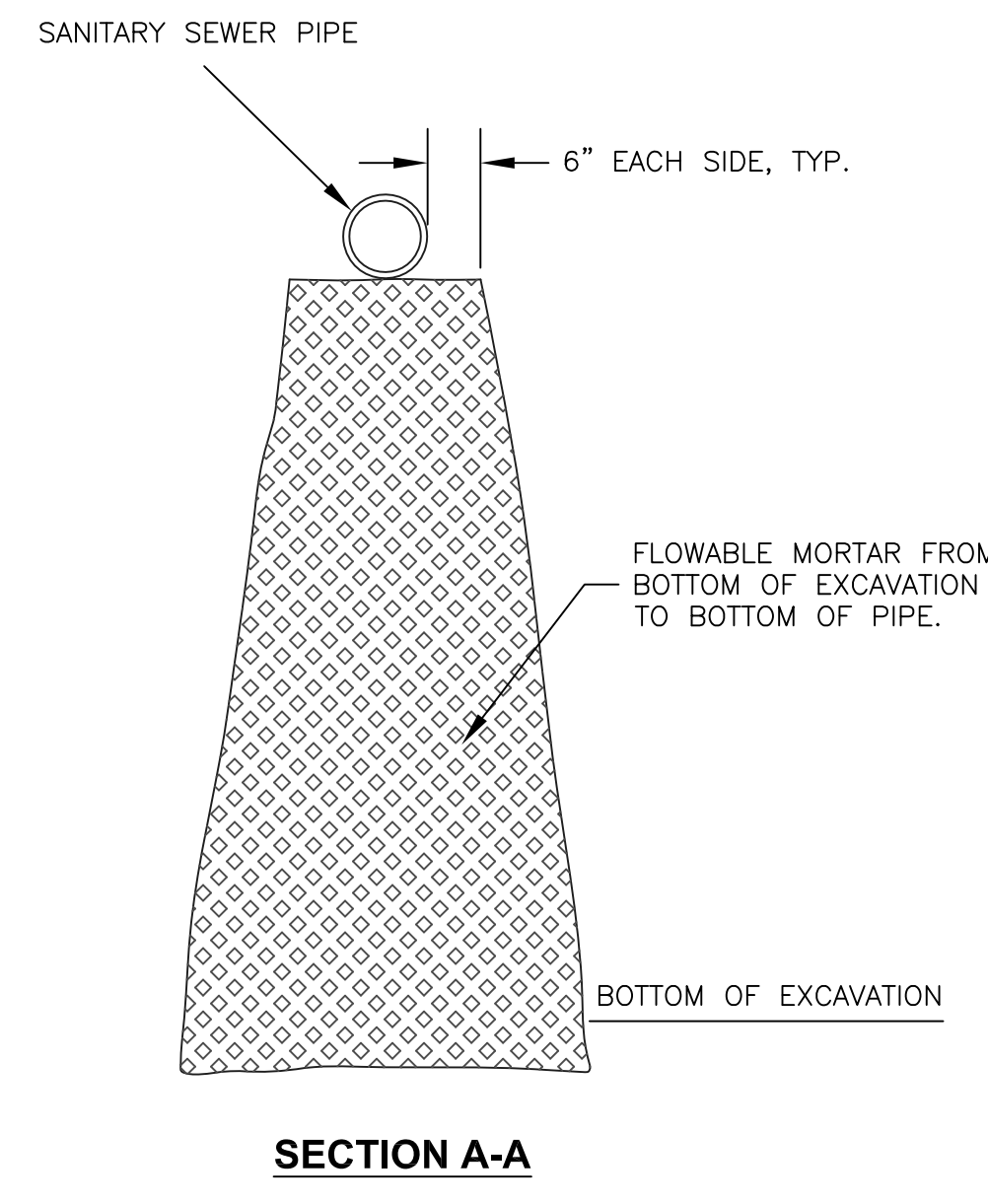
1. PRECAST MANHOLES SHALL CONFORM TO ASTM C-478 AND THE KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT MINIMUM STANDARDS OF DESIGN.
2. PIPE(S) SHALL BE TEMPORARILY PLUGGED PRIOR TO FORMING INVERTS. INVERTS SHALL BE FORMED WITH KDOT CLASS A CONCRETE.
3. STANDARD DEPTH MANHOLE IS 6'-0". LESSER DEPTH TO BE PAID FOR AS STANDARD 6'-0" MANHOLE.
4. GRANULAR EMBEDMENT SHALL BE PLACED FROM THE OUTSIDE FACE OF THE MANHOLE TO A DISTANCE OF 18" BEYOND THE LIMITS OF EXCAVATION FOR THE MANHOLE, AS SHOWN.
5. COMPRESSION TYPE PIPE TO MANHOLE CONNECTIONS SHALL BE A-LOK, MANHOLE PIPE CONNECTORS, OR APPROVED EQUAL.
6. D.I.P., V.C.P., OR TRUSS PIPE TO PIPE CONNECTIONS SHALL BE FERNCO RUBBER GASKET COUPLING OR APPROVED EQUAL.
7. MANHOLE RINGS AND LIDS SHALL BE CLAY & BAILEY NO. 2032, NEENAH NO. R-1736, GCI CASTINGS NO. SM-2401, DEETER FOUNDRY NO. 1048, OR APPROVED EQUAL. ALL MANHOLE LIDS SHALL BE ALIGNED OVER INVERT OUT OF MANHOLE.
8. BEFORE FINAL ACCEPTANCE OF THE PROJECT, A 2"x4" PIECE OF LUMBER, 6'-0" TO 8'-0" TALL, OR A STEEL FENCE POST, 5'-0" TO 6'-0" TALL, SHALL BE PLACED ADJACENT TO EACH MANHOLE, IN ORDER TO LOCATE THESE STRUCTURES FOR CONTRACTORS DURING FUTURE DEVELOPMENT.
9. THE WALL THICKNESS FOR MANHOLES UNDER 16'-0" DEEP SHALL BE 1/12 OF THE INTERNAL SHELL DIAMETER, OR 4", WHICHEVER IS GREATER. THE WALL THICKNESS FOR MANHOLES 16'-0" DEEP OR GREATER SHALL BE 1/12 OF THE INTERNAL SHELL DIAMETER PLUS 1" OR 5", WHICHEVER IS GREATER.
10. IF THE SANITARY SEWER PIPE HAS A DEFLECTION IN IT, SUCH PIPE SHALL BE ROTATED SO THAT THE DEFLECTION IS ON IT'S SIDE.
11. ANY SANITARY SEWER PIPE FOUND TO HAVE MORE THAN A 5% DEFLECTION WILL BE REJECTED.
12. ALL REINFORCING SHALL BE AS NOTED ON PLANS AND/OR SHOP DRAWINGS AND SHALL CONFORM TO CITY OF LAWRENCE UTILITIES DEPARTMENT SPECIFICATIONS FOR SANITARY SEWER, SECTION 2510.3.6.



