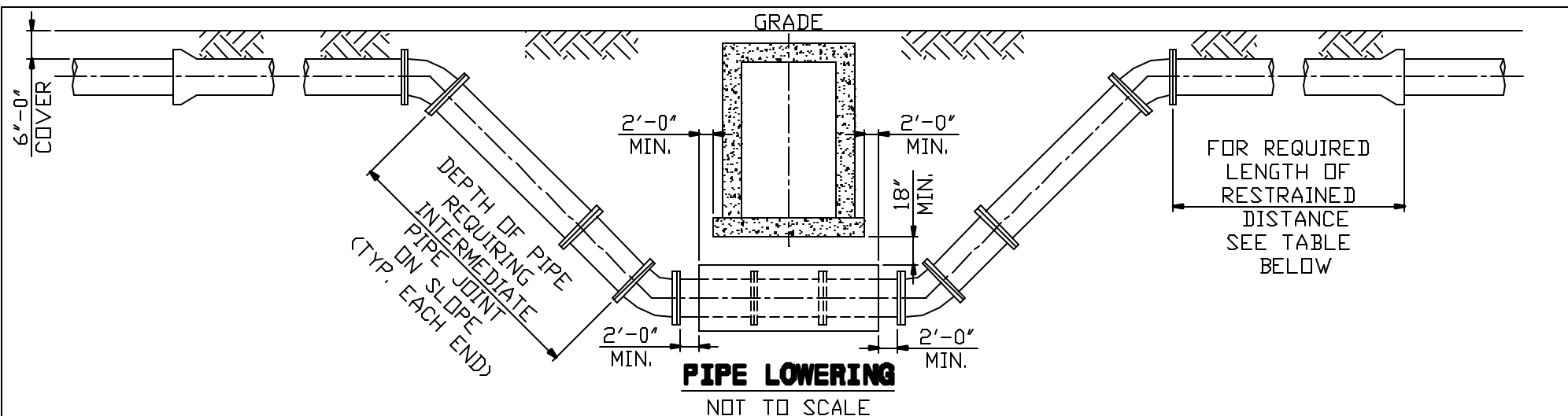


CLEVELAND DIVISION
OF WATER
CONSTRUCTION
STANDARDS

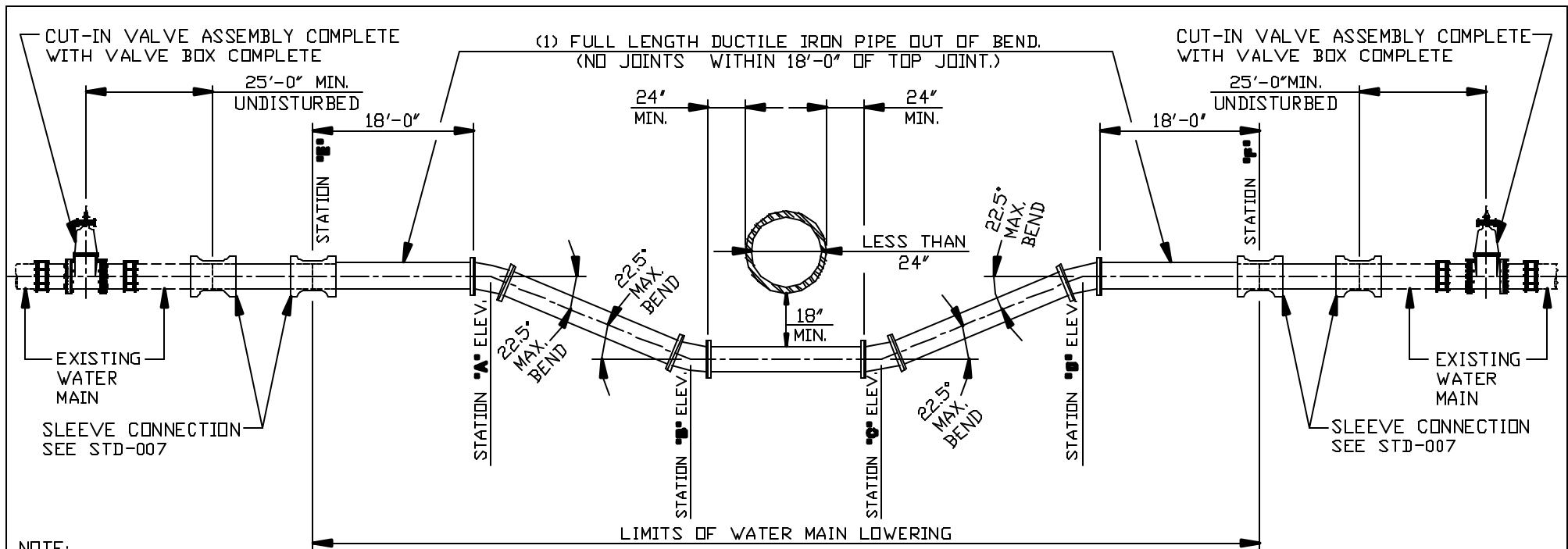
Lowering Details



TO LOWER WATER MAIN TO CLEAR OBSTACLE WHERE DEPTH OF PIPE LOWERING REQUIRES AN INTERMEDIATE JOINT ON SLOPE THE ENTIRE OFFSET SHALL HAVE BOLTLESS RESTRAINED PUSH-ON JOINT PIPE AND FITTINGS AS SPECIFIED. JOINT RESTRAINT SHALL EXTEND BEYOND TOP VERTICAL BEND TO THE LIMITS SHOWN IN TABLE.

