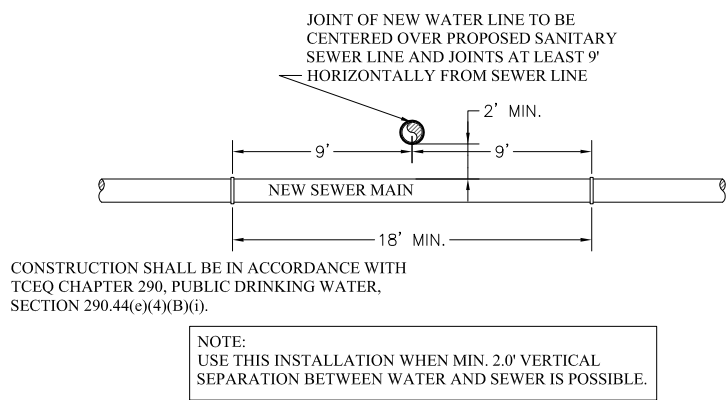
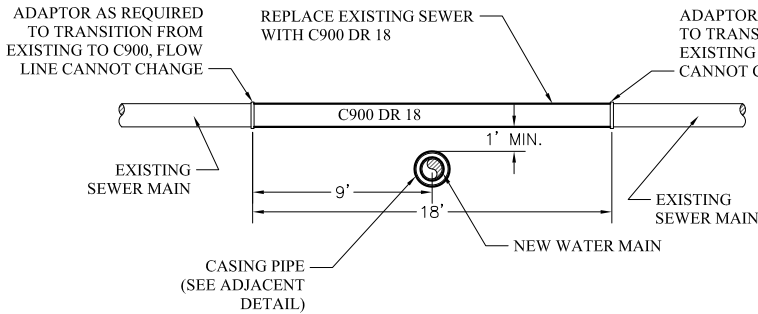


UTILITY CROSSING



CROSSING # 1

TYPICAL INSTALLATION OF NEW WATER LINE OVER NEW NON- PRESSURE RATED SANITARY SEWER LINE IN ACCORDANCE WITH TCEQ REGULATIONS

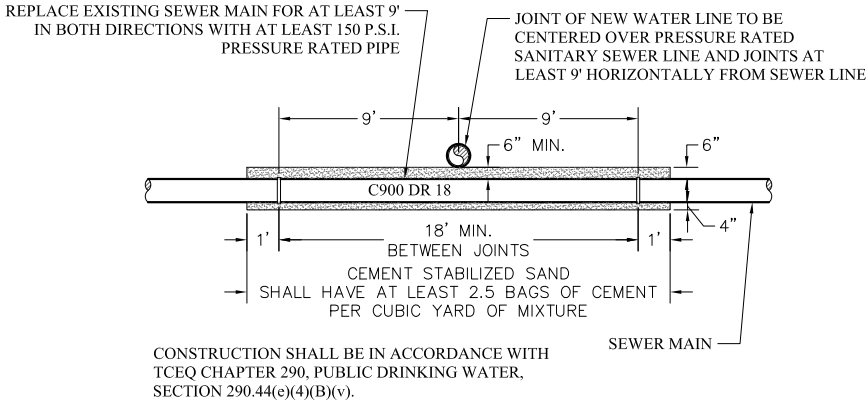


- NOTE:
1. IF STANDARD LENGTH OF PIPE IS LESS THAN 18', ADDITIONAL DETAILS WILL BE REQUIRED ALONG WITH COSA APPROVAL.
 2. IF A CROSSING NOT SHOWN HERE IS REQUIRED, CITY APPROVAL WILL BE REQUIRED PRIOR TO CONSTRUCTION.

NOTE:
USE THIS INSTALLATION WHEN WATER CROSSES UNDER A WASTEWATER MAIN OR LATERAL. BOTH WATER AND WASTEWATER MUST PASS A PRESSURE AND LEAKAGE TEST AS SPECIFIED IN AWWA C600 STANDARDS

