

Lawton Industrial Park II

Lot 3, Block 3

Lawton, Oklahoma

GENERAL CONSTRUCTION NOTES

Pay items listed in the bid schedule are the only pay items for the project. Any other items necessary for a complete project, but not shown in the bid schedule shall be considered an incidental item and its cost to be included in other items.

The contractor shall verify all utility locations prior to bidding project. All utility locations shown are approximate, except as noted.

Any contractor-caused damage to utility and/or service lines, shown or not shown on the plans, shall be repaired or replaced at no cost to the City Of Lawton and shall be accomplished by the contractor, subcontractor or licensed plumber as approved by the City Engineer.

All water mains or service lines that are to be abandoned shall be physically severed as close to the remaining waterline as possible and a mechanical joint cap or plug installed as directed by the City Engineer.

The contractor shall be responsible for notifying all utility companies prior to commencing work in the project area. Likewise, the contractor is responsible for coordinating his work and that of the involved utilities in the project area.

The contractor shall be responsible for furnishing all labor, material, equipment and incidental items needed to provide adequate construction signing, barricades, traffic control devices and other related items for the project area, during the construction period. This work is to be considered an incidental item and the cost of this item is to be included in other pay items.

The contractor shall notify the L.P.D. Chief, L.F.D. Chief, City Engineer, Public Works Director and all privately owned ambulance companies 24 hours in advance of when traffic is to be restricted on any street. If an emergency arises, the contractor shall immediately notify all parties previously noted.

The contractor shall provide reasonable access to residential, commercial and public properties in the project area. During construction, traffic may be restricted to local traffic only with approval of the City Engineer.

The contractor shall carefully remove, store and reinstall all City-owned signs whose removal is required by his construction work in the project area. It shall be the contractor's responsibility to arrange for the City to inspect all signs scheduled for removal prior to their removal. Once said signs have been removed, it will be assumed that they were in good condition at the time of removal. Any signs damaged or lost by the contractor shall be replaced at no cost to the City. Materials shall be approved by the City Engineer.

All post-mounted signs shall be reset in concrete and at the proper height and location (City to provide location).

All sidewalk and paved driveway removals shall be bounded by joints or sawcuts.

The contractor shall be responsible for coordinating all driveway closings with the respective property owners and tenants, if property is rented.

Existing concrete drives will be replaced with 6" min. non-reinforced class 3500 PSI H.E.S. concrete as specified on the plan documents.

Property owners will be notified by the City, prior to construction, that it will be the owner's responsibility to remove or relocate fences, trees, shrubs or other property which they intend to keep. If the items are not removed at the time of construction and are in the way of construction, the contractor shall remove and dispose of the items as directed by the City Engineer. Fences shall be reinstalled at the contractor unit price for fences as directed by the City Engineer.

The contractor shall verify all dimensions and elevations prior to the start of work.

Any surplus excavation shall become the property of the contractor, and disposal shall be the contractor's responsibility at no additional cost.

The contractor shall be responsible for all surveying and construction staking for the project.

All grading and surfacing shall be in accordance with the plan sheets and Oklahoma Department of Transportation Standard Specifications for Highway Construction.

All excavation within 2' of pavement shall be backfilled and compacted to 95% standard proctor density with limestone screenings.

The contractor shall establish a healthy stand of Bermuda grass over areas disturbed during construction. The method of application shall be solid slab sod. The price for watering and proper maintenance is considered to be incidental and shall be included in the price bid for other items.

The contractor shall remove and stockpile all salvaged topsoil to be used later as backfill behind curbs and drives. This is not a pay item, but cost of same is to be included in other items of work.

The contractor shall level all disturbed areas with topsoil and hand rake to a uniform appearance. Cost shall be included in the price bid for other items.

The contractor shall take special care not to damage trees and shrubs. Trees and shrubs shall not be removed unless so directed by the engineer. Shrubs so removed shall be placed on the property owner's land or disposed of off-site as directed by the engineer. All costs shall be included in the price bid for other items.

The contractor shall take special care not to damage any sheds or other structures located on existing easements. Sheds shall not be moved unless authorized by the engineer. All costs to remove/replace sheds shall be included in the price bid for other items.

CAUTION: For underground utility locations, contact 1-800-522-6543 prior to excavation.

GENERAL CONSTRUCTION NOTES FOR WATERLINES

Water mains shall be capped if required for testing, prior to tie-ins being made.

All excavation within 2' of pavement shall be backfilled and compacted to 95% standard proctor density with limestone screenings.

Fences and mailboxes shall be removed and reinstalled by the contractor as directed by the Engineer.

All service line taps shall be 1" and service lines shall be 1" in size.

New 1" service lines shall be installed from new main to meter box according to standard detail sheet including angle valve on all meters located adjacent to new main. For services located on the opposite side of the street from the main, the existing service line shall be utilized and connected to the new main.

Additional driveway repair may be added as directed by the Project Engineer. For driveway repairs, see details.

Sidewalk repair shall be paid under pay item for concrete drive repair.

Contractor shall bore under trees in - lies of tree removal at locations directed by the Project Engineer. Cost shall be included in the price bid for bore w/o casing.

All water main valves shall be operated only by City of Lawton Public Works personnel. The contractor shall notify the Public Works/Engineering Department a minimum of 96 hours in advance of required valve operations.

The contractor shall coordinate tie-ins of new waterlines to existing lines with the City of Lawton Public Works/Engineering Director and the City of Lawton Fire Department Chief.

The contractor shall be responsible for door-to-door notification of all affected persons prior to shutting off a water main.

All new fire hydrants shall be covered with a burlap bag until such time as they are operational.

Existing fire hydrants and related valves shall be removed and salvaged in good condition and delivered to the City of Lawton Public Works/Engineering Maintenance Yard located at 2100 SW 6th Street during normal working hours as directed by the Engineer. Costs to be included with price bid for other items.

The contractor shall remove valve boxes from valves to be abandoned in areas not paved and backfill hole with suitable material. In paved areas where the valve box cannot be easily removed, the contractor shall remove the lid and fill the box with concrete. Salvaged valve boxes and lids shall be delivered by the contractor to the City of Lawton Public Works/Engineering Yard.

All meters to be relocated shall be placed as close to the property line as practical, or as directed by the Project Engineer. The quantities shown in the summary of bid quantities for meter relocation and 1" service line are for bidding purposes only. The actual quantities required will be determined during construction.

All lines and fittings shall be thrust blocked in accordance with City of Lawton water standards.

All backfill for waterline trenching shall be water jetted after the connection of all service lines. Cost to be included in the unit price for pipe.

