

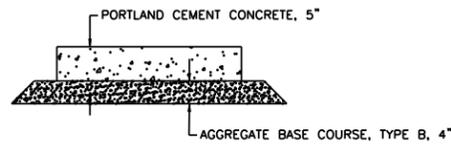
JOINT RESTRAINT TABLE - Unless additional pipe restraint is shown on the Plans, the restrained length measured from the fitting joint to the end of the last restrained joint pipe for pipe fittings shall equal or exceed those tabulated below:

| Pipe Size (Inches) | Tee * Branch | RESTRAINED LENGTH - FEET | | | | |
|--------------------|--------------|--------------------------|----------|--------------|--------------|-----------|
| | | FITTINGS | | | | |
| | | 90 Elbow | 45 Elbow | 22-1/2 Elbow | 11-1/4 Elbow | Dead Ends |
| 4 | 9 | 10 | 5 | 2 | 1 | 15 |
| 6 | 17 | 14 | 6 | 3 | 2 | 21 |
| 8 | 24 | 18 | 8 | 4 | 2 | 27 |
| 10 | 30 | 22 | 10 | 5 | 3 | 33 |
| 12 | 36 | 26 | 11 | 6 | 3 | 38 |
| 14 | 42 | 29 | 12 | 6 | 3 | 44 |
| 16 | 48 | 33 | 14 | 7 | 4 | 49 |
| 18 | 53 | 37 | 16 | 8 | 4 | 54 |
| 20 | 58 | 40 | 17 | 8 | 4 | 60 |
| 24 | 104 | 71 | 30 | 15 | 8 | 105 |
| 30 | 125 | 86 | 36 | 18 | 9 | 126 |
| 36 | 146 | 99 | 42 | 21 | 10 | 147 |

NOTE:
FOR BIDDING PURPOSES ONLY
CONTRACTOR TO SUBMIT DESIGN
CALCULATIONS PRIOR TO CONSTRUCTION.

Test Pressure on sizes 20" and smaller based on 100 psi.
Test Pressure on sizes 24" and larger based on 150 psi.
Increase all lengths in Table by 75% for use on polyethylene wrapped pipe.
*One full length (18') of pipe on both sides of branch to be restrained.

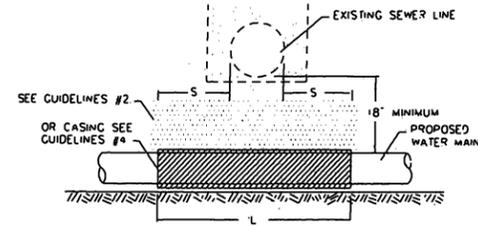
DUCTILE IRON JOINT RESTRAINT TABLE



5" CONCRETE SIDEWALK

PROPOSED WATER MAIN BELOW EXISTING SEWER LINE WITH 18" MINIMUM VERTICAL SEPARATION

NOTE COMPACTION REQUIREMENTS REFER TO 20-2 20B



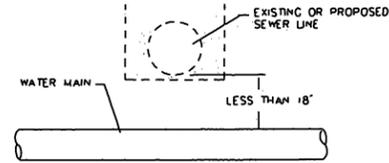
NOTE 'S' THE LENGTH NECESSARY TO PROVIDE 10 FEET OF SEPARATION AND MEASURED PERPENDICULAR TO EXISTING SEWER LINE

GUIDELINES

1. OMT SELECT GRANULAR EMBEDMENT AND GRANULAR BACKFILL TO ONE (1) FOOT OVER TOP OF WATER MAIN AND USE SELECT EXCAVATED MATERIAL (CLASS IV) AND COMPACT THE LENGTH OF 'L'.
2. IF SELECT GRANULAR BACKFILL EXISTS REMOVE WITHIN WIDTH OF EXISTING SEWER LINE TRENCH AND REPLACE WITH SELECT EXCAVATED MATERIAL (CLASS IV) AND COMPACT.
3. PROVIDE ADEQUATE SUPPORT FOR EXISTING SEWER LINE TO PREVENT DAMAGE DUE TO SETTLEMENT.
4. USE 'L' FEET OF WATER MAIN MATERIAL FOR CASING OF PROPOSED WATER MAIN AND SEAL ENDS OF CASING.