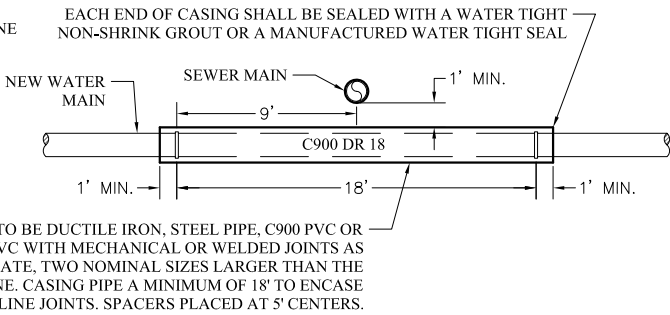
CROSSING # 3

TYPICAL INSTALLATION OF NEW WATER LINE UNDER SANITARY SEWER LINE IN ACCORDANCE WITH TCEQ REGULATIONS



CROSSING # 2

TYPICAL INSTALLATION OF NEW WATER LINE OVER A PRESSURE RATED SANITARY SEWER LINE IN ACCORDANCE WITH TCEQ REGULATIONS

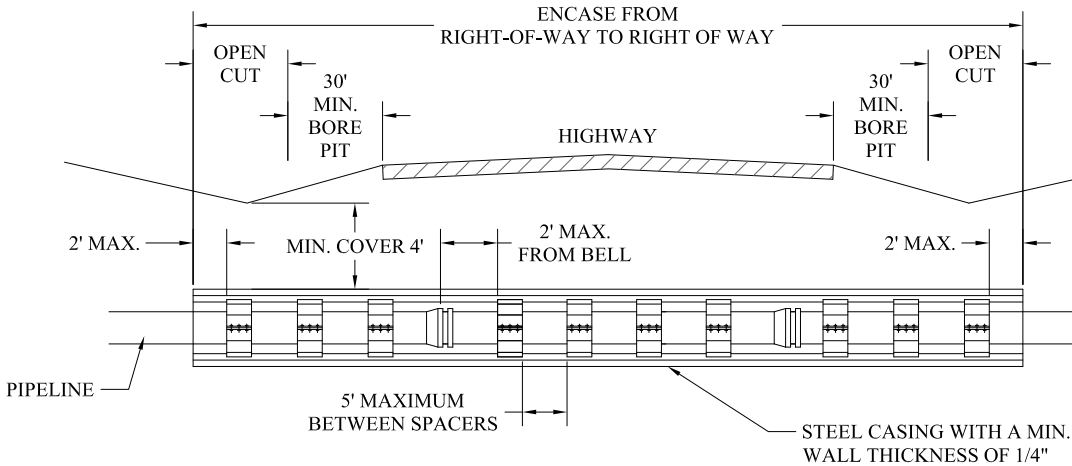


WATER LINE SHALL BE ENCASED AS DESCRIBED IN TCEQ CHAPTER 290, PUBLIC DRINKING WATER, SECTION 290.44(e)(4)(B)(iv)(III).

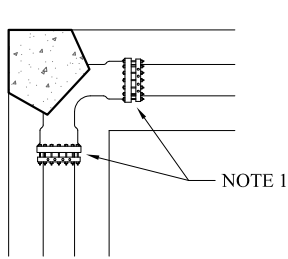
NOTES

1. ALL HIGHWAY CROSSINGS SHALL BE MADE BY BORING OR TUNNELING. ENCASEMENT PIPE SHALL EXTEND FROM ROW TO ROW. BORE PITS SHALL BE A MINIMUM OF 30' FROM THE EDGE OF PAVEMENT.
2. GROUT AROUND CASING ALL OVER CUTTING IN EXCESS OF 1".
3. CASING SPACERS SHALL BE SPACED A MAXIMUM OF 2' FROM EACH END OF JOINT AND NOT MORE THAN 5' BETWEEN SPACERS. CASING SPACERS SHALL BE APS POLYETHYLENE OR OWNER APPROVED EQUAL.
4. GROUT EACH END OF ENCASEMENT A MINIMUM OF 2'.
5. GROUT SHALL HAVE A MINIMUM STRENGTH OF 1,800 P.S.I. IN 28 DAYS WITH A SLUMP OF 10" OR GREATER.
6. BORING PIT SHALL BE CONFINED TO THE WORK EASEMENT.
7. BORE PITS SHALL BE LOCATED AT THE SPECIFIED END OF ENCASEMENT PIPE AND SHALL BE CONSTRUCTED IN SUCH A MANNER AS TO NOT INTERFERE WITH HIGHWAY STRUCTURAL INTEGRITY & ADEQUATE CLEARANCE FOR SAFE TRAFFIC OPERATIONS. IF NECESSARY, SHORING SHALL BE USED.
8. LINES AND GRADES ARE CRITICAL AND SHALL BE MAINTAINED.
9. RESTORE HIGHWAY RIGHT-OF-WAY TO ORIGINAL OR BETTER CONDITION IN ACCORDANCE WITH TXDOT PERMIT REQUIREMENTS.