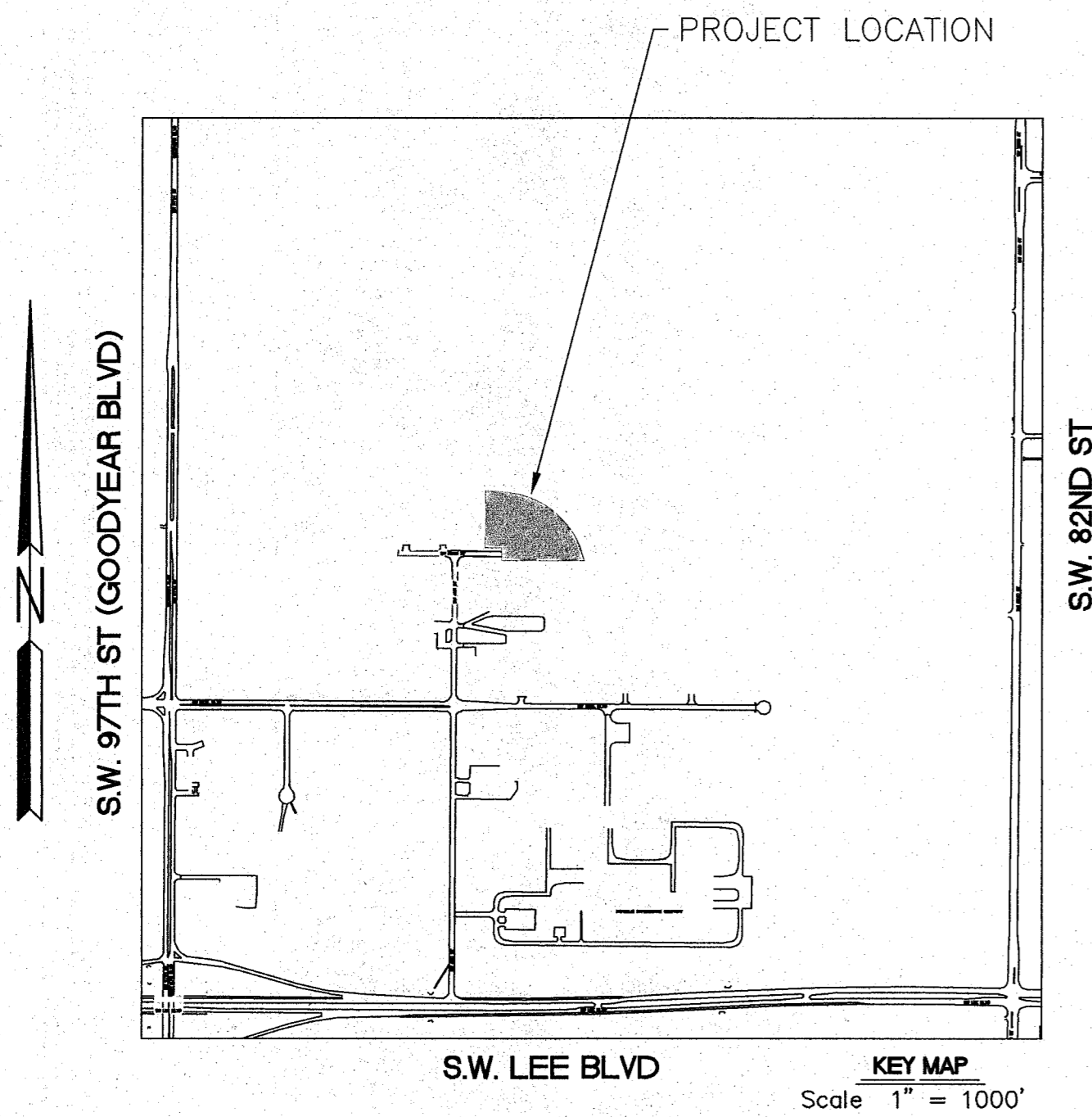
The contractor shall place a 4" thick layer of topsoil on all areas to be grassed. The price of salvaging, importing, and placing topsoil shall be included in the unit price for "GRASSING".

Minimum cover for the waterline installation shall be thirty inches (30") from the top of ground to the top of the pipe unless specified otherwise.

All taps shall be accomplished by the contractor. Cost shall be included in the price bid for service taps or tapping saddle and valve.

PVC (AWWA C900 DR18) or Polybond lined D.I. (Class 51) sanitary sewer pipe may be required at locations where the minimum spacing requirement with water mains cannot be achieved. The contractor shall furnish and install (complete) the required type and length of pipe at locations as directed by the Engineer. Materials and methods for Trenching/backfill shall follow specifications as set in SECTION 0300 "Sewerline Construction". Cost shall be included in the price bid for "Sanitary Sewer Pipe (PVC C900 DR18 or Polybond D.I. Pipe Class 51).

All lines which are to remain in service shall be completely disconnected from abandoned lines by plugging the live line cross or tee with an M.J. plug. Lead joint fittings shall be completely removed and a new line segment sleeved in. The end of abandoned pipe shall be sealed with non-shrink grout. Fittings shall be paid at the contract bid price and all other costs shall be considered incidental.



SHEET INDEX

- C1 TITLE SHEET
- C2 SURVEY PLAN
- C3 PLAN & PROFILE - WATERLINE
- C4 PLAN & PROFILE - SSL
- C5 STANDARD DETAILS - WATER SYSTEMS-1
- C6 STANDARD DETAILS - WATER SYSTEMS-2
- C7 STANDARD DETAILS - SANITARY SEWER-1
- C8 STANDARD DETAILS - SANITARY SEWER-2