WATER AND SEWER SEPARATION REQUIREMENTS (VERTICAL SEPARATION)

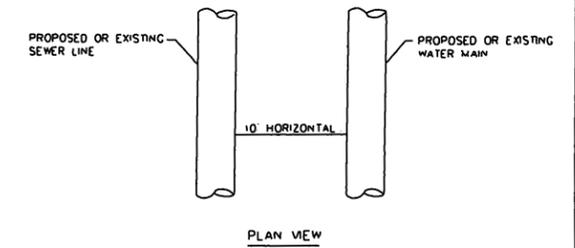
PLACEMENT OF WATER MAIN BELOW EXISTING OR PROPOSED SEWER LINE WITH LESS THAN 18" MINIMUM VERTICAL SEPARATION NOT ALLOWED.



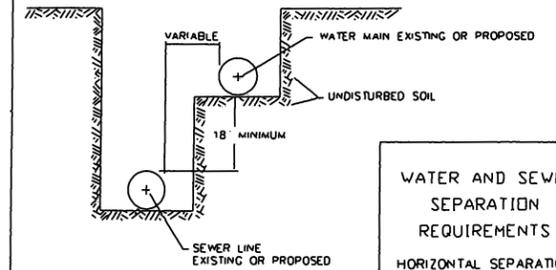
NOT ALLOWED*
MUST MAINTAIN 18" VERTICAL SEPARATION

WATER AND SEWER SEPARATION REQUIREMENTS (VERTICAL SEPARATION)

WHEN PROPOSED SEWER (OR WATER) IS LOCATED 10 FEET OR MORE FROM EXISTING WATER (OR SEWER), NO SPECIAL CONSTRUCTION REQUIRED SEE SECTION 41-2 01B (1)



WHEN PROPOSED SEWER (OR WATER) IS LOCATED LESS THAN 10 FEET FROM EXISTING WATER (OR SEWER), DETAILS BELOW SHALL APPLY SEE SECTION 41-2 01B (2)



WATER AND SEWER SEPARATION REQUIREMENTS HORIZONTAL SEPARATION

GENERAL NOTES:

1. THE CONSTRUCTION OF THE WATER MAIN SHALL BE PERFORMED ACCORDING TO THE LATEST EDITION OF THE STANDARD SPECIFICATIONS FOR WATER AND SEWER MAIN CONSTRUCTION IN ILLINOIS.
2. AREAS DISTURBED BY CONSTRUCTION SHALL BE KEPT TO A MINIMUM. ALL AREAS DISTURBED UNNECESSARILY SHALL BE RESTORED AS REQUIRED IN THE SPECIAL PROVISIONS AT THE CONTRACTOR'S EXPENSE.
3. THE APPROXIMATE LOCATION OF KNOWN PUBLIC UTILITIES ARE PROVIDED FOR THE CONTRACTOR'S USE, AND ARE BASED UPON INFORMATION AVAILABLE AT THE TIME OF THE ADVERTISEMENT FOR BIDS. THE OWNER AND ENGINEER DO NOT GUARANTEE THE ACCURACY OF UTILITIES INFORMATION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY J.U.L.I.E. AT LEAST 48 HOURS PRIOR TO EXCAVATION TO VERIFY LOCATIONS OF ALL UTILITIES.
4. THE TOP OF ALL STRUCTURES SHALL BE FLUSH WITH THE ADJACENT SURFACE. FRAMES ON ALL NEW STRUCTURES SHALL BE ADJUSTED TO THE FINAL SURFACE ELEVATIONS AS PART OF THE NEW STRUCTURE COST.
5. A MINIMUM OF 3 FEET OF PROTECTIVE COVER SHALL BE CONSTRUCTED PRIOR TO RUNNING HEAVY EQUIPMENT OVER INSTALLED PIPES.
6. ALL TRENCHES WITHIN 2 FEET OF PROPOSED PAVEMENT, SIDEWALK, DRIVEWAYS, OR CURB & GUTTER SHALL BE BACKFILLED WITH TRENCH BACKFILL ONLY.

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| ROBINSON ENGINEERING, LTD. CONSULTING REGISTERED PROFESSIONAL ENGINEERS AND PROFESSIONAL LAND SURVEYORS 1700 SOUTH PARK AVENUE SOUTH HOLLAND, ILLINOIS 60473 (708) 381-6700 FAX (708) 381-3858 © COPYRIGHT 2011 ILLINOIS DESIGN FIRM REGISTRATION NO. 184001128. | | REVISIONS No. Date Remarks | |
| 147TH STREET PROJECT PROPOSED WATERMAIN IMPROVEMENTS | | | |
| POSEN, ILLINOIS | | | |
| Drawn by: MED | Date: 10/10/11 | | |
| Checked by: JMR | Scale: NONE | | |
| Sheet 10 of 11 | Project No. 10-432 | | |