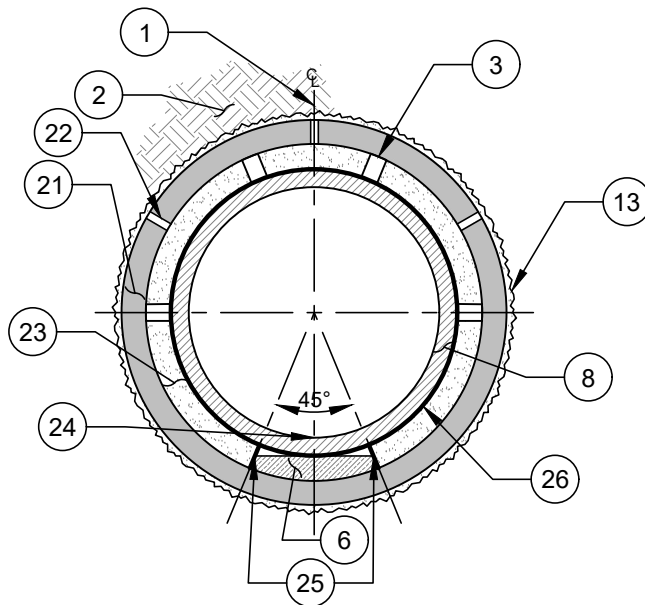
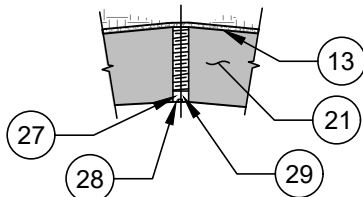


TUNNEL SECTION WITH SKID AND STEEL RISER DETAIL



TUNNEL SECTION WITH SOLID RAILS DETAIL



GROUT HOLE DETAIL

NOTES FOR TUNNEL CONSTRUCTION:

- a. ALL ALTERNATE CONSTRUCTION MEANS AND METHODS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO INITIATING CONSTRUCTION.
- b. STRICTLY ADHERE TO SPECIFICATION FOR GROUTING BEHIND TUNNEL LINER PLATES. CAUTION: NO GROUTING SHALL BE PERFORMED WITHOUT NOTIFYING ENGINEER AT LEAST FOUR (4) HOURS IN ADVANCE. FOLLOWING NOTIFICATION, GROUTING MAY PROCEED.
- c. A MINIMUM OF THREE (3) CASING SPACERS PER JOINT OF PIPE SHALL BE PROVIDED.
- d. REFER TO TECHNICAL SPECIFICATIONS FOR SPECIFIC CASING SPACER.
- e. EACH PIPE JOINT INSIDE TUNNEL CASING SHALL BE TESTED WITH JOINT TESTER PRIOR TO GROUTING. DEFECTIVE JOINTS SHALL BE REPAIRED AS APPROVED BY THE ENGINEER.
- f. FOR SEWER PROJECTS, CONTRACTOR SHALL ESTABLISH, RECORD, AND SUBMIT TO ENGINEER FOR APPROVAL PRIOR TO FINAL GROUTING DATA SHOWING HORIZONTAL ALIGNMENT AND GRADE OF CARRIER PIPE WITHIN TUNNEL.
- g. ONCE THE INTERNAL CELLULAR GROUTING BEGINS, WORK SHALL BE CONTINUOUS UNTIL COMPLETED. CARRIER PIPE MAY BE INSTALLED FROM EITHER END OF TUNNEL EXCEPT:
 - i.a. JOINTS (BELLS AND SPIGOTS) SHALL BE ORIENTED BELLS UPSTREAM.
 - i.b. JOINTS SHALL BE PULLED/PUSHED IN PLACE ONE JOINT AT A TIME TO ALLOW PROPER BLOCKING.
- j. CELLULAR GROUTING OF VOID BETWEEN TUNNEL AND CARRIER PIPE SHALL BE DONE FROM UPSTREAM END OF TUNNEL.