H. Lester Seiger

RECORD DRAWING
8-16-24

H. LESTER SEIGER - P.E. 16103

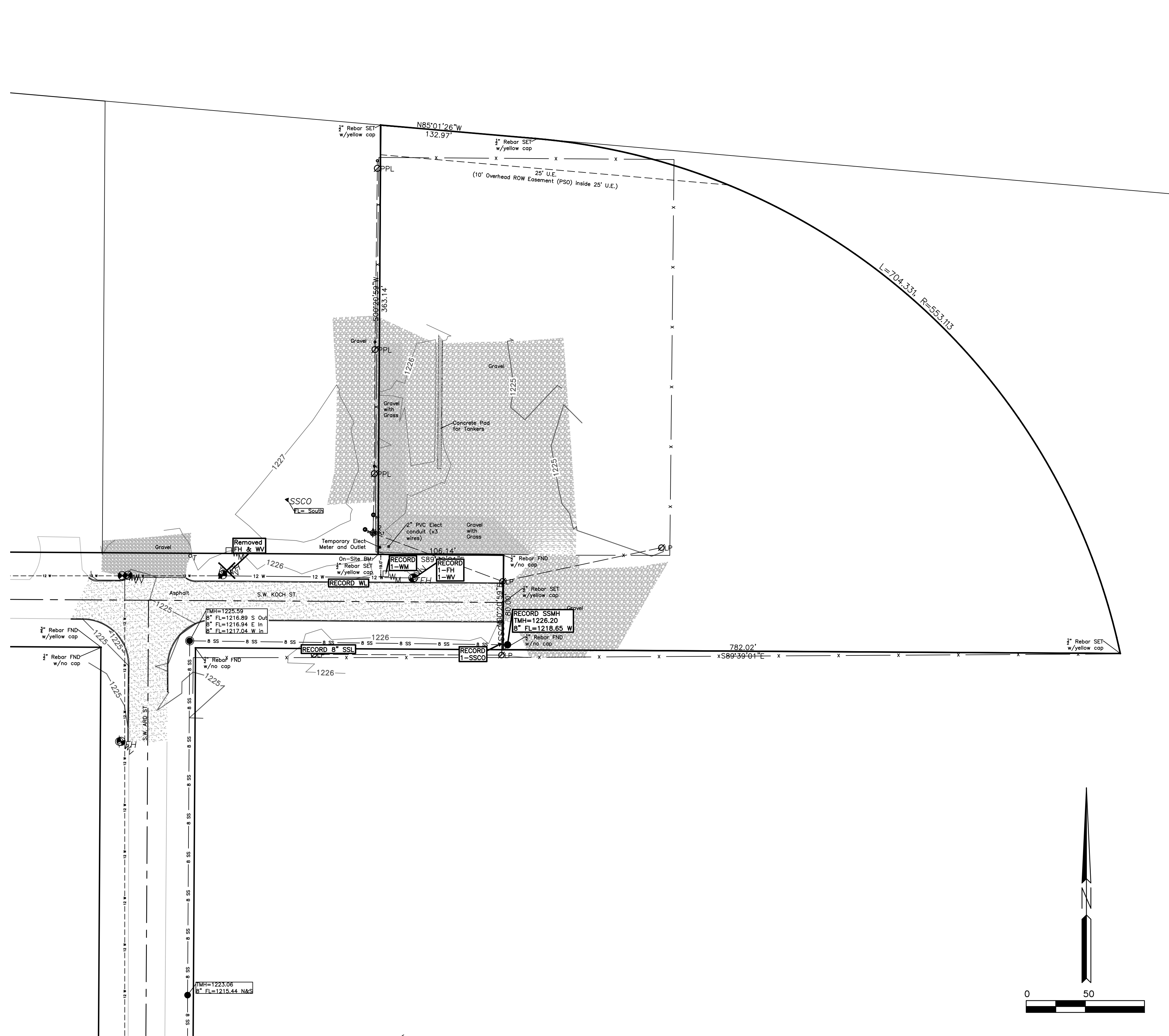
landmark

2505 N.E. SKYLINE PLACE, LAWTON, OK. 73507

H. Lester Seiger, P.E., P.L.S.

Tel. (580) 357-2022

engineering



Legend

- Existing Contour (1' Interval) 1'60
- Existing Fence
- Existing Light Pole ∅LP
- Existing Power Pole w/Light ∅PPL
- Existing Power Pole w/Light & Transformer ∅PPLT
- Existing Down Guy ∅dg
- Existing Telephone Riser ∅T
- Existing Overhead Power Line
- Existing Waterline 8 W
- Existing Fire Hydrant ∅FH
- Existing Water Valve ∅WV
- Existing Water Meter ∅WM
- Existing Sanitary Sewer Manhole
- Existing Sanitary Sewer Line 8 SS
- Existing Sanitary Sewer Cleanout *SSCO

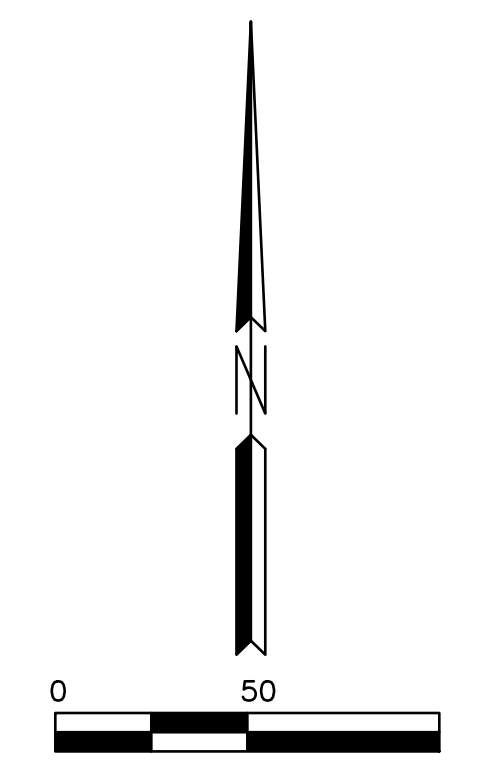
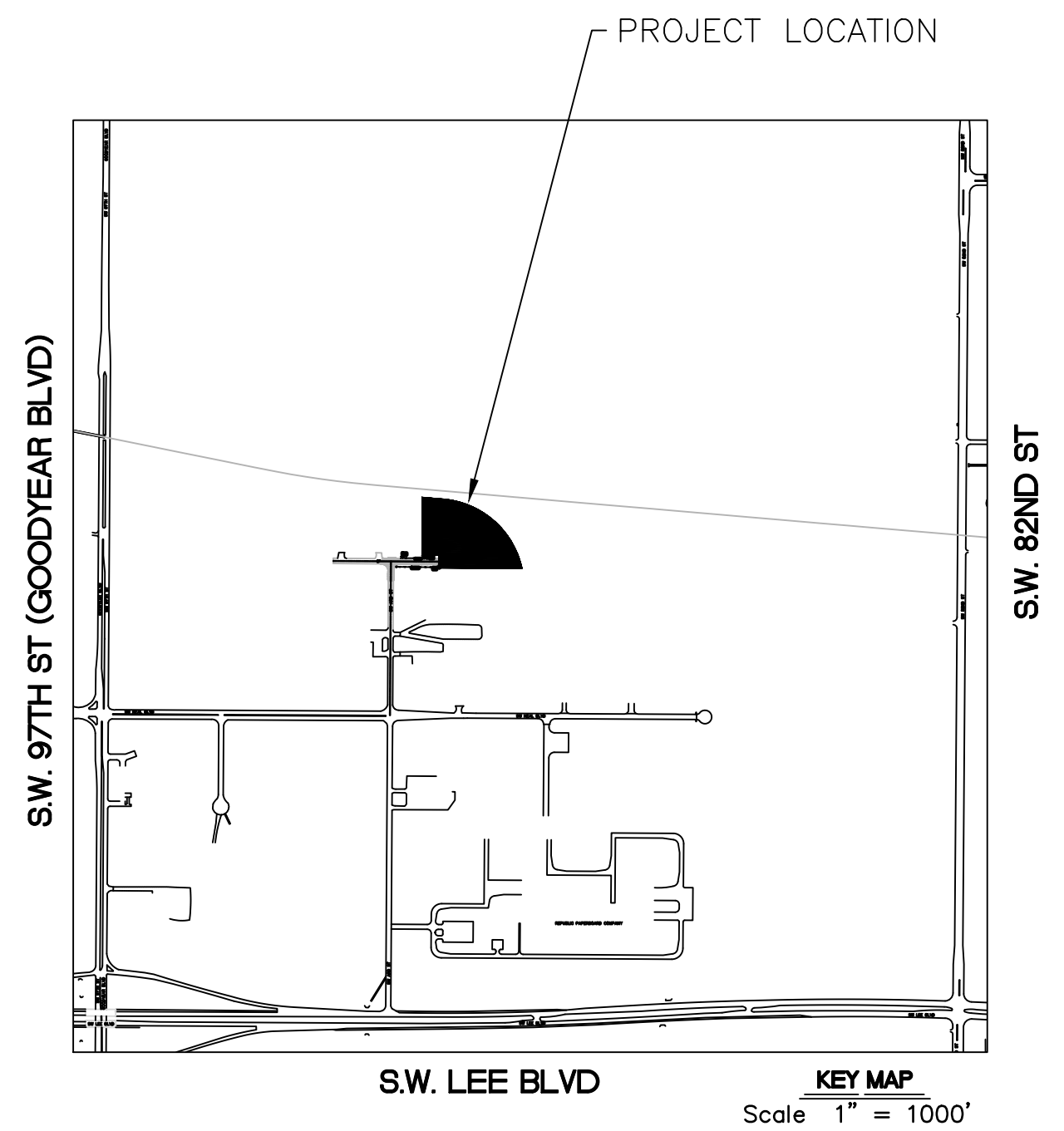
PROPERTY DESCRIPTION

Lot 3, Block 3,
Lawton Industrial Park Part II
Lawton, Oklahoma.

