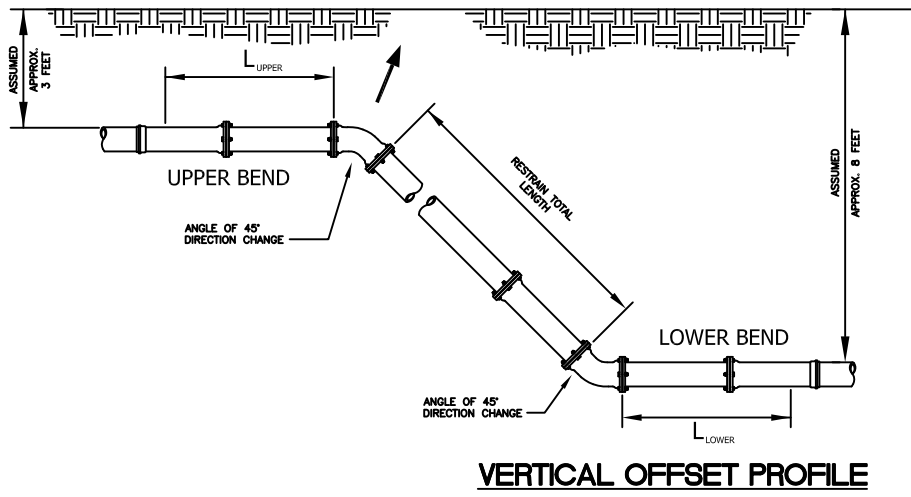
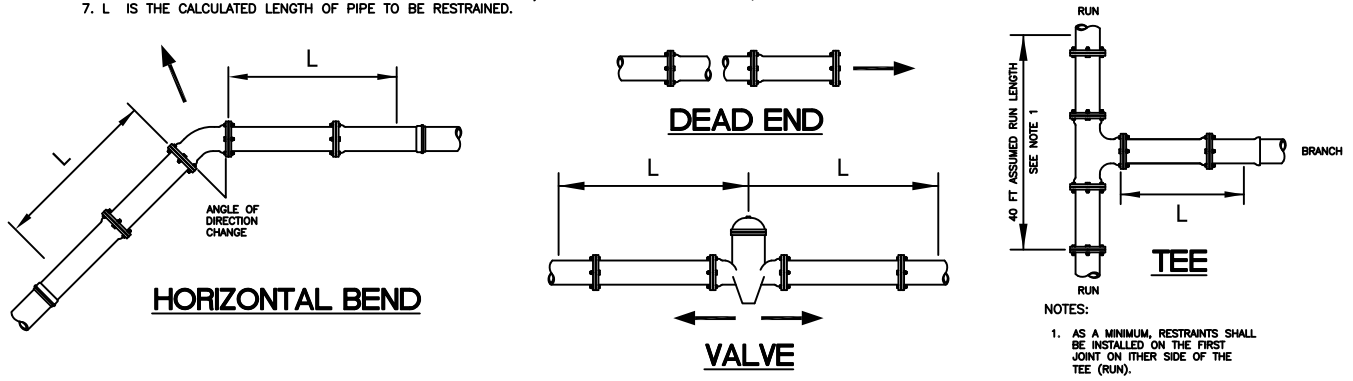