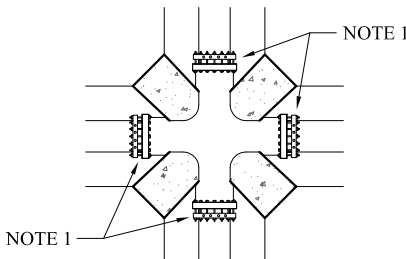
HIGHWAY CROSSING



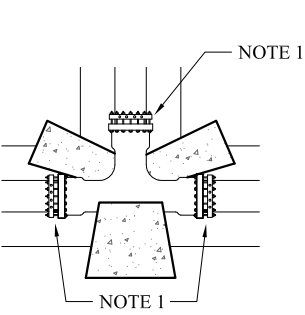
RETAINING GLAND, JOINT RESTRAINTS AND THRUST BLOCKING



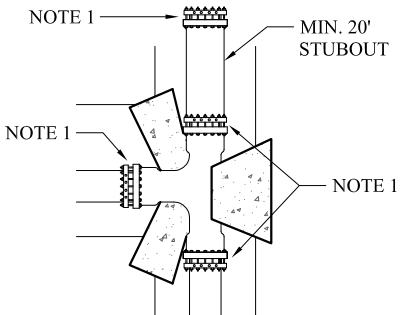
BEND



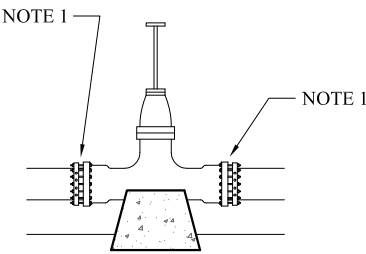
CROSS



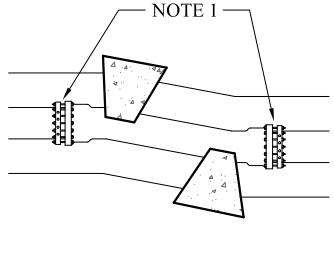
TEE



TEE WITH STUBOUT



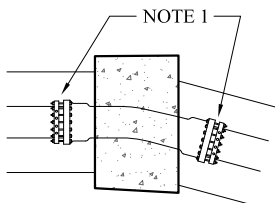
VALVE



OFFSET

NOTES:

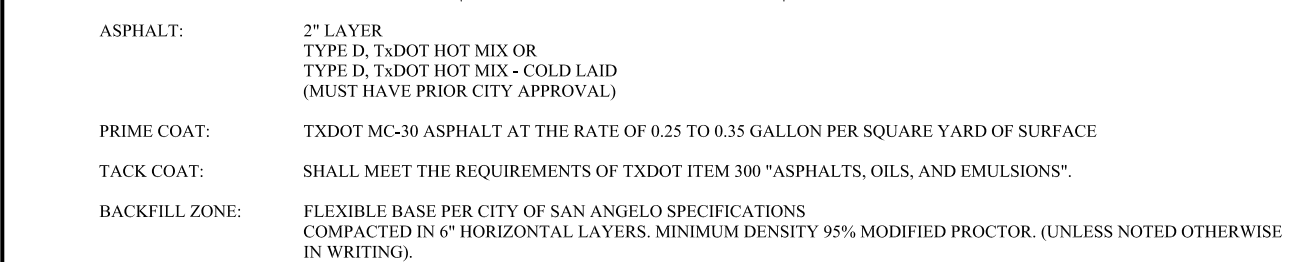
1. ALL MECHANICAL JOINT CONNECTIONS ON BENDS SHALL BE EBBA IRON OR FORD "MEGA LUG" PIPE RESTRAINTS OR APPROVED EQUAL.
2. ALL CONCRETE TO BE 3,000 P.S.I. CONCRETE.