Basis of Bearing;
Plat

Benchmark;
BM= ALCP 36A2, Elevation=1236.50

On Site BM: 1/2" Rebar Set w/yellow cap Elevation=1226.13

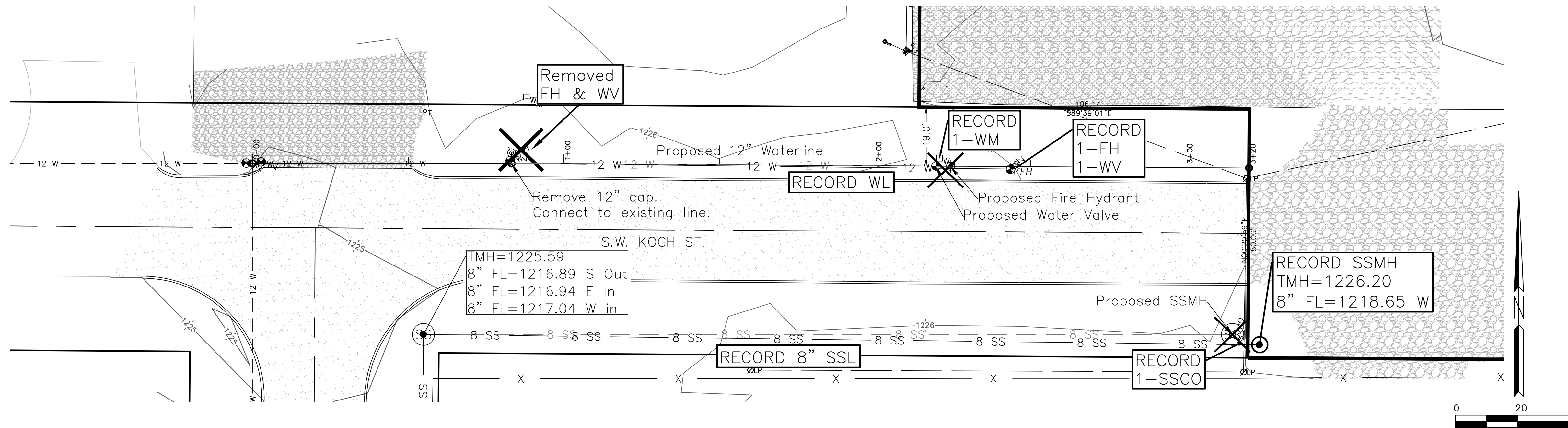


NOTES:

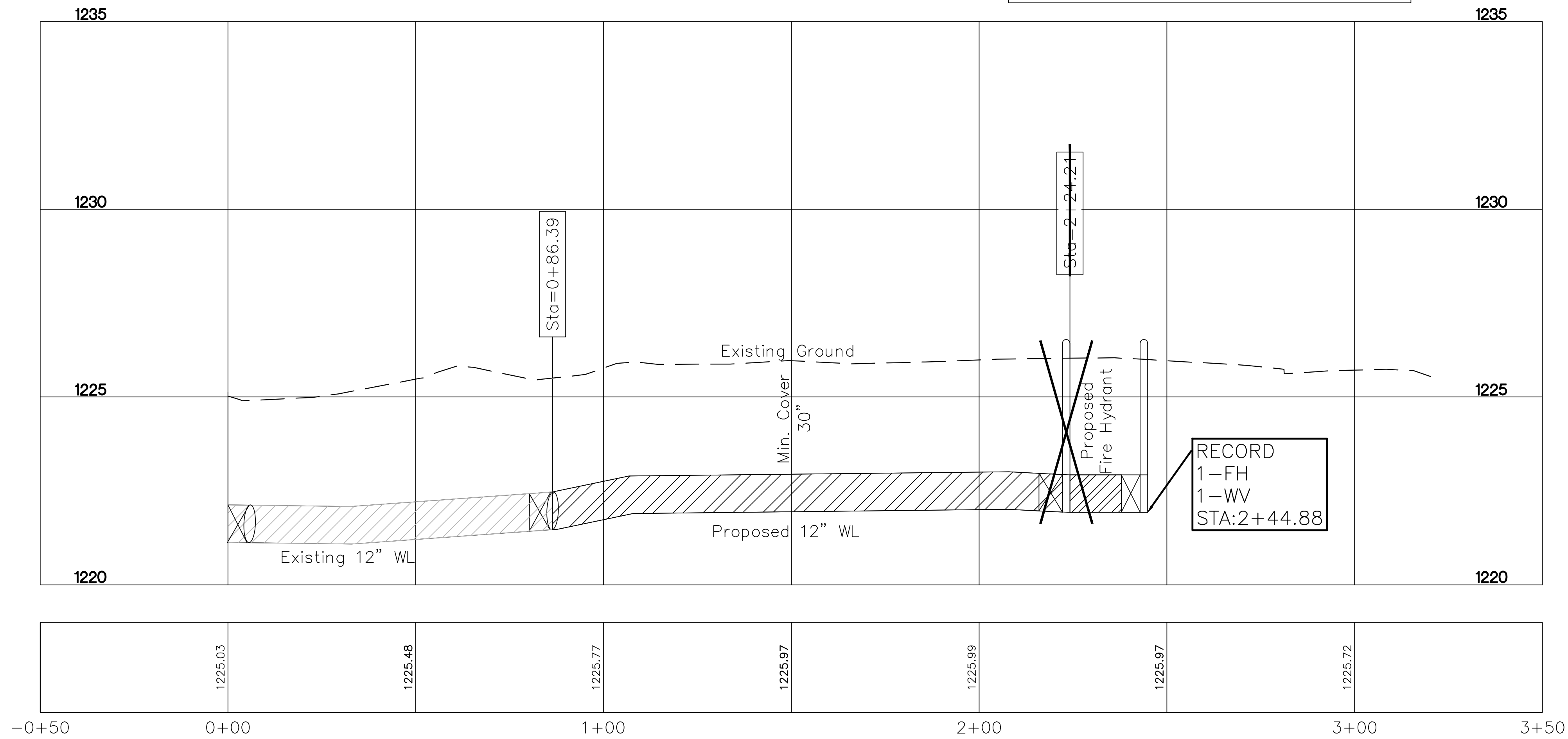
1. The underground utilities shown have been located from field survey information and existing drawings. The surveyor makes no guarantee that the underground utilities shown comprise all such utilities in the area, either in service or abandoned. The surveyor further does not warrant that the underground utilities shown are in the exact location indicated although he does certify that they are located as accurately as possible from the information available. It is the Contractor's responsibility to verify and locate all underground utilities prior to commencing work.

| | | | | | | | | | |
|---|-------------|---------------------|---------------------------------------|---------------------------------|-----------------------|-----------------|------------------------|--------------------|----------------------------------|
| | | | | | | | | | |
| Lawton Industrial Park II Lot 3, Block 3 LAWTON, OKLAHOMA | No. | Date | Revision | No. | Date | Revision | No. | Date | Revision |
| Engineering | OK CA# 2075 | Tel. (800) 357-2022 | 2305 NE SHORE PLACE, LAWTON, OK 73507 | H. Lester Seliger, P.E., P.L.S. | SHEET TITLE SURVEY | DATE 6/13/16 | PROJECT NO. 18gen13 | SHEET NO. OF 02 | RECORD DRAWING 8-16-24 |

Note: All disturbed area on the public right-of-way shall be grassed.



Profile View of S.W. KOCH ST.



Scale
Hor. 1"=20'
Ver. 1"=2'

Landmark
2505 N.E. SHINE PLACE, LAWTON, OK 73507
H. Lester Seliger, P.E., P.L.S.