① CALCULATIONS FOR RESTRAINED LENGTHS INCLUDE 75 PSI FOR TESTING.

| DIAMETER | BEND | STATIC PRESSURE ① | * RESTRAINED LENGTHS |
|----------------|--------|-------------------|----------------------|
| 8" | 11°15' | 0 to 275 PSI | ONE (1) |
| | 22°30' | 0 to 250 PSI | ONE (1) |
| | | 251 to 275 PSI | TWO (2) |
| | 45° | 0 to 125 PSI | ONE (1) |
| 126 to 275 PSI | | TWO (2) | |
| 12" | 11°15' | 0 to 275 PSI | ONE (1) |
| | 22°30' | 0 to 165 PSI | ONE (1) |
| | | 166 to 275 PSI | TWO (2) |
| | 45° | 0 to 65 PSI | ONE (1) |
| | | 66 to 215 PSI | TWO (2) |
| 166 to 275 PSI | | THREE (3) | |
| 16" | 11°15' | 0 to 275 PSI | ONE (1) |
| | 22°30' | 0 to 115 PSI | ONE (1) |
| | | 116 to 275 PSI | TWO (2) |
| | 45° | 0 to 45 PSI | ONE (1) |
| | | 46 to 165 PSI | TWO (2) |
| 166 to 275 PSI | | THREE (3) | |

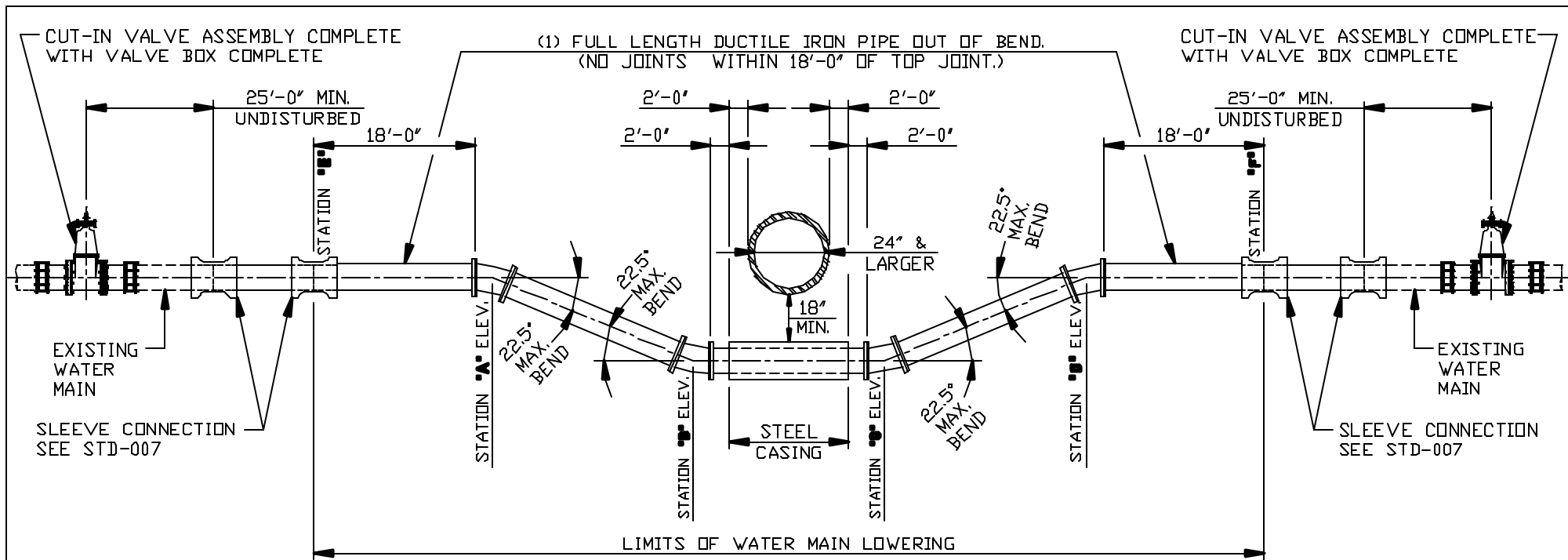


NOTE:

- 1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINED OR FUSION BONDED EPOXY COATED RETAINED MECHANICAL JOINT FITTINGS.
- 2) WHERE DEPTH OF LOWERING REQUIRES AN INTERMEDIATE JOINT BETWEEN STATIONS 'A' & 'B' AND/OR 'C' & 'D' THE ENTIRE LOWERING SHALL BE MADE WITH DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PIPE AND DUCTILE IRON CLASS 350, CEMENT LINED FITTINGS **ALL** HAVING BOLTLESS RESTRAINED PUSH-ON JOINTS, TYPE II.
- 3) WHERE LENGTH OF LOWERING UNDER OBSTRUCTION(S) REQUIRES AN INTERMEDIATE JOINT **ONLY** BETWEEN STATIONS 'B' & 'C', THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.
- 4) WHERE EXISTING WATER MAIN IS SIX (6)-INCHES IN DIAMETER THE PIPE LOWERING SHALL BE MADE WITH PIPE AND FITTINGS NO LESS THAN EIGHT (8)-INCH IN DIAMETER WITH REDUCERS INSTALLED AT STATIONS 'B' AND 'C'. THE REDUCERS SHALL BE RETAINED MECHANICAL JOINT WITH SMALL END OF REDUCER PLAIN END FOR CONNECTION WITH SLEEVES OR COMPRESSION COUPLINGS.
- 5) ALL EXISTING WATER SERVICE CONNECTIONS BETWEEN THE CUT-IN-VALVE ASSEMBLIES SHALL BE MAINTAINED BY 'TEMPORARY SERVICE CONNECTIONS' PROVIDED AND MAINTAINED BY THE CONTRACTOR.
- 6) EXISTING WATER SERVICE CONNECTIONS NEEDED TO BE RETAPPED AND RECONNECTED WILL ONLY BE PERMITTED BETWEEN STATIONS 'A' AND 'B' AND STATIONS 'D' AND 'E'. NO RETAPPING OF SERVICE CONNECTIONS WILL BE ALLOWED BETWEEN STATIONS 'A' AND 'D'.