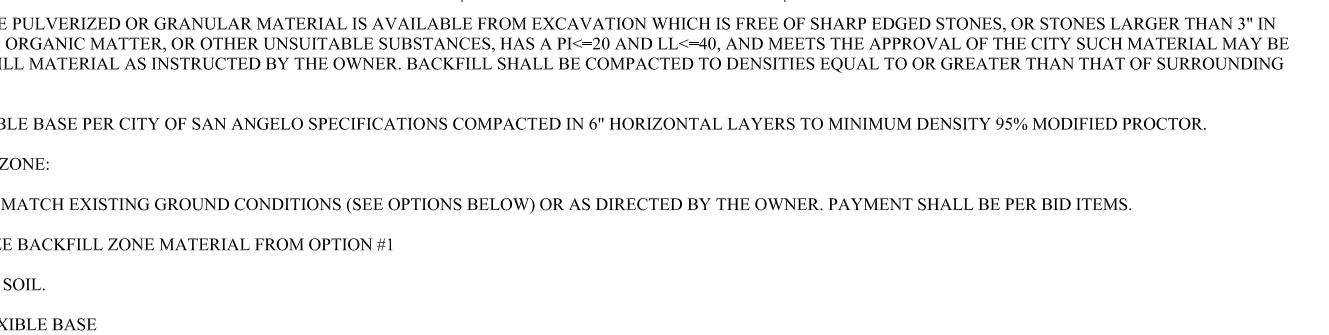
VERTICAL BEND

| | | | | | |
|--|-------------|-------------------|-----------------|-------------|----------------|
| AKS | JTM | 1"=100' | N/A | WU-01-15 | FEBRUARY, 2015 |
| DRAWN BY: | CHECKED BY: | HORIZONTAL SCALE: | VERTICAL SCALE: | JOB NUMBER: | DATE: |
| ENGINEERING SERVICES DEPARTMENT | | | | | |
| THE CITY OF SAN ANGELO, TEXAS | | | | | |
| 2015 WATER LINE IMPROVEMENTS | | | | | |
| TYPICAL SECTIONS & DETAILS 3 | | | | | |
| STATE OF TEXAS JOSEPH T. MANGREIM 117205 LICENSED PROFESSIONAL ENGINEER Joseph T. Mangreim THE SEAL APPEARING ON THIS DRAWING WAS AUTHORIZED BY JOSEPH T. MANGREIM, P.E. NO. 117205 ON 02/13/2015 | | | | | |
| M-886 | | | | | |