OK CA# 2075
Tel. (800) 357-2022
Engineering

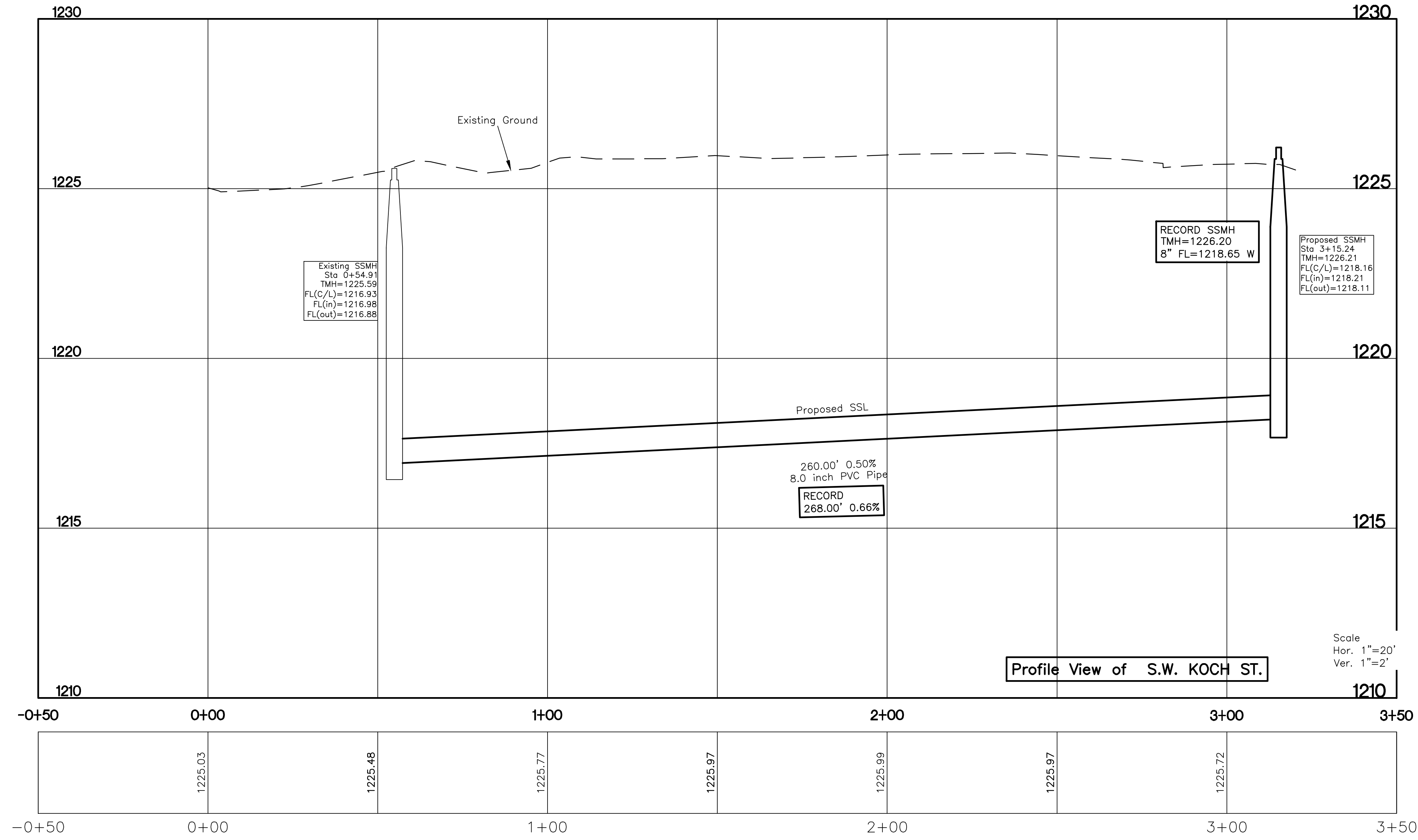
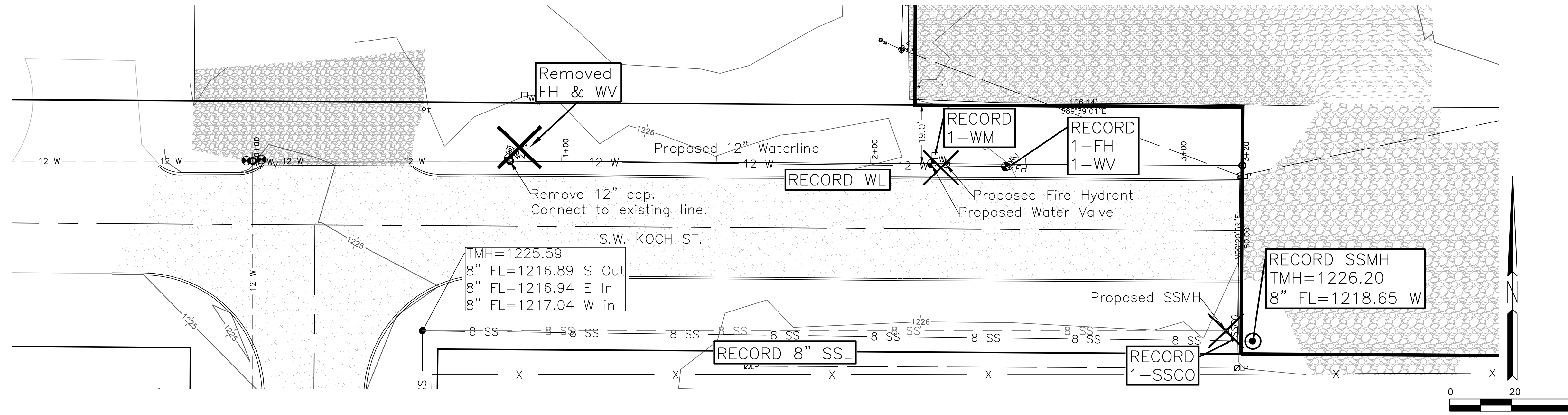
Lawton Industrial Park Part II
Lot 3, Block 3
LAWTON, OKLAHOMA

SHEET TITLE
PROPOSED WL
PLAN & PROFILE

DATE
11/21/16
PROJECT NO.
18gen13

SHEET NO. OF
63
RECORD
DRAWING
8-16-24

Note: All disturbed area on the public right-of-way shall be grassed.



| No. | Date | Revision |
|-----|------|----------|
| | | |
| | | |
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Lawton Industrial Park Part II
 Lot 3, Block 3
 LAWTON, OKLAHOMA

Landmark Engineering
 OK CA# 2075
 H. Lester Seliger, P.E., P.L.S.
 2505 N.E. SHINE ROAD, LAWTON, OK 73507
 Tel. (800) 357-2022

| | |
|-----------------------------|----------|
| SHEET TITLE | |
| PROPOSED SSL PLAN & PROFILE | |
| DATE | 11/21/16 |
| PROJECT NO. | 18gen13 |
| SHEET NO. OF | 54 |
| RECORD DRAWING | |
| 8-16-24 | |

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MINIMUM THRUST BLOCK REQUIREMENT

(MINIMUM SURFACE AREA IN CONTACT WITH UNDISTURBED SOIL AT THE LOCATION INDICATED IN DETAIL NO. 1)

1. HORIZONTAL AND DOWNWARD THRUST

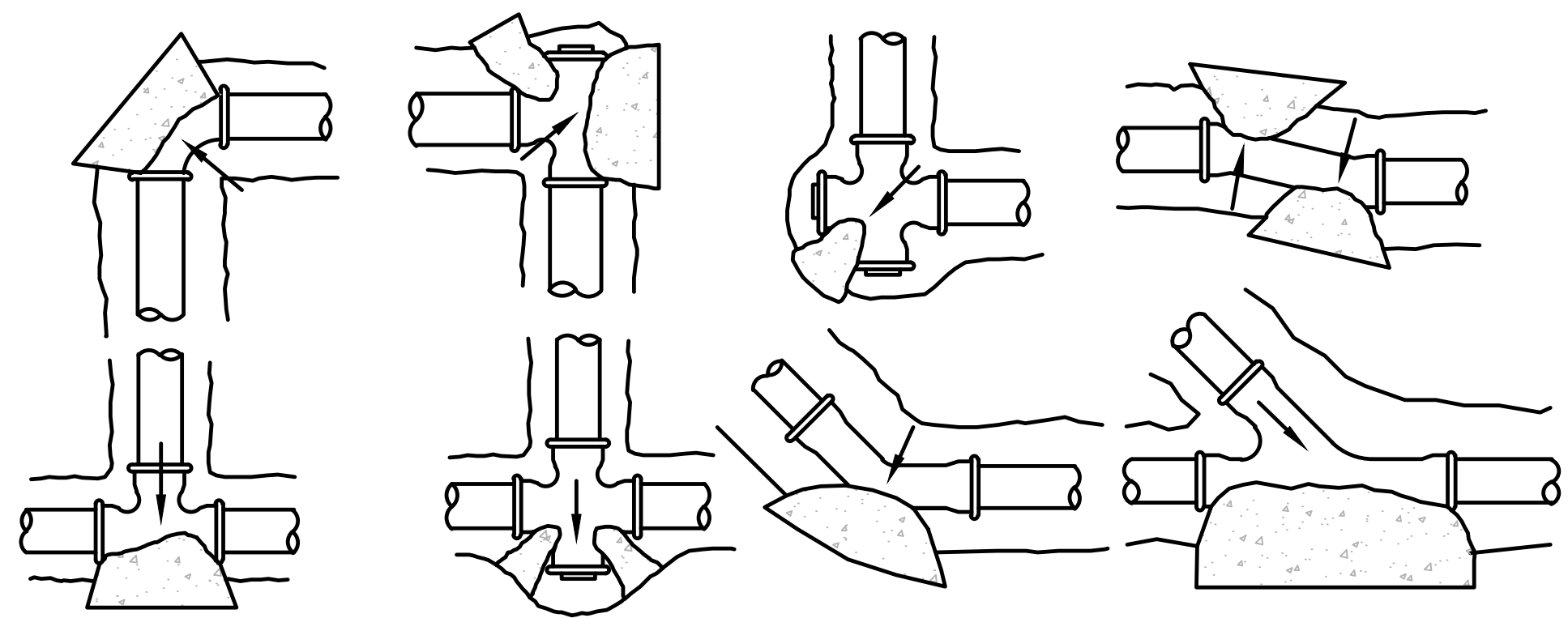
THE FOLLOWING PROCEDURE SHALL BE USED TO ARRIVE AT THE AREA OF THRUST BLOCKING REQUIRED FOR DISTRIBUTION OF HORIZONTAL AND DOWNWARD THRUST TO UNDISTURBED SOIL:

- A. USE TEST PRESSURE OF 150 PSI OR AS DETERMINED BY THE ENGINEER.
- B. MULTIPLY PRESSURE OBTAINED FROM STEP A BY THE VALUE SHOWN IN TABLE 1 FOR THE APPROPRIATE FITTING AND PIPE SIZE. THIS IS THE TOTAL THRUST IN POUNDS AT THE FITTING.
- C. USE TABLE 2 TO DETERMINE THE BEARING STRENGTH OF THE SOIL AT THE SPECIFIC LOCATION. IF NOT SURE, CONTACT THE CITY OF LAWTON ENGINEERING DIVISION.
- D. DIVIDE THE THRUST OBTAINED FROM STEP B BY THE BEARING STRENGTH OF THE SOIL OBTAINED FROM STEP C IN ORDER TO ARRIVE AT THE AREA REQUIRED FOR THRUST BLOCKING IN SQUARE FEET. THIS AREA IS THE MINIMUM SURFACE AREA THAT WILL BE IN CONTACT WITH UNDISTURBED SOIL.
- E. SEE DETAIL 1 FOR LOCATION OF THRUST BLOCKING.

2. UPWARD THRUST

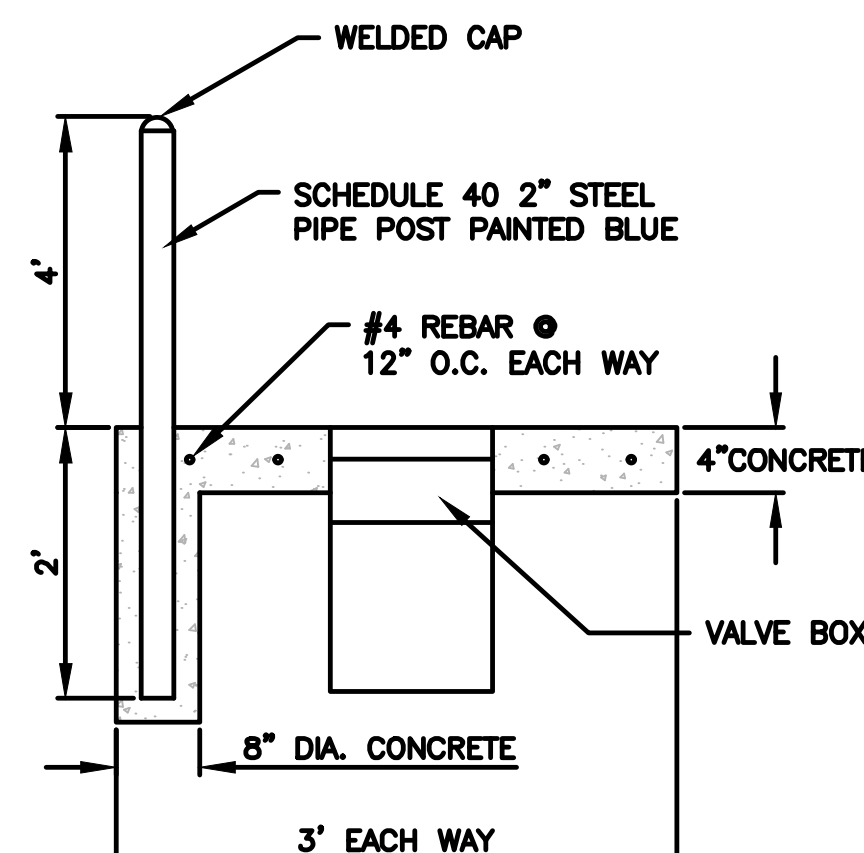
THE FOLLOWING PROCEDURE SHALL BE USED TO ARRIVE AT THE QUANTITY OF CONCRETE REQUIRED TO COUNTERBALANCE AN UPWARD THRUST.

- A. FOLLOWING STEPS 1A & 1B ABOVE.
- B. DIVIDE THE THRUST OBTAINED FROM STEP 1B ABOVE BY 150 POUNDS PER CUBIC FOOT (CONCRETE DENSITY) TO ARRIVE AT THE QUANTITY OF CONCRETE REQUIRED IN CUBIC FEET.
- C. REINFORCE THE CONCRETE PER DETAIL NO. 2

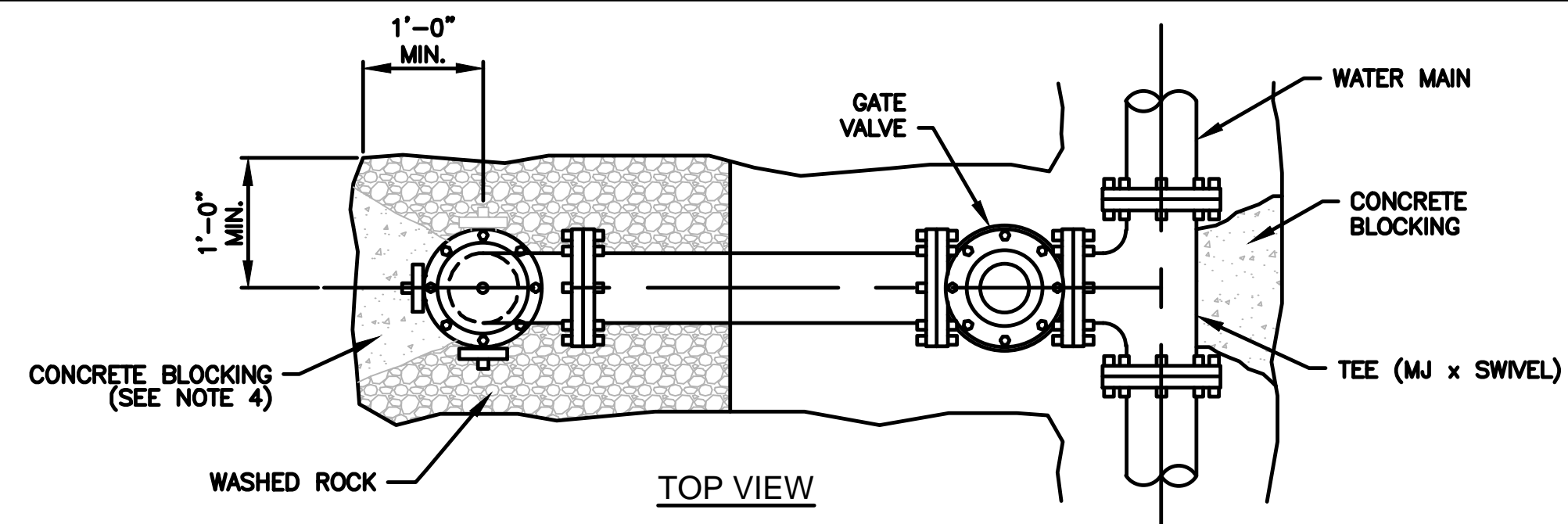


DETAIL NO. 1
THRUST BLOCKS FOR HORIZONTAL & DOWNWARD THRUST
(SEE MINIMUM THRUST BLOCK REQUIREMENT FOR MINIMUM SURFACE CONTACT AREA)