**STANDARD PRECAST MANHOLE (ECCENTRIC CONE)**  
N.T.S.




**STANDARD DROP MANHOLE SECTION (FOR 8" OR 10" MAINS ONLY)**  
N.T.S.



**SECTION A-A**

BY	DATE	REVISION
JDS	12/2010	UPDATE TO DIMENSIONS ON DROP MANHOLE AND TYPICAL TRENCH DETAIL
JDS	12/2011	REVISE REFERENCE TO CA-5 AND CM-H TO GRANULAR EMBEDMENT

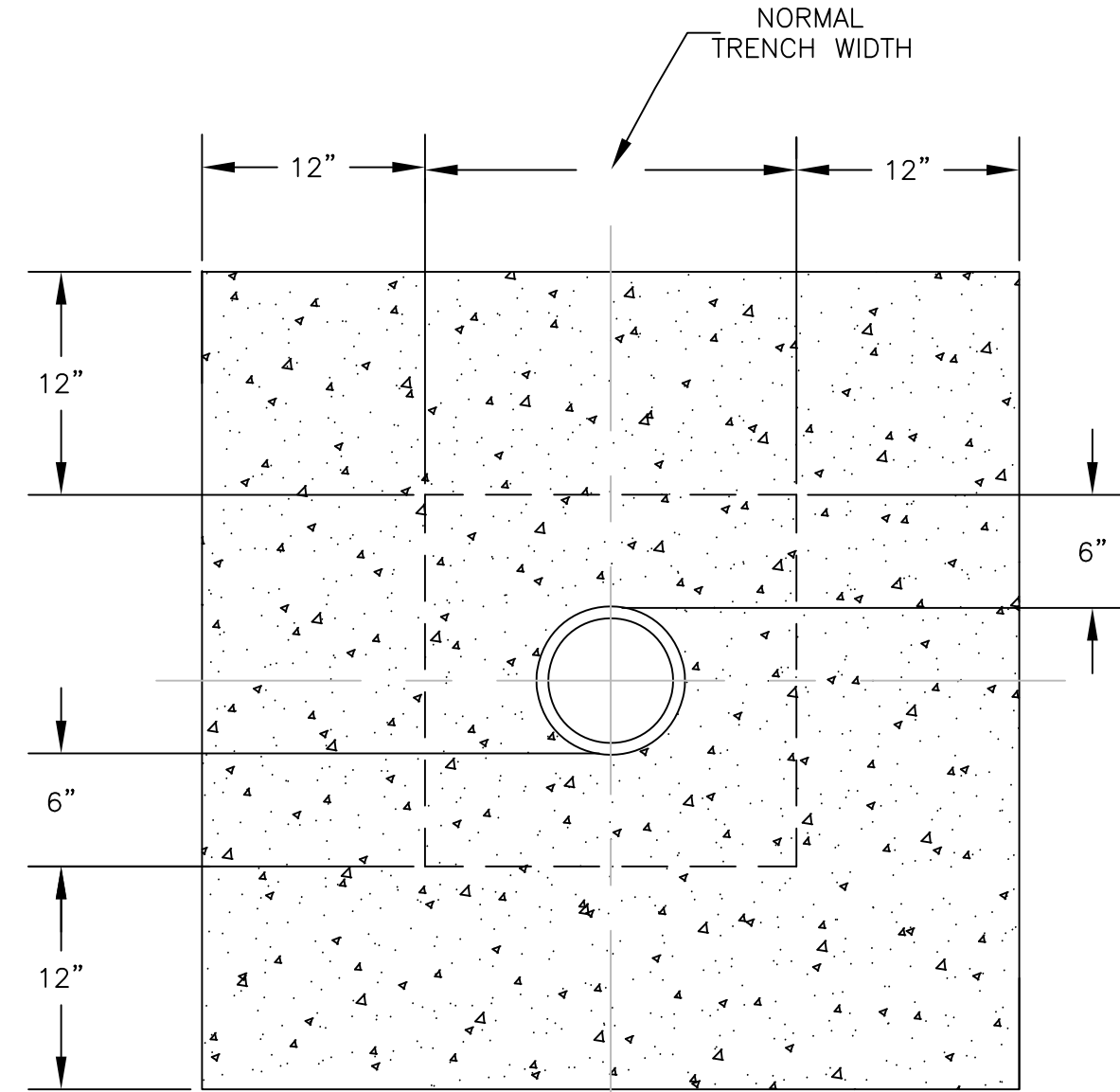


**City of Lawrence**  
UTILITIES

**STANDARD SANITARY DETAILS-GRAVITY**

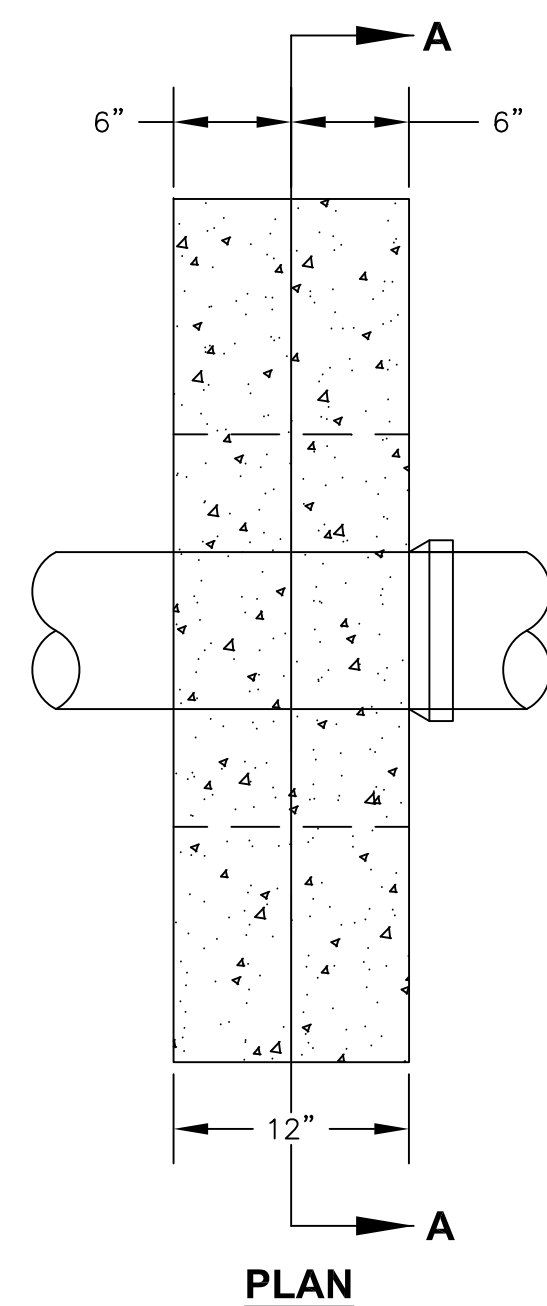