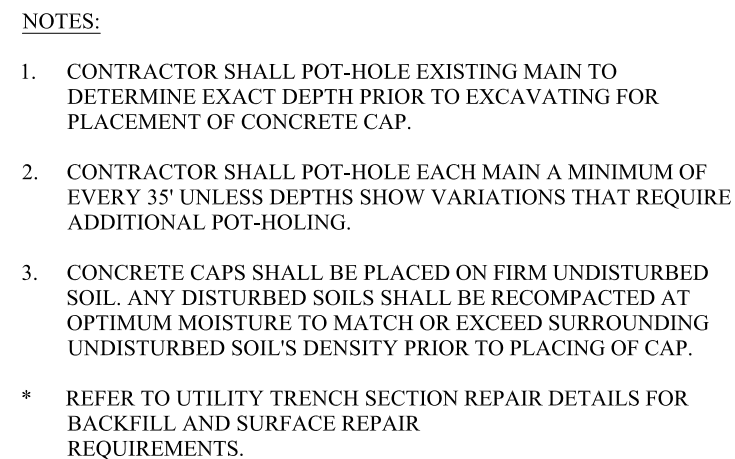
ASPHALT PAVEMENT



OTHER UNPAVED AREAS

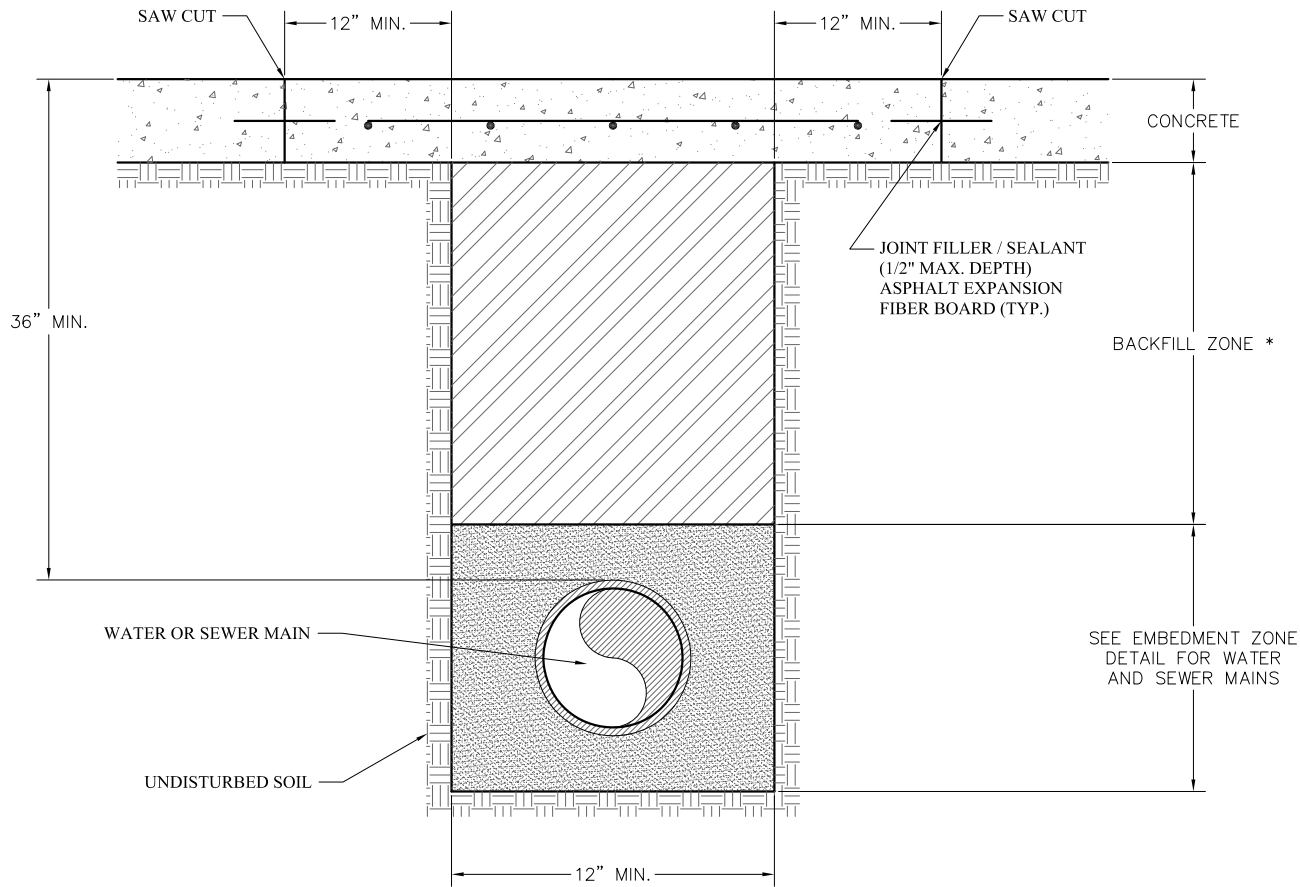


OVER EXISTING MAIN



UTILITY TRENCH SECTION

RIGID PAVEMENT

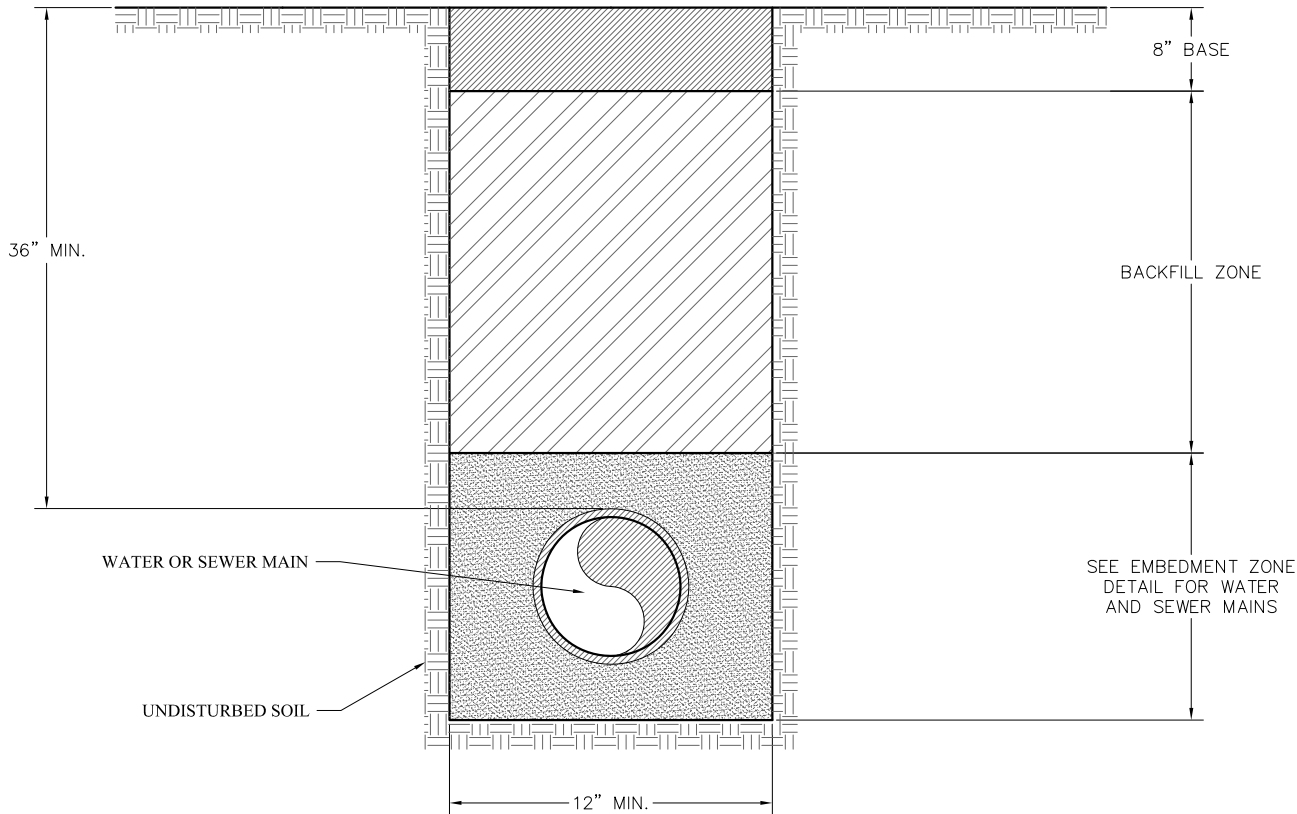


NOTES:


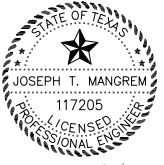
- CONCRETE: CLASS P, 3500 P.S.I. COMPRESSIVE; 555 P.S.I., FLEXURAL. BEND EXISTING REBAR INTO CENTER OF NEW CONCRETE. REPLACE AS NECESSARY WITH #4 REBAR ON 18" CENTERS EACH WAY AND DOWEL IN #4 REBAR 9" DEEP WITH 24" LAP SPLICE, OR 36 POUNDS OF NOVAMESH 850 PER CUBIC YARD WITH #4 REBAR DOWELS 9" DEEP AND 9" INTO THE TRENCH ON 18" CENTERS.
- BACKFILL ZONE : FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS COMPACTED IN 6" HORIZONTAL LAYERS. MINIMUM DENSITY 95% MODIFIED PROCTOR. (UNLESS APPROVED OTHERWISE IN WRITING).

UTILITY TRENCH SECTION

UNPAVED STREETS, ALLEYS & DRIVEWAYS