DETAIL FOR WATER MAIN LOWERING UNDER OBSTRUCTIONS LESS THAN 24" IN DIAMETER OR WIDTH FOR "EXISTING CONSTRUCTION"

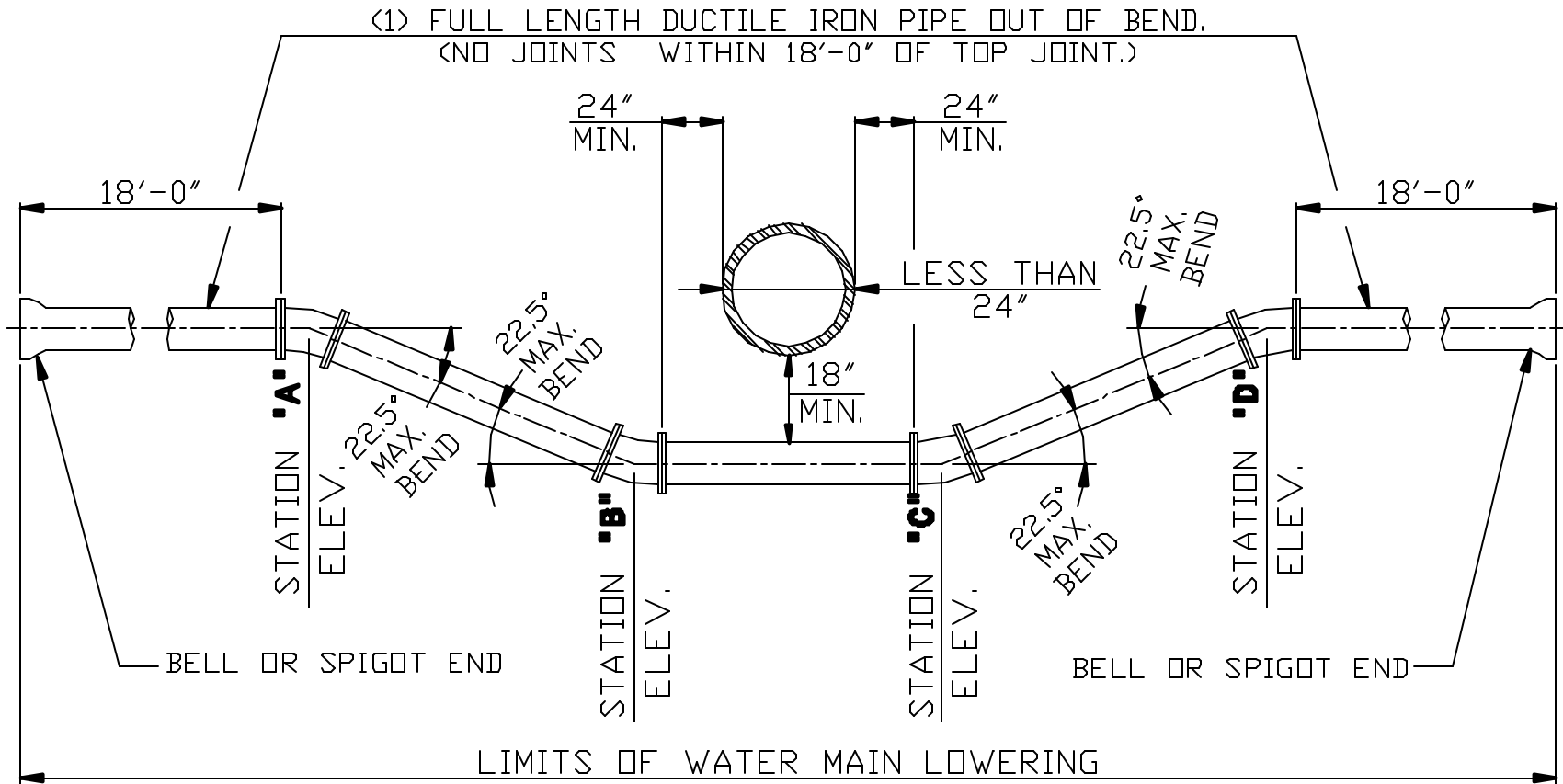
- NOT TO SCALE -



NOTE:

- 1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINED OR FUSION BONDED EPOXY COATED RETAINED MECHANICAL JOINT FITTINGS.
- 2) WHERE DEPTH OF LOWERING REQUIRES AN INTERMEDIATE JOINT BETWEEN STATIONS 'A' & 'B' AND/OR 'C' & 'D' THE ENTIRE LOWERING SHALL BE MADE WITH DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PIPE AND DUCTILE IRON CLASS 350, CEMENT LINED FITTINGS **ALL** HAVING BOLTLESS RESTRAINED PUSH-ON JOINTS, TYPE II.
- 3) WHERE LENGTH OF LOWERING UNDER OBSTRUCTION(S) REQUIRES AN INTERMEDIATE JOINT **ONLY** BETWEEN STATIONS 'B' & 'C', THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.
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- 5) ALL EXISTING WATER SERVICE CONNECTIONS BETWEEN THE CUT-IN-VALVE ASSEMBLIES SHALL BE MAINTAINED BY "TEMPORARY SERVICE CONNECTIONS" PROVIDED AND MAINTAINED BY THE CONTRACTOR.
- 6) EXISTING WATER SERVICE CONNECTIONS NEEDED TO BE RETAPPED AND RECONNECTED WILL ONLY BE PERMITTED BETWEEN STATIONS 'A' AND 'E' AND STATIONS 'D' AND 'F'. NO RETAPPING OF SERVICE CONNECTIONS WILL BE ALLOWED BETWEEN STATIONS 'A' AND 'D'.

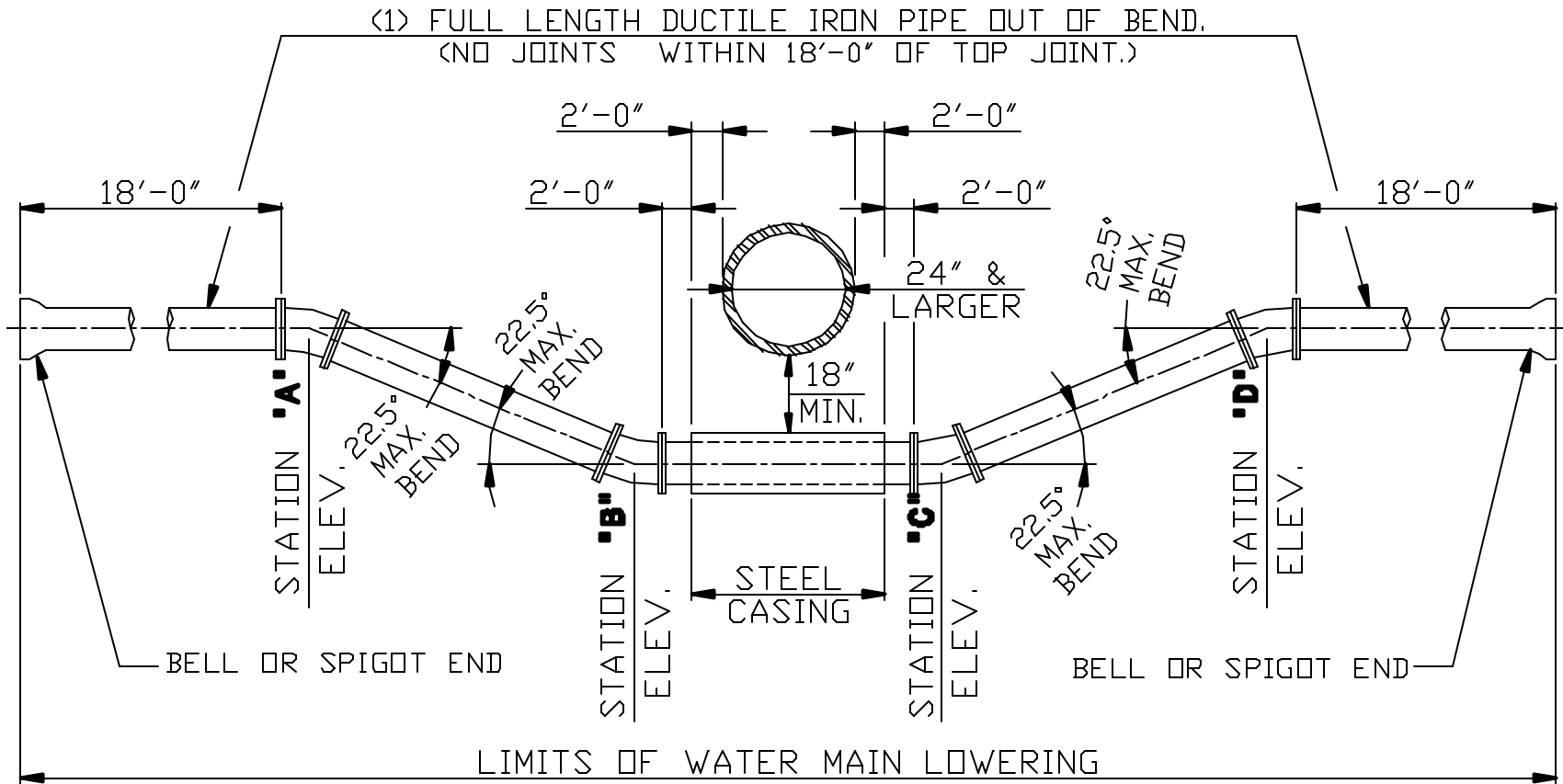
DETAIL FOR WATER MAIN LOWERING UNDER OBSTRUCTIONS 24" & LARGER IN DIAMETER OR WIDTH FOR 'EXISTING CONSTRUCTION'



NOTE:

- 1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINED RETAINED MECHANICAL JOINT FITTINGS.
- 2) WHERE DEPTH OF LOWERING REQUIRES AN INTERMEDIATE JOINT BETWEEN STATIONS 'A' & 'B' AND/OR 'C' & 'D' THE ENTIRE LOWERING SHALL BE MADE WITH DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PIPE AND DUCTILE IRON CLASS 350, CEMENT LINED FITTINGS **ALL** HAVING BOLTLESS RESTRAINED PUSH-ON JOINTS, TYPE I.
- 3) WHERE LENGTH OF LOWERING UNDER OBSTRUCTIONS) REQUIRES AN INTERMEDIATE JOINT **ONLY** BETWEEN STATIONS 'B' & 'C', AND PIPE JOINTS ARE AS INDICATED IN NOTE '1' ABOVE, THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.
- 4) WHERE LENGTH OF LOWERING UNDER OBSTRUCTIONS) REQUIRES AN INTERMEDIATE JOINT **ONLY** BETWEEN 'B' AND 'C' AND PIPE JOINTS ARE AS INDICATED IN NOTE '2' ABOVE, THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE I.

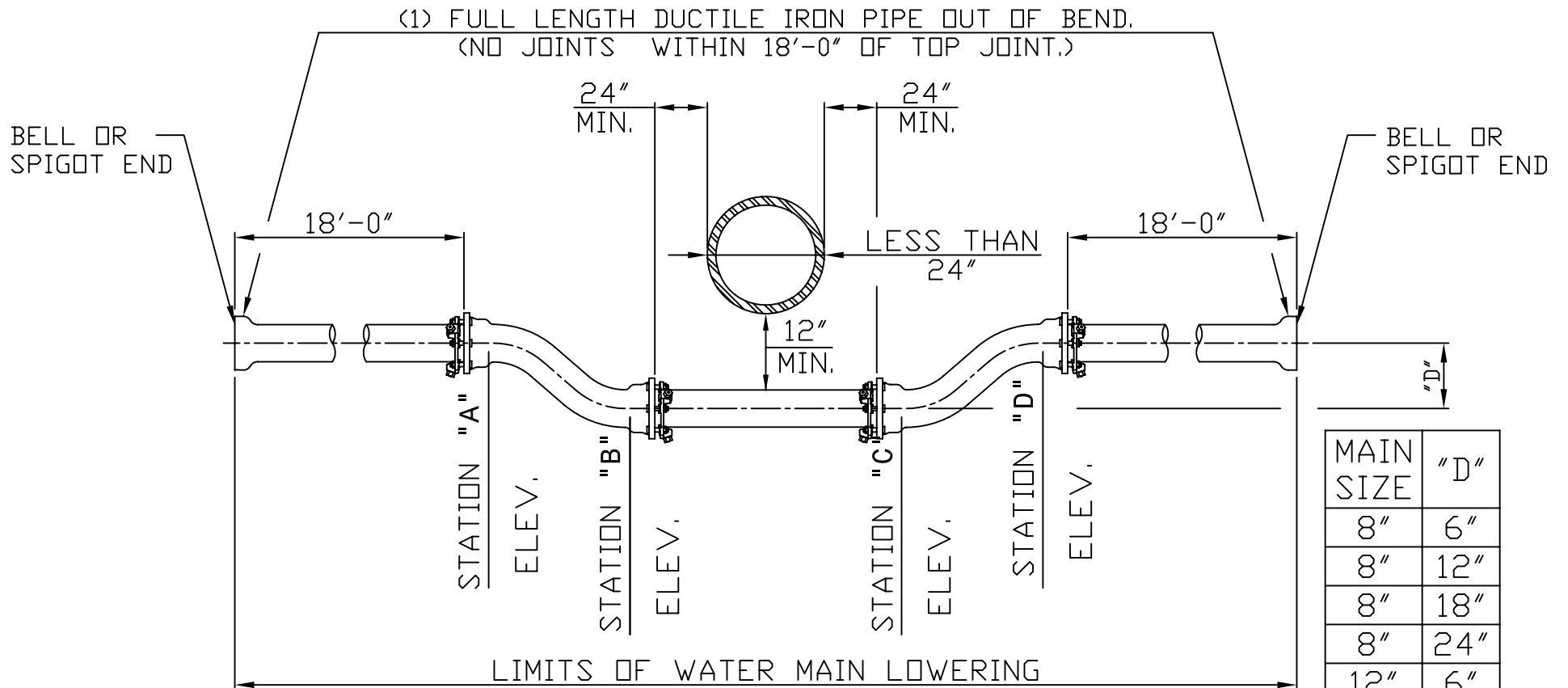
**DETAIL FOR WATER MAIN LOWERING UNDER OBSTRUCTIONS
LESS THAN 24" IN DIAMETER OR WIDTH FOR 'NEW CONSTRUCTION'**



NOTE:

- 1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINED RETAINED MECHANICAL JOINT FITTINGS.
- 2) WHERE DEPTH OF LOWERING REQUIRES AN INTERMEDIATE JOINT BETWEEN STATIONS 'A' & 'B' AND/OR 'C' & 'D' THE ENTIRE LOWERING SHALL BE MADE WITH DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PIPE AND DUCTILE IRON CLASS 350, CEMENT LINED FITTINGS **ALL** HAVING BOLTLESS RESTRAINED PUSH-ON JOINTS, TYPE I.
- 3) WHERE LENGTH OF LOWERING UNDER OBSTRUCTIONS) REQUIRES AN INTERMEDIATE JOINT **ONLY** BETWEEN STATIONS 'B' & 'C', AND PIPE JOINTS ARE AS INDICATED IN NOTE '1' ABOVE, THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.
- 4) WHERE LENGTH OF LOWERING UNDER OBSTRUCTIONS) REQUIRES AN INTERMEDIATE JOINT **ONLY** BETWEEN 'B' AND 'C' AND PIPE JOINTS ARE AS INDICATED IN NOTE '2' ABOVE, THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE I.