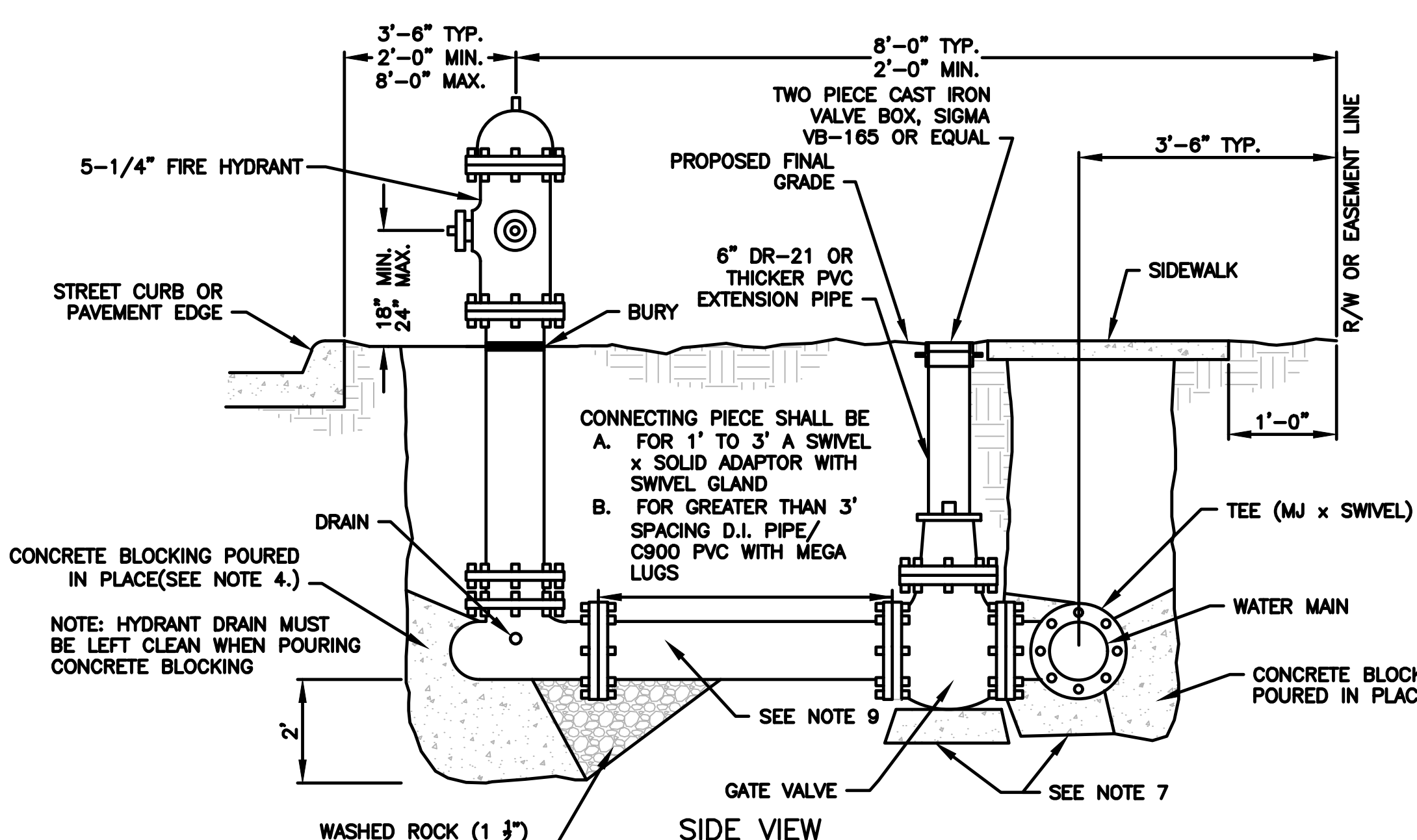
NOTE: ALL CONCRETE FOR THRUST BLOCKING SHALL BE 2500 PSI