- BASE: FLEXIBLE BASE PER CITY OF SAN ANGELO SPECIFICATIONS. THICKNESS PER CITY OF SAN ANGELO STANDARD STREET SPECIFICATIONS COMPACTED IN 6" LAYERS. MINIMUM DENSITY 95% MODIFIED PROCTOR.
- BACKFILL ZONE: WHERE PULVERIZED OR GRANULAR MATERIAL IS AVAILABLE FROM EXCAVATION WHICH IS FREE OF SHARP EDGED STONES, OR STONES LARGER THAN 3" IN DIAMETER, CLAY, ORGANIC MATTER, OR OTHER UNSUITABLE SUBSTANCES, HAS A PI<= 20 AND LL<=40, AND MEETS THE APPROVAL OF THE CITY. SUCH MATERIAL MAY BE USED FOR BACKFILL MATERIAL AS INSTRUCTED BY THE OWNER.

| | | | |
|--|-------------------|---|---------------------------------------|
| AKS | DRAWN BY: |  | ENGINEERING SERVICES DEPARTMENT |
| JTM | CHECKED BY: | | |
| 1"=100' | HORIZONTAL SCALE: | | |
| N/A | VERTICAL SCALE: | | |
| WU-01-15 | JOB NUMBER: | 2015 WATER LINE IMPROVEMENTS | TYPICAL SECTIONS & DETAILS 5 |
| FEBRUARY, 2015 | DATE: | | |
|  <i>Joseph T. Mangrem</i> THE SEAL APPEARING ON THIS DRAWING WAS AUTHORIZED BY JOSEPH T. MANGREM, P.E. NO. 117205 ON 02/13/2015 | | | M-888 |