| DUCTILE IRON | | | | | | | | |
|----------------|--|-----|-------|--------|------------------|------------|---------------------|--------------------|
| Pipe Size (in) | Minimum Pipe Length to be Restrained, L (ft) | | | | | | | |
| | Horizontal Fittings | | | | | | 45° Vertical Offset | |
| | 90° | 45° | 22.5° | 11.25° | Dead Ends/Valves | Equal Tees | L _{UPPER} | L _{LOWER} |
| 3 | 22 | 10 | 5 | 3 | 46 | 1 | 19 | 10 |
| 4 | 27 | 11 | 6 | 3 | 56 | 1 | 23 | 11 |
| 6 | 38 | 16 | 8 | 4 | 79 | 1 | 33 | 16 |
| 8 | 48 | 20 | 10 | 5 | 101 | 11 | 42 | 20 |
| 10 | 58 | 24 | 12 | 6 | 123 | 32 | 51 | 24 |
| 12 | 67 | 28 | 14 | 7 | 143 | 51 | 59 | 28 |
| 14 | 76 | 32 | 15 | 8 | 164 | 70 | 68 | 32 |
| 16 | 84 | 35 | 17 | 9 | 182 | 88 | 76 | 35 |
| 18 | 92 | 38 | 19 | 10 | 202 | 106 | 84 | 38 |
| 20 | 100 | 42 | 20 | 10 | 219 | 123 | 91 | 42 |
| 24 | 114 | 48 | 23 | 12 | 255 | 156 | 106 | 48 |

| PVC | | | | | | | | |
|----------------|--|-----|-------|--------|------------------|------------|---------------------|--------------------|
| Pipe Size (in) | Minimum Pipe Length to be Restrained, L (ft) | | | | | | | |
| | Horizontal Fittings | | | | | | 45° Vertical Offset | |
| | 90° | 45° | 22.5° | 11.25° | Dead Ends/Valves | Equal Tees | L _{UPPER} | L _{LOWER} |
| 3 | 25 | 11 | 5 | 3 | 61 | 1 | 26 | 11 |
| 4 | 30 | 13 | 6 | 3 | 73 | 1 | 31 | 13 |
| 6 | 43 | 18 | 9 | 5 | 105 | 1 | 44 | 18 |
| 8 | 54 | 23 | 11 | 6 | 133 | 14 | 55 | 23 |
| 10 | 65 | 27 | 13 | 7 | 162 | 42 | 67 | 27 |
| 12 | 75 | 31 | 15 | 8 | 189 | 67 | 78 | 31 |
| 14 | 85 | 36 | 17 | 9 | 216 | 93 | 90 | 36 |
| 16 | 94 | 39 | 19 | 10 | 241 | 116 | 100 | 39 |
| 18 | 104 | 43 | 21 | 11 | 267 | 140 | 111 | 43 |
| 20 | 112 | 47 | 23 | 11 | 290 | 162 | 120 | 47 |
| 24 | 128 | 53 | 26 | 13 | 337 | 206 | 140 | 53 |

NOTES:

- CALCULATIONS ARE BASED ON THE FOLLOWING ASSUMPTIONS:
TEST PRESSURE = 150 PSI, SOIL GROUP = SM, TRENCH TYPE = 3, DEPTH = 2.5', SAFETY FACTOR = 2
- WITH EQUAL TEES, THE DISTANCE OF THE RUN LENGTH IS ASSUMED TO BE 40'. FOR OTHER RUN LENGTHS, INDIVIDUAL CALCULATIONS MUST BE MADE.
- AS A MINIMUM, PIPE RESTRAINTS ARE TO BE PLACED ON THE FIRST JOINT FROM THE FITTING.
- FOR ALL NEW CONSTRUCTION, WHEN A PIPE MUST BE INSTALLED IN A CASING THE REQUIRED JOINT RESTRAINTS MUST ALSO BE INSTALLED INSIDE THE CASING. THE CASING IS TO BE SIZED ACCORDINGLY.
- FOR AN EXISTING MAIN LOCATED UNDER A PAVED SURFACE, THE CONTRACTOR WILL NOT BE REQUIRED TO PLACE RESTRAINTS ON THE EXISTING PIPE.
- FOR AN EXISTING MAIN NOT LOCATED UNDER A PAVED SURFACE, THE CONTRACTOR WILL BE REQUIRED TO PLACE RESTRAINTS ON THE EXISTING PIPE.
- L IS THE CALCULATED LENGTH OF PIPE TO BE RESTRAINED.



VERTICAL OFFSET PROFILE



PROPOSED

SCALE: N.T.S.
DATE: 12/18/14

**PIPE JOINT RESTRAINT
TABULATION**

DETAIL
D-62