JOHN SHUTAK  
UTILITIES ENGINEER

DAVID L. CORLISS  
CITY MANAGER

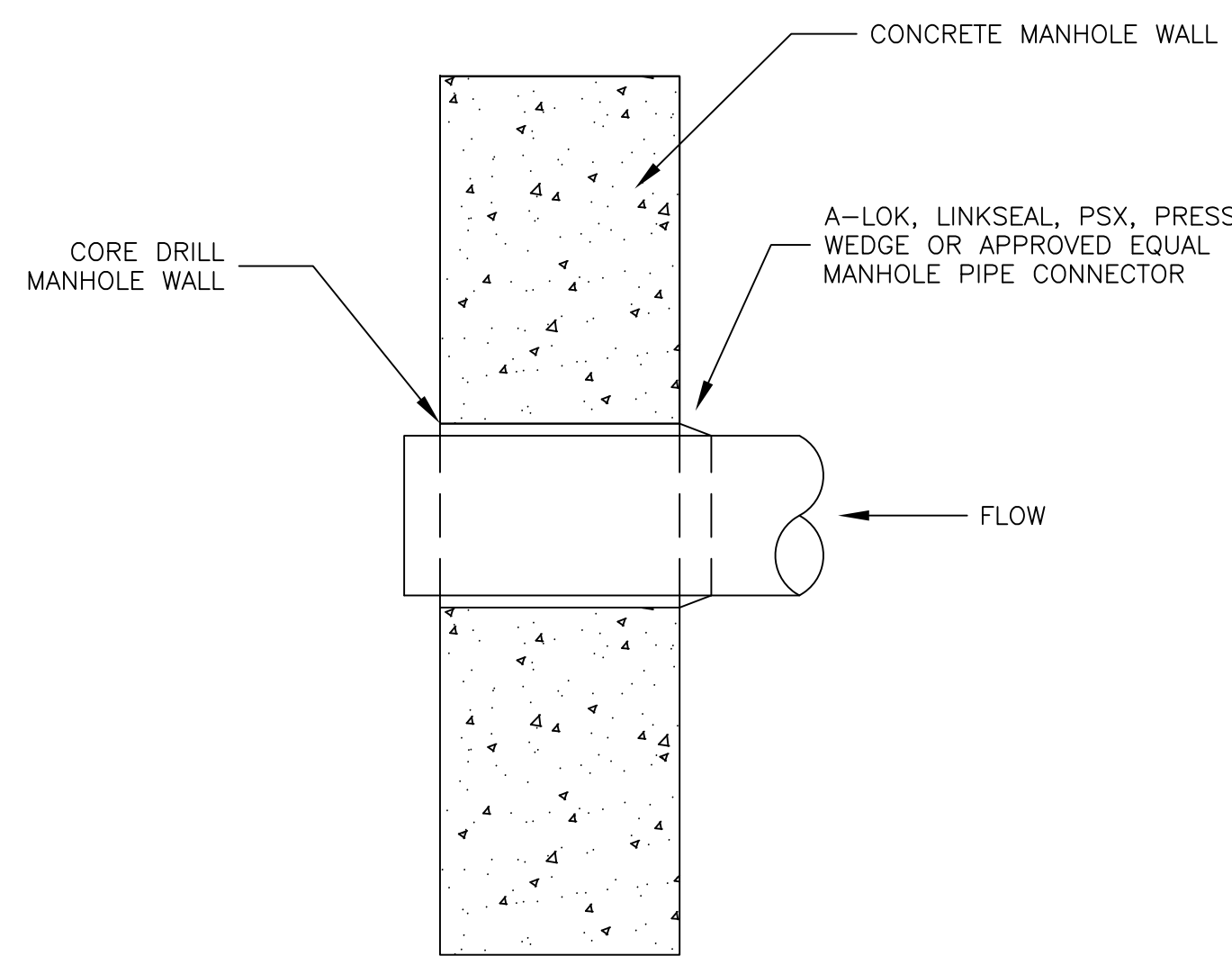


SECTION A-A

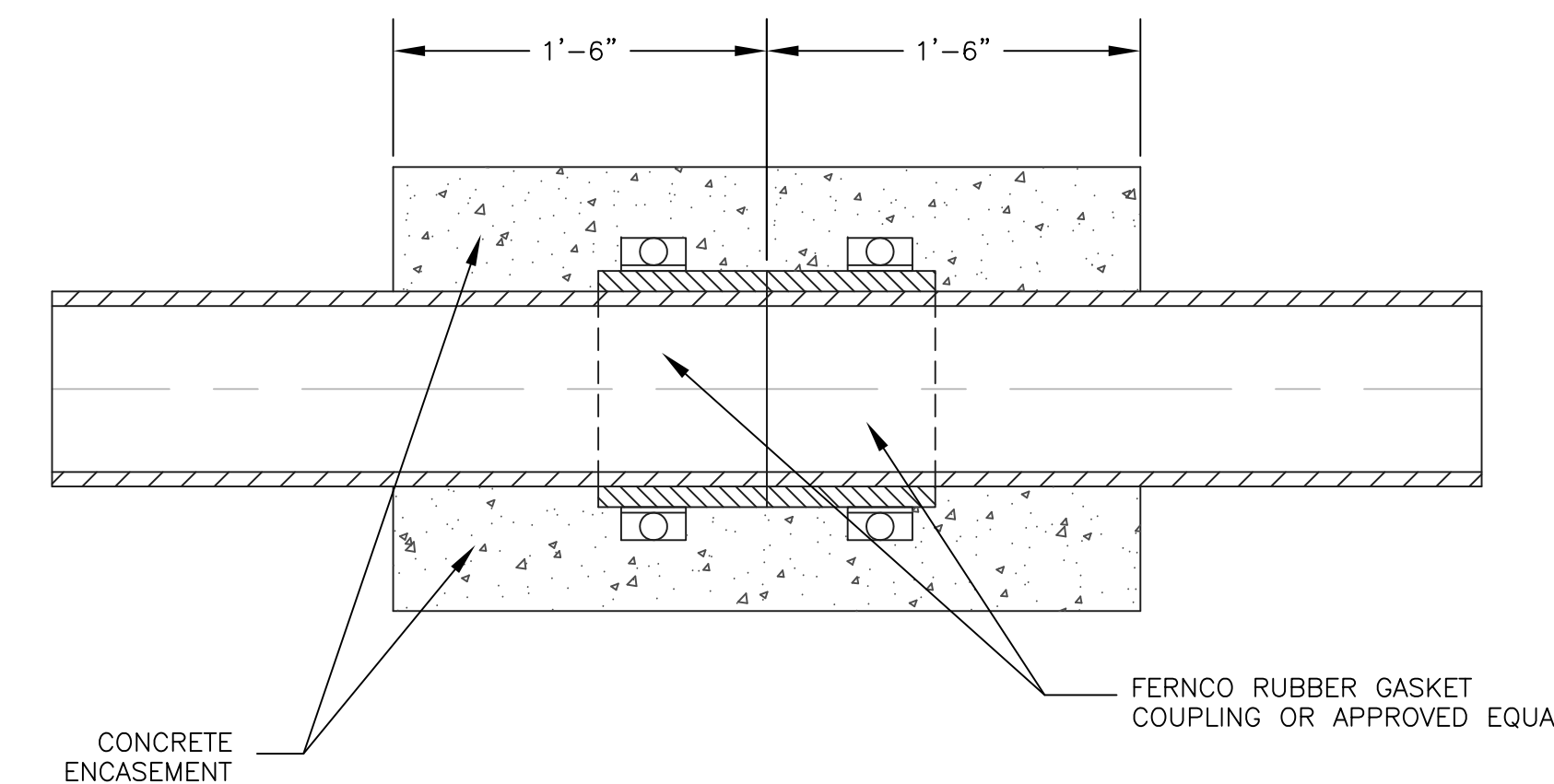
CONCRETE COLLAR DETAIL  
N.T.S.