**DETAIL FOR WATER MAIN LOWERING UNDER OBSTRUCTIONS
24" & LARGER IN DIAMETER OR WIDTH FOR "NEW CONSTRUCTION"**

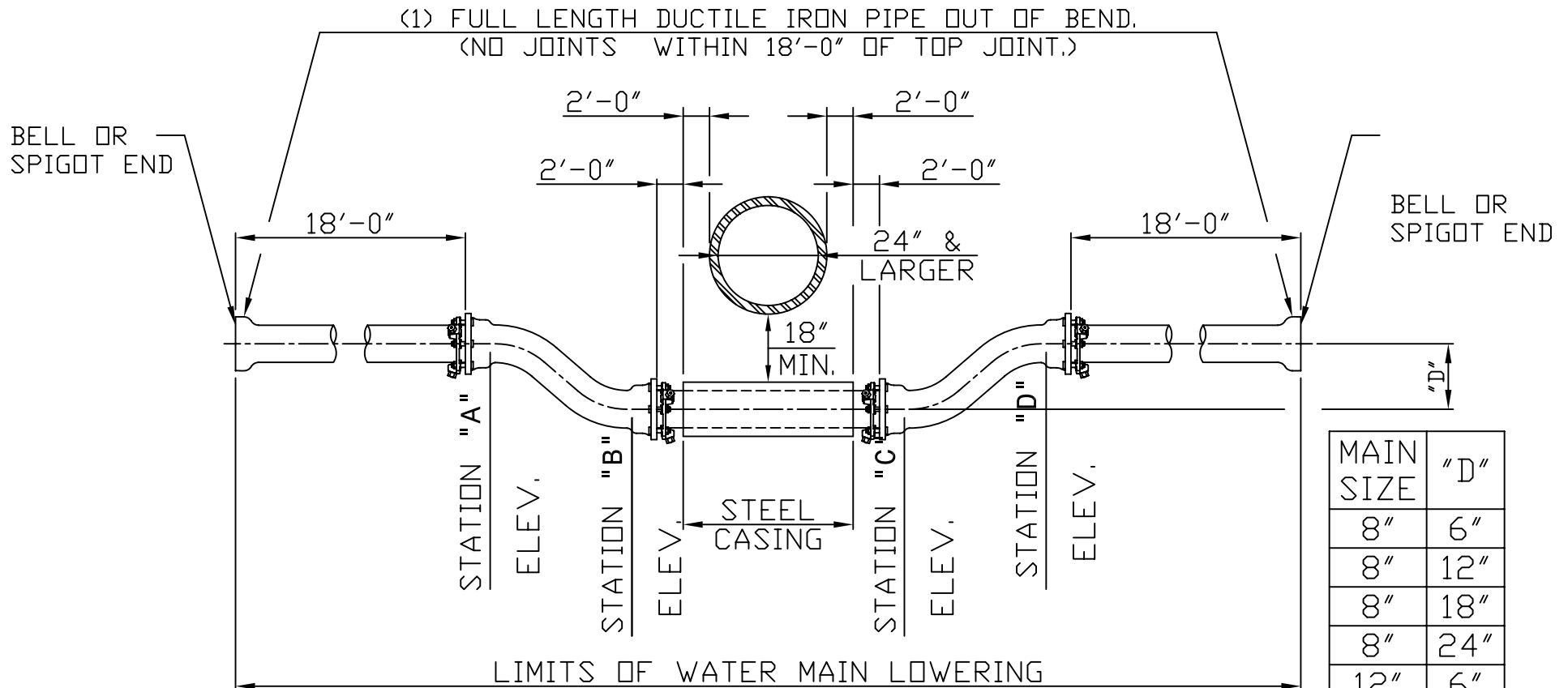


NOTE:

- 1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINE RETAINED MECHANICAL JOINT FITTINGS.
* ALL FITTINGS MUST FOLLOW ANSI/AWWA C110/A21.10 FOR FULL BODY FITTINGS AND ANSI/AWWA C153/A221.5 FOR COMPACT FITTINGS.
ALL FITTINGS ARE NOT AVAILABLE FROM ALL APPROVED MANUFACTURES.
- 2) WHERE LENGTH OF LOWERING UNDER OBSTRUCTION(S) REQUIRES AN INTERMEDIATE JOINT ONLY BETWEEN STATIONS "B" & "C", AND PIPE JOINTS ARE AS INDICATED IN NOTE "1" ABOVE, THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.