NO. DESCRIPTION:

- 1. CENTERLINE OF LINER AND CARRIER PIPE.
- 2. UNDISTURBED EARTH.
- 3. BLOCKING OR TREATED WOOD BLOCKING WITH WEDGES (TYPICAL 4 RADIAL LOCATIONS EACH PIPE LENGTH). SEE NOTE C.
- 4. GLASS REINFORCED POLYMER SKID SIZE & NUMBER TO BE DETERMINED BY SPACER MANUFACTURER. (SEE NOTE B, c).
- 5. WELDED STEEL RISER (TYP.) (SEE NOTE B, b).
- 6. CONCRETE INVERT.
- 7. STEEL CONTINUOUS ANGLE GUIDE (TYP. OF 2).
- 8. CARRIER PIPE.
- 9. PAINTED STEEL SECTIONAL BAND WITH PVC LINING APPLIED TO THE INNER SURFACE (SEE NOTE B, a).
- 10. FILL VOID BETWEEN TUNNEL LINER AND CARRIER PIPE WITH CELLULAR GROUT (SEE NOTE C).
- 11. STEEL PLATE TUNNEL LINER.
- 12. FLANGE LINE OF STEEL TUNNEL LINER PLATES.
- 13. PRESSURE GROUT FILLED ANNULAR SPACE OUTSIDE OF TUNNEL LINER/PLATES OR CASING AFTER INSTALLATION.
- 14. TUNNEL.
- 15. TUNNEL ACCESS SHAFT.
- 16. EXISTING GROUND SURFACE.
- 17. 8" MASONRY BULKHEAD (TYP.) EACH END.
- 18. PIPE JOINT.
- 19. CENTERLINE OF LINER.
- 20. CENTERLINE OF CARRIER PIPE.
- 21. JACKING PIPE, GALVANIZED TUNNEL LINER, OR STEEL CASING.
- 22. 2" DIAMETER MIN. GROUT PORTS. ALTERNATE 10, 12, AND 2 O'CLOCK POSITIONS.
- 23. GROUTED ANNULAR SPACE WITH LIGHTWEIGHT CELLULAR LOW PRESSURE GROUT (CELLULAR CONCRETE ONLY) TO COMPLETELY FILL TUNNEL EXCAVATION.
- 24. CARRIER PIPE INVERT LOCATION AS SHOWN ON PLAN SHEETS.
- 25. SOLID RAILS OR EQUIVALENT.
- 26. MORTAR BAND.
- 27. AFTER GROUTING, SEAL ALL GROUT HOLES WITH RECESSED PIPE PLUG. INSTALL PLUG FLUSH WITH INSIDE OF PIPE. FILL ANY VOIDS WITH DRY PACK MORTAR AND INSTALL LINING PATCH OVER GROUT HOLE IN ACCORDANCE WITH SPECIFICATIONS.
- 28. RECESSED 1 INCH MINIMUM.
- 29. 2" MIN. DIAMETER THREADED NIPPLE WITH RECESSED FIBERGLASS PIPE THREAD.

NOTES:

- A. ALL PIPE SHALL BE RESTRAINED JOINT.
- B. CASING SPACERS CONSIST OF a) STEEL SECTIONAL BAND WITH FLEXIBLE PVC LINER ON THE INNER SURFACE b) STEEL RISERS WELDED TO STEEL BAND SECTIONS c) GLASS REINFORCED POLYMER SKIDS CONNECTED TO THE RISERS. CASING SPACERS TO BE SUPPLIED AS READY TO INSTALL UNITS BY THE MANUFACTURER. THE NUMBER OF SPACERS PER PIPE SECTION SHALL BE A MINIMUM OF 3 (BASED ON 18-20 FT PIPE SEGMENTS), OR AS REQUIRED BY THE MANUFACTURER BASED ON ALLOWABLE LOAD. ALL SPACERS SHALL BE EQUALLY SPACED ALONG THE PIPE.
- C. BLOCKING TO BE INSTALLED AS SHOWN TO PREVENT ANY MOVEMENT IN THE CARRIER PIPE DURING CELLULAR GROUTING OF THE SPACE BETWEEN THE TUNNEL LINER/CASING PIPE AND THE CARRIER PIPE.

NO SCALE

VERSION
1.0
DATE
04/2024

DETAIL
21.3