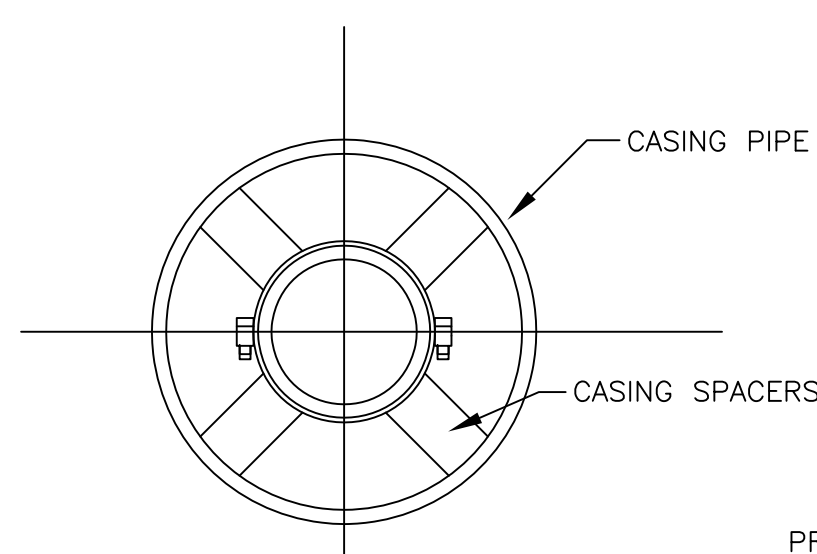
PLAN



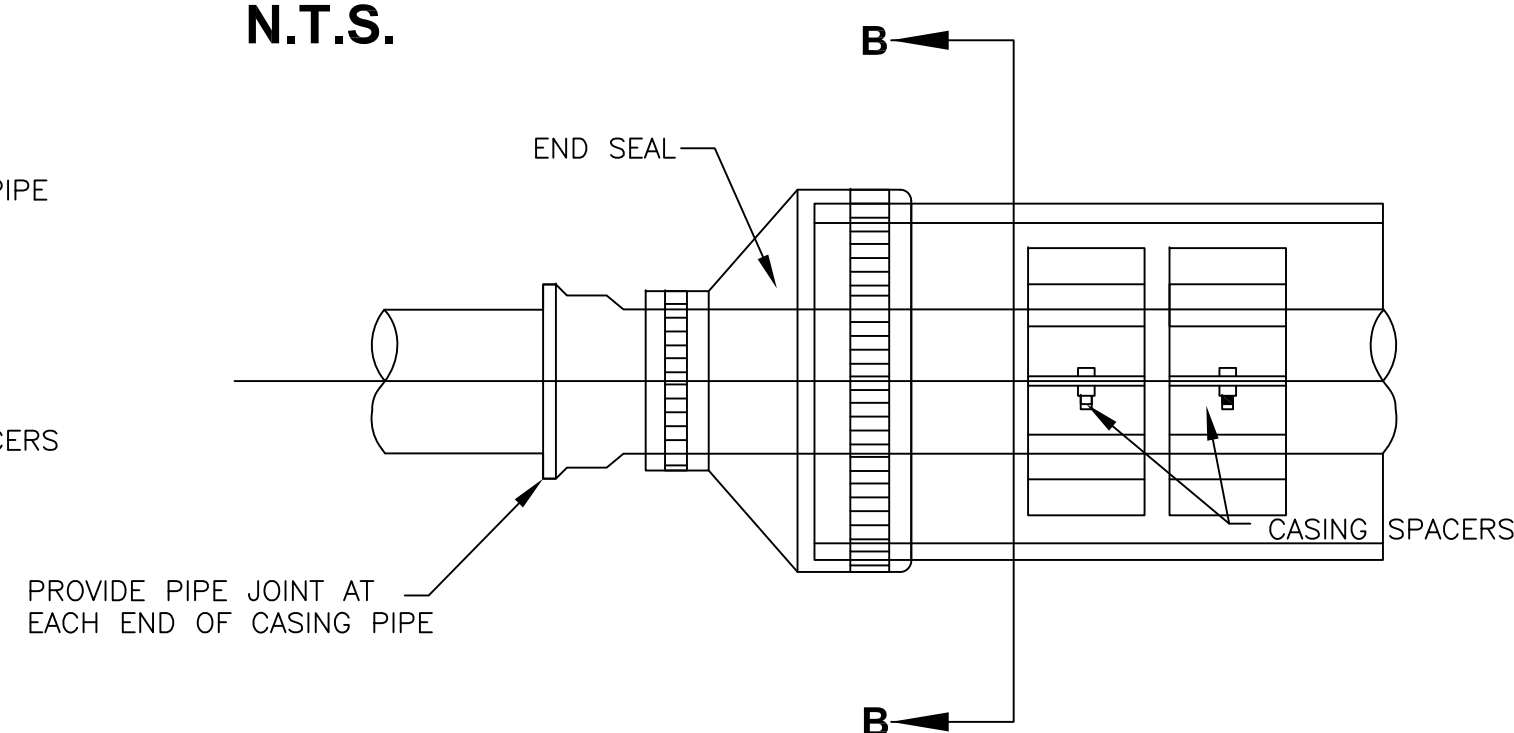
CONNECTION TO EXISTING MANHOLE  