DETAIL FOR WATER MAIN LOWERING USING MECHANICAL JOINT OFFSETS
UNDER OBSTRUCTIONS LESS THAN 24" IN DIAMETER OR WIDTH FOR "NEW CONSTRUCTION"

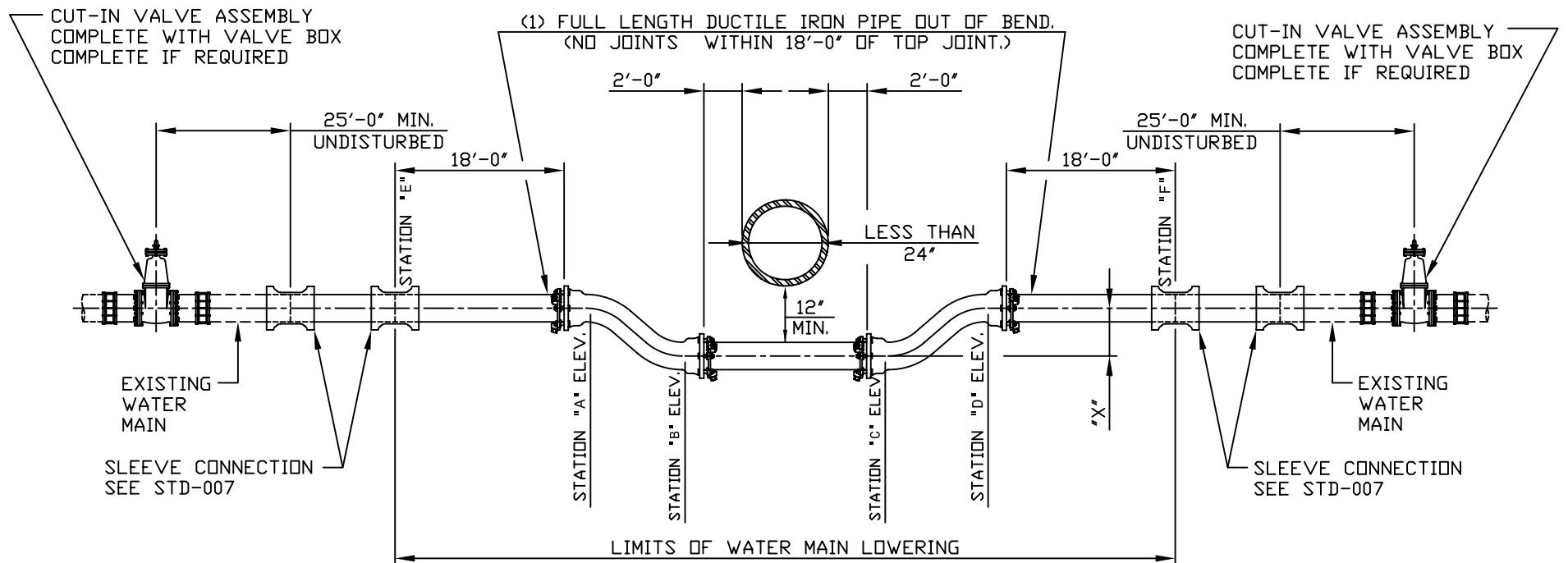
- NOT TO SCALE -



NOTE:

- 1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINE RETAINED MECHANICAL JOINT FITTINGS.
* ALL FITTINGS MUST FOLLOW ANSI/AWWA C110/A21.10 FOR FULL BODY FITTINGS AND ANSI/AWWA C153/A221.5 FOR COMPACT FITTINGS.
ALL FITTINGS ARE NOT AVAILABLE FROM ALL APPROVED MANUFACTURES.
- 2) WHERE LENGTH OF LOWERING UNDER OBSTRUCTION(S) REQUIRES AN INTERMEDIATE JOINT ONLY BETWEEN STATIONS "B" & "C", AND PIPE JOINTS ARE AS INDICATED IN NOTE "1" ABOVE, THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.

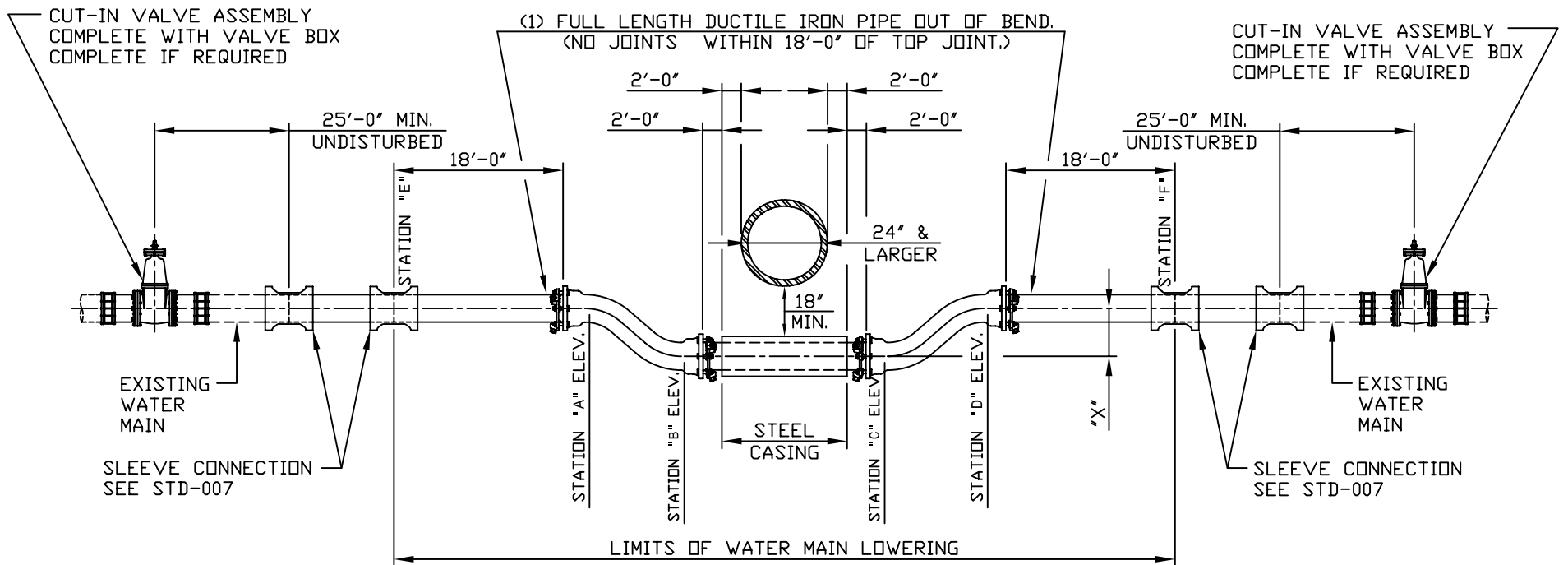
**DETAIL FOR WATER MAIN LOWERING USING MECHANICAL JOINT OFFSETS
UNDER OBSTRUCTIONS 24" & LARGER IN DIAMETER OR WIDTH FOR "NEW CONSTRUCTION"**



