



INSTALLATION GUIDE FOR RISERS

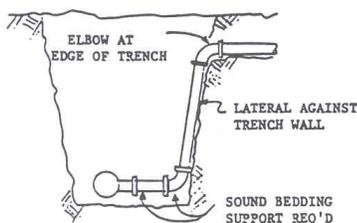
Sewer risers or vertical stacks may be required in deep sanitary sewers to minimize excavation for service lines. Risers are generally permitted where the main sewer line is deeper than 7 ft. (2m.).

Any vertical riser pipe, even at shallow depths, creates a load scenario not common in other sewer installations. Any settlement of material alongside the riser produces a “drag-down” load due to the frictional forces at the interface. (A vertical riser is considered anything more than 45° from the horizontal.) Additionally, settlement of the lateral fitting assembly produces the same drag-down load. These loads must be mitigated or transferred harmlessly off the stack to prevent such things as over-insertion, fittings’ fracture, main sewer line deflection or misalignment, etc.

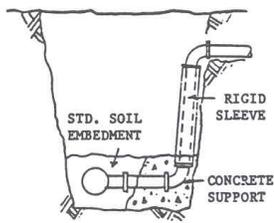
The design of vertical risers (especially at main lines at depths of 13 ft. ‘4m.’ or greater) should examine these drag-down loads and make specific accommodation for them. The figures below show typical deep riser installations, which will help to minimize these vertical loads.

In addition, the following practices are considered appropriate for all riser installations:

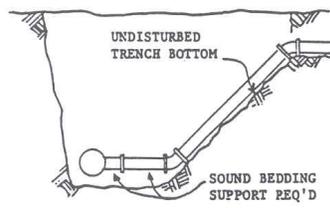
- Transitions from horizontal to vertical should be smooth and well supported. This may be accomplished with the fitting combinations, gradual bends and/or trench geometry.
- Service lateral from the main sewer should exit at an angle no greater than 45 degrees from the horizontal.
- Use a single joint of lateral pipe for the riser section whenever possible (up to 13 feet).
- Compaction, to minimize or eliminate settlement and the resulting loading is critical beneath the main line sewer, elevation fitting and any horizontal portion on the assembly (top and bottom).
- When trench boxes are used, the riser should be installed along the inside wall of the trench box, with adequate support provided at the transition to horizontal, similar to *Figure b* below.
- Service laterals and fittings should be installed without angular joint deflections.



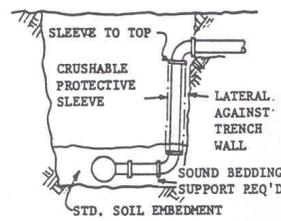
a) FOR MODERATE TRENCH DEPTH



b) RIGID SLEEVE FOR ANY TRENCH
(CONCRETE MUST SUPPORT SLEEVE)



c) SLOPING LATERAL TRENCH—ANY DEPTH
(SLOPE AT 1:1 OR FLATTER)



d) CRUSHABLE SLEEVE—ANY DEPTH
(SLEEVE OF NEAR ZERO COLUMN STRENGTH)