N.T.S.



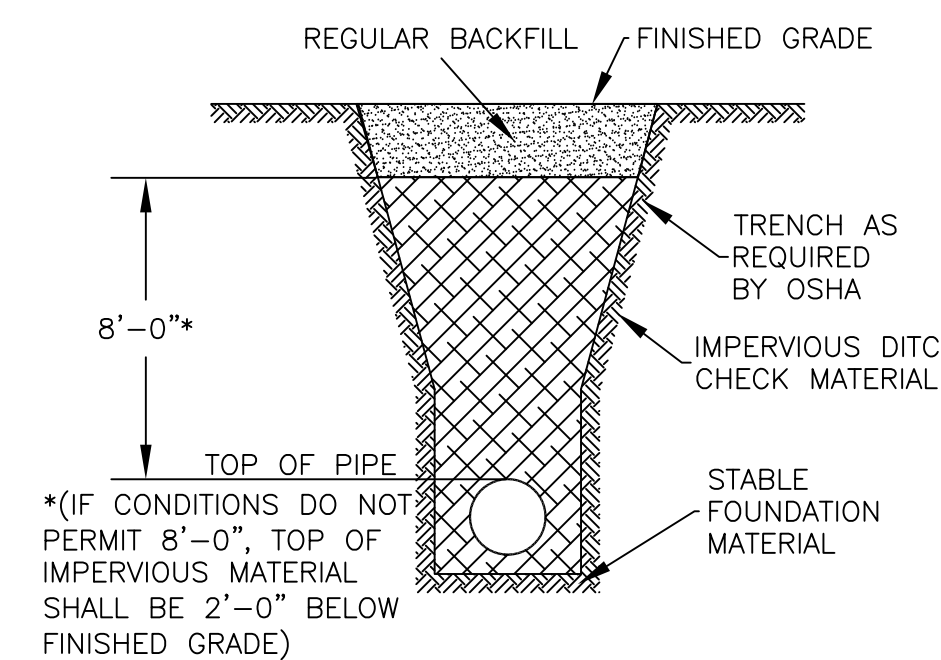
D.I.P., V.C.P. OR TRUSS PIPE CONNECTION  
(FOR REPAIRS ONLY)  
N.T.S.