| | | | | | | | | | | | | | | | | | | | | |
|-----------|----|-----|-----|-----|----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| MAIN SIZE | 4" | 4" | 4" | 4" | 6" | 6" | 6" | 6" | 8" | 8" | 8" | 8" | 10" | 10" | 10" | 10" | 12" | 12" | 12" | 12" |
| "X" | 6" | 12" | 18" | 24" | 6" | 12" | 18" | 24" | 6" | 12" | 18" | 24" | 6" | 12" | 18" | 24" | 6" | 12" | 18" | 24" |

- NOTE:
- 1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINED RETAINED MECHANICAL JOINT FITTINGS.
* ALL FITTINGS MUST FOLLOW ANSI/AWWA C110/A21.10 FOR FULL BODY FITTINGS AND ANSI/AWWA C153/A221.5 FOR COMPACT FITTINGS.
ALL FITTINGS ARE NOT AVAILABLE FROM ALL APPROVED MANUFACTURES.
 - 2) WHERE LENGTH OF LOWERING UNDER OBSTRUCTION(S) REQUIRES AN INTERMEDIATE JOINT ONLY BETWEEN STATIONS "B" & "C", THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.
 - 3) WHERE EXISTING WATER MAIN IS SIX (6)-INCHES IN DIAMETER THE PIPE LOWERING SHALL BE MADE WITH PIPE AND FITTINGS NO LESS THAN EIGHT (8)-INCH IN DIAMETER WITH REDUCERS INSTALLED AT STATIONS "E" AND "F". THE REDUCERS SHALL BE RETAINED MECHANICAL JOINT WITH SMALL END OF REDUCER PLAIN END FOR CONNECTION WITH SLEEVES OR COMPRESSION COUPLINGS.
 - 4) ALL EXISTING WATER SERVICE CONNECTIONS BETWEEN THE CUT-IN-VALVE ASSEMBLIES SHALL BE MAINTAINED BY "TEMPORARY SERVICE CONNECTIONS" PROVIDED AND MAINTAINED BY THE CONTRACTOR.
 - 5) EXISTING WATER SERVICE CONNECTIONS NEEDED TO BE RETAPPED AND RECONNECTED WILL ONLY BE PERMITTED BETWEEN STATIONS "A" AND "E" AND STATIONS "D" AND "F". NO RETAPPING OF SERVICE CONNECTIONS WILL BE ALLOWED BETWEEN STATIONS "A" AND "D".

**DETAIL FOR WATER MAIN LOWERING UNDER OBSTRUCTIONS LESS THAN 24" IN DIAMETER OR WIDTH
USING MECHANICAL OFFSETS FOR "EXISTING MAINS"**



| | | | | | | | | | | | | | | | | | | | | |
|-----------|----|-----|-----|-----|----|-----|-----|-----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| MAIN SIZE | 4" | 4" | 4" | 4" | 6" | 6" | 6" | 6" | 8" | 8" | 8" | 8" | 10" | 10" | 10" | 10" | 12" | 12" | 12" | 12" |
| "X" | 6" | 12" | 18" | 24" | 6" | 12" | 18" | 24" | 6" | 12" | 18" | 24" | 6" | 12" | 18" | 24" | 6" | 12" | 18" | 24" |

NOTE:

- 1) WATER MAIN SHALL BE DUCTILE IRON, MINIMUM CLASS 52, CEMENT LINED PUSH-ON JOINT PIPE WITH RETAINED MECHANICAL JOINT DUCTILE IRON CLASS 350, CEMENT LINED RETAINED MECHANICAL JOINT FITTINGS.
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ALL FITTINGS ARE NOT AVAILABLE FROM ALL APPROVED MANUFACTURERS.
- 2) WHERE LENGTH OF LOWERING UNDER OBSTRUCTION(S) REQUIRES AN INTERMEDIATE JOINT ONLY BETWEEN STATIONS "B" & "C", THAT INTERMEDIATE JOINT(S) SHALL BE MADE WITH A BOLTLESS RESTRAINED PUSH-ON JOINT, TYPE II.
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**DETAIL FOR WATER MAIN LOWERING UNDER OBSTRUCTIONS 24" & LARGER IN DIAMETER OR WIDTH
USING MECHANICAL OFFSETS FOR "EXISTING MAINS"**