VALVE BOX DETAIL
UNIMPROVED AREAS OR AS DIRECTED BY THE ENGINEER



TOP VIEW



SIDE VIEW

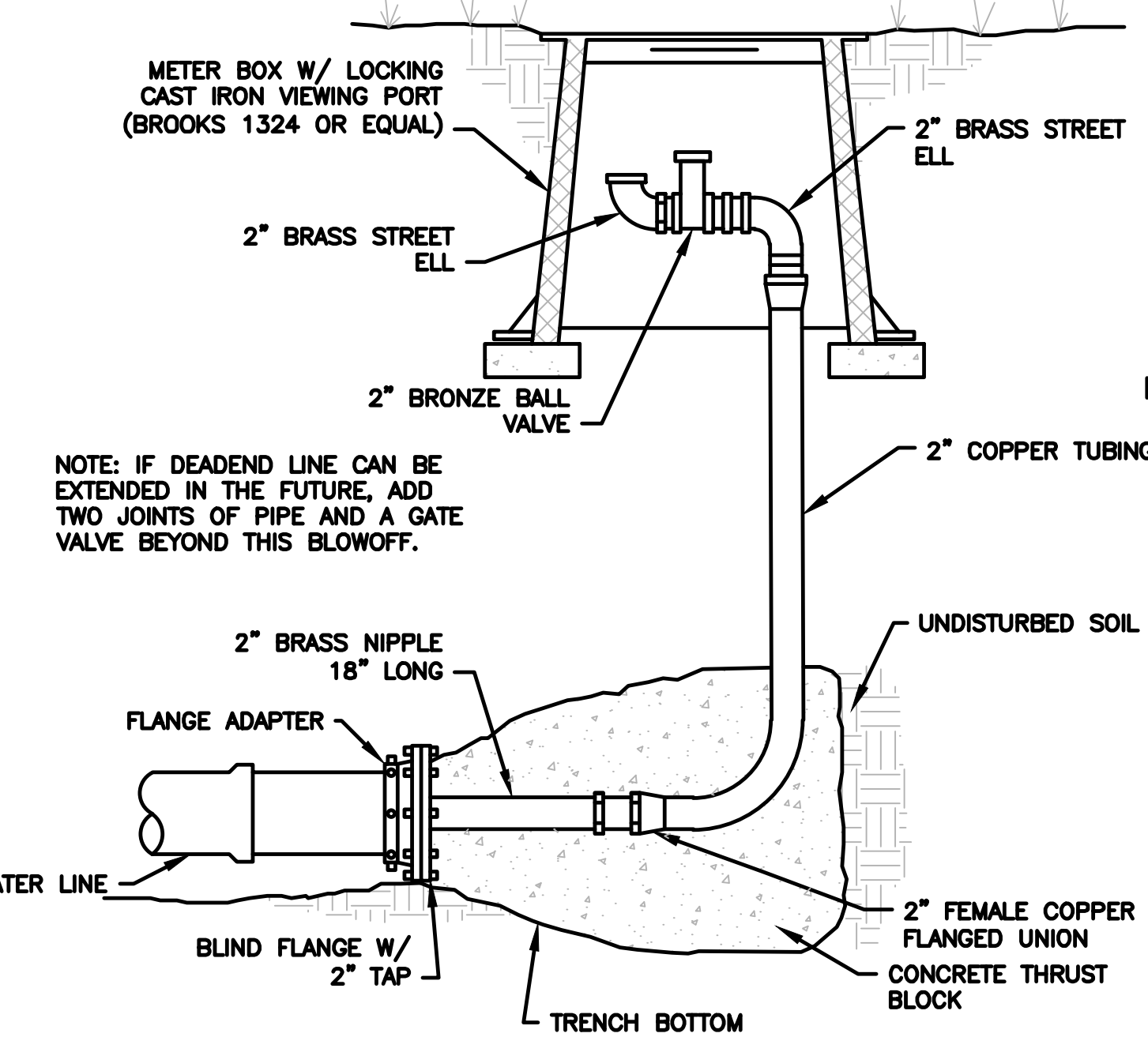
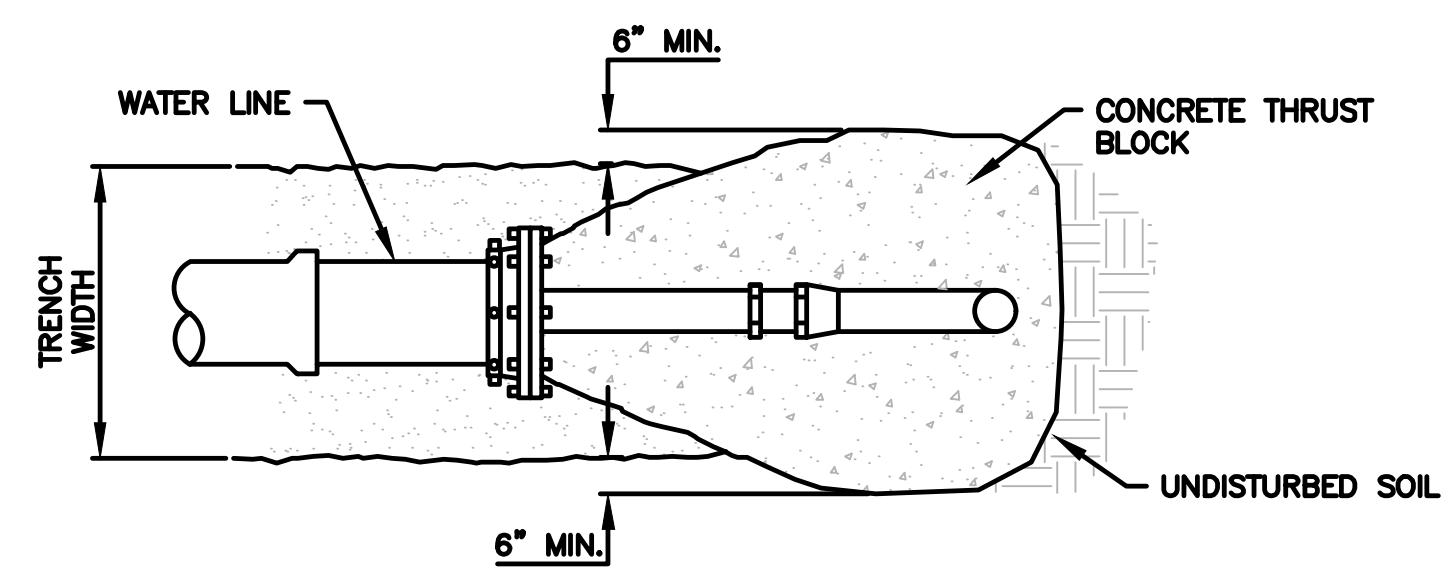
DETAIL NO. 3
FIRE HYDRANTS

| PIPE SIZE (IN.) | DEAD END, TEE OR FH | 90° ELBOW | 45° ELBOW | 22 1/2° ELBOW |
|-----------------|---------------------|-----------|-----------|---------------|
| 4 | 19 | 27 | 15 | 7 |
| 6 | 39 | 55 | 30 | 15 |
| 8 | 67 | 94 | 51 | 26 |
| 10 | 109 | 154 | 84 | 43 |
| 12 | 155 | 218 | 119 | 61 |
| 14 | 210 | 296 | 161 | 82 |
| 16 | 272 | 383 | 209 | 106 |
| 18 | 351 | 494 | 269 | 137 |
| 20 | 434 | 611 | 333 | 169 |
| 24 | 623 | 878 | 478 | 244 |

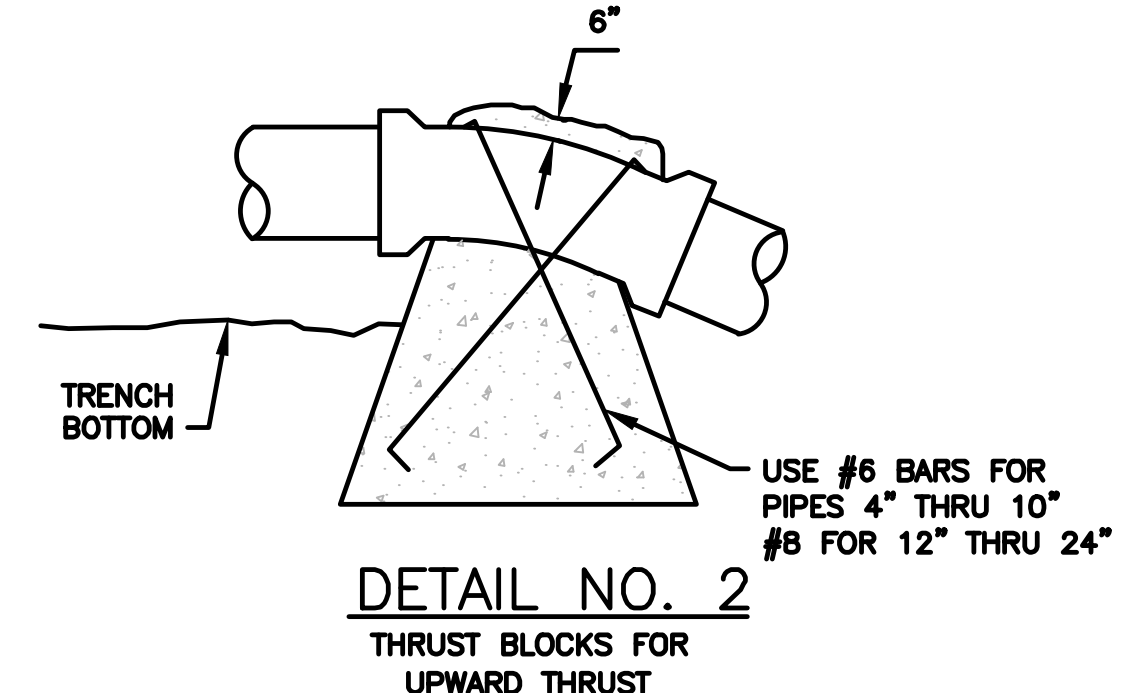
| SOILS AND SAFE BEARING LOADS | LBS. PER SQ. FT. |
|--|------------------|
| SOUND SHALE | 10,000 |
| CEMENTED GRAVEL AND SAND (DIFFICULT TO PICK) | 4,000 |
| COARSE AND FINE COMPACTED SAND | 3,000 |
| MEDIUM CLAY (CAN BE SPADED) | 2,000 |
| SOFT CLAY | 1,000 |
| MUCK | 0 |

GENERAL NOTES