SECTION B-B

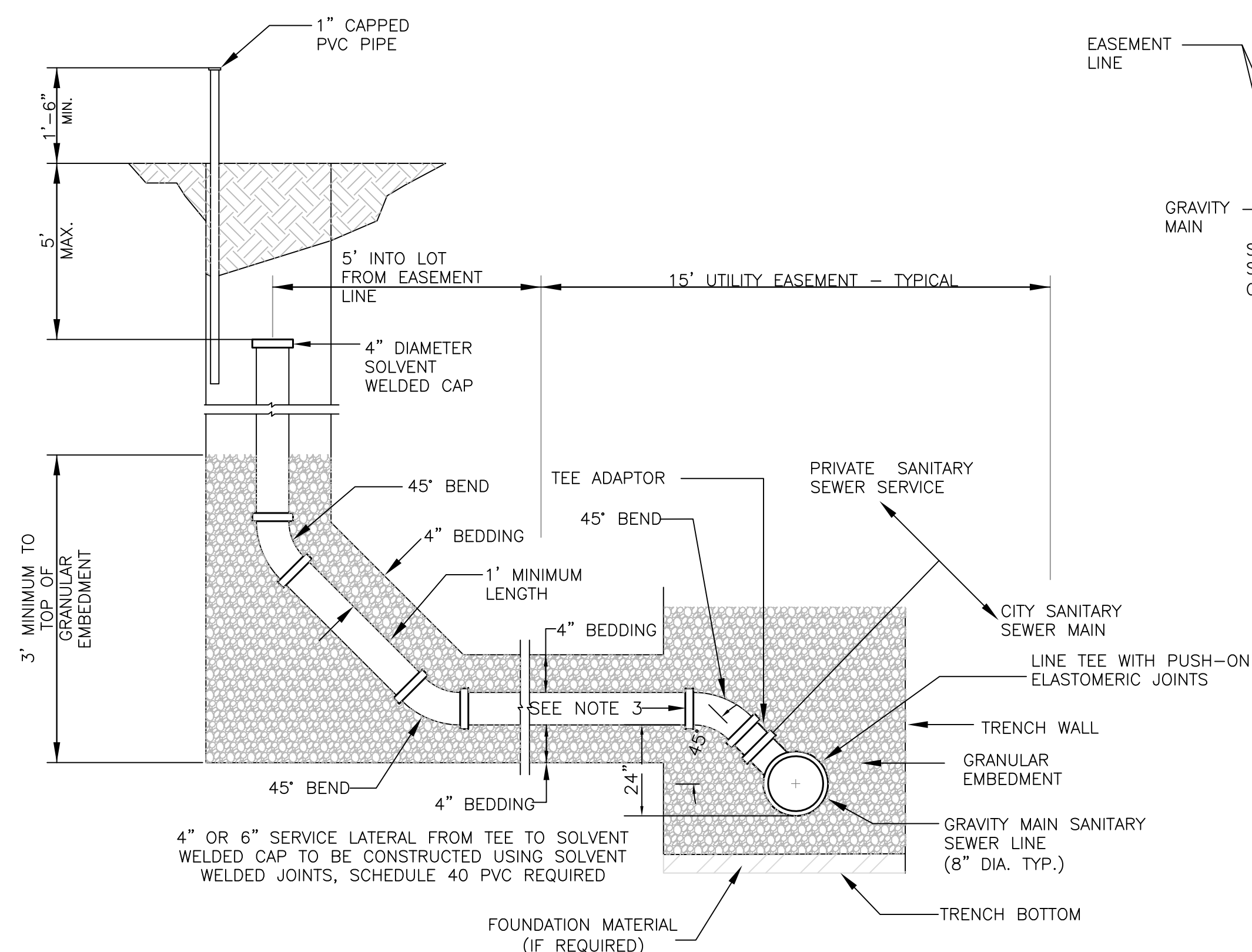


CASING PIPE DETAIL  
N.T.S.

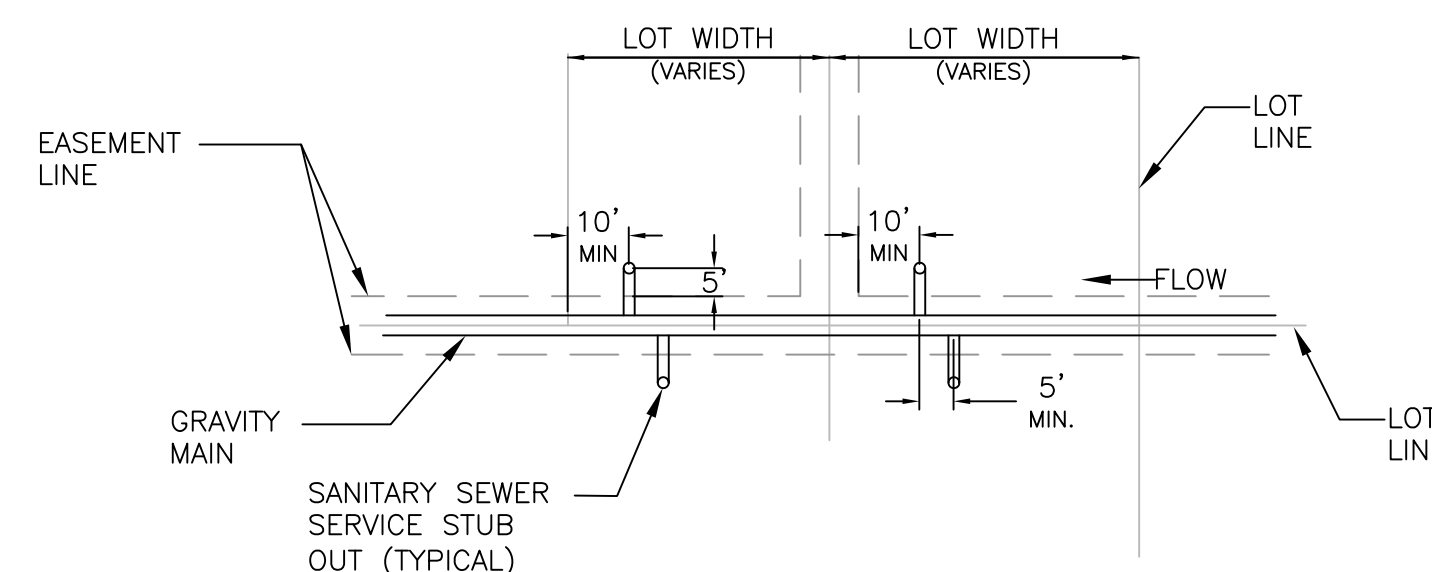


- NOTES: 1. IMPERVIOUS DITCH CHECKS SHALL BE PLACED WHERE SHOWN ON THE PLANS. LENGTHS SHALL BE A MINIMUM OF 10 LF. FLOWABLE FILL IS REQUIRED FOR PVC PIPE. FOR OTHER PIPE TYPES, CLAY MATERIAL OR FLOWABLE FILL MAY BE USED AT THE CONTRACTOR'S OPTION. FLOWABLE FILL MATERIAL SHALL CONSIST OF A PORTLAND CEMENT GROUT HAVING A MINIMUM TWENTY-EIGHT (28) DAY COMPRESSIVE STRENGTH OF FIVE HUNDRED POUNDS PER SQUARE INCH (500 PSI). ORGANIC MATERIAL SHALL BE SELECT CLAY MATERIAL SEPARATED FROM EXCAVATED MATERIALS, FREE OF CLODS, CLUMPS, DEBRIS, ORGANIC MATERIAL, AND STONES, COMPACTED SO AS TO OBTAIN 90% OF MAXIMUM DENSITY AT OPTIMUM MOISTURE PLUS OR MINUS 2%, AS DETERMINED BY ASTM D698.
2. REGULAR BACKFILL (ABOVE DITCH CHECK) SHALL BE FREE OF DEBRIS, ORGANIC MATERIALS AND STONES LARGER THAN 12".

IMPERVIOUS DITCH CHECK  
N.T.S.

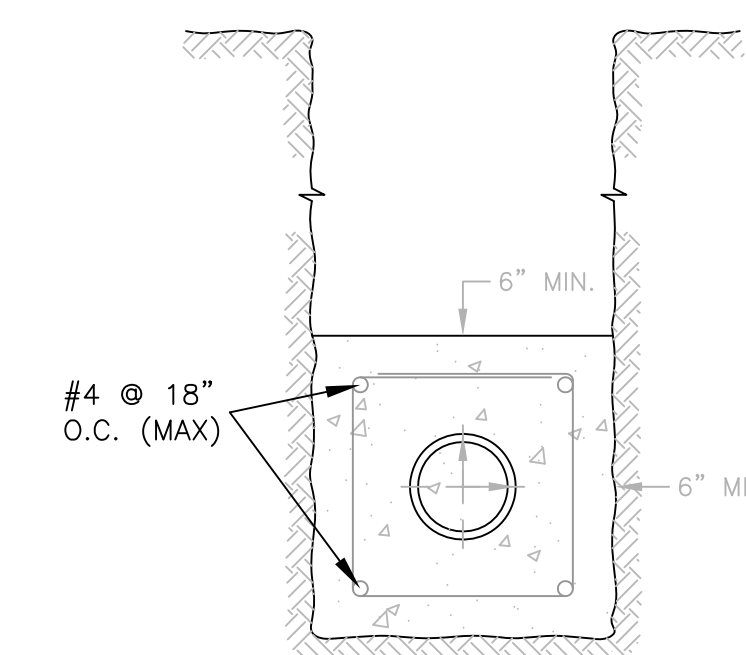


SANITARY SEWER SERVICE  
CONNECTION STUB OUT  
N.T.S.




PLAN VIEW OF  
SANITARY SEWER SERVICE  
CONNECTION STUB OUT LOCATIONS  
BACK LOT LINE EXAMPLE SHOWN

- GENERAL NOTES:
- SERVICE TEE SHALL BE INSTALLED SO THAT SERVICE CONNECTION IS AT LEAST 45° FROM HORIZONTAL.
  - SOLVENT WELDED CONNECTIONS ARE REQUIRED FOR THE ENTIRE SERVICE CONNECTION FROM THE TEE TO THE CAP.
  - MINIMUM GRADE FOR SERVICE LATERAL IS 1.00% FOR SIX (6) INCH AND 2.00% FOR FOUR (4) INCH SERVICE LINES.
  - LOCATION OF TEE CONNECTION BY STATION AND HORIZONTAL LENGTH OF STUB OUT TO BE NOTED ON CONSTRUCTION DRAWINGS OF SANITARY SEWER MAIN CONSTRUCTION.



CONCRETE ENCASEMENT DETAIL  
N.T.S.

BY	DATE	REVISION


**City of Lawrence**  
 UTILITIES

STANDARD SANITARY  
 DETAILS-GRAVITY

JOHN SHUTAK  
UTILITIES ENGINEER
DAVID L. CORLISS  
CITY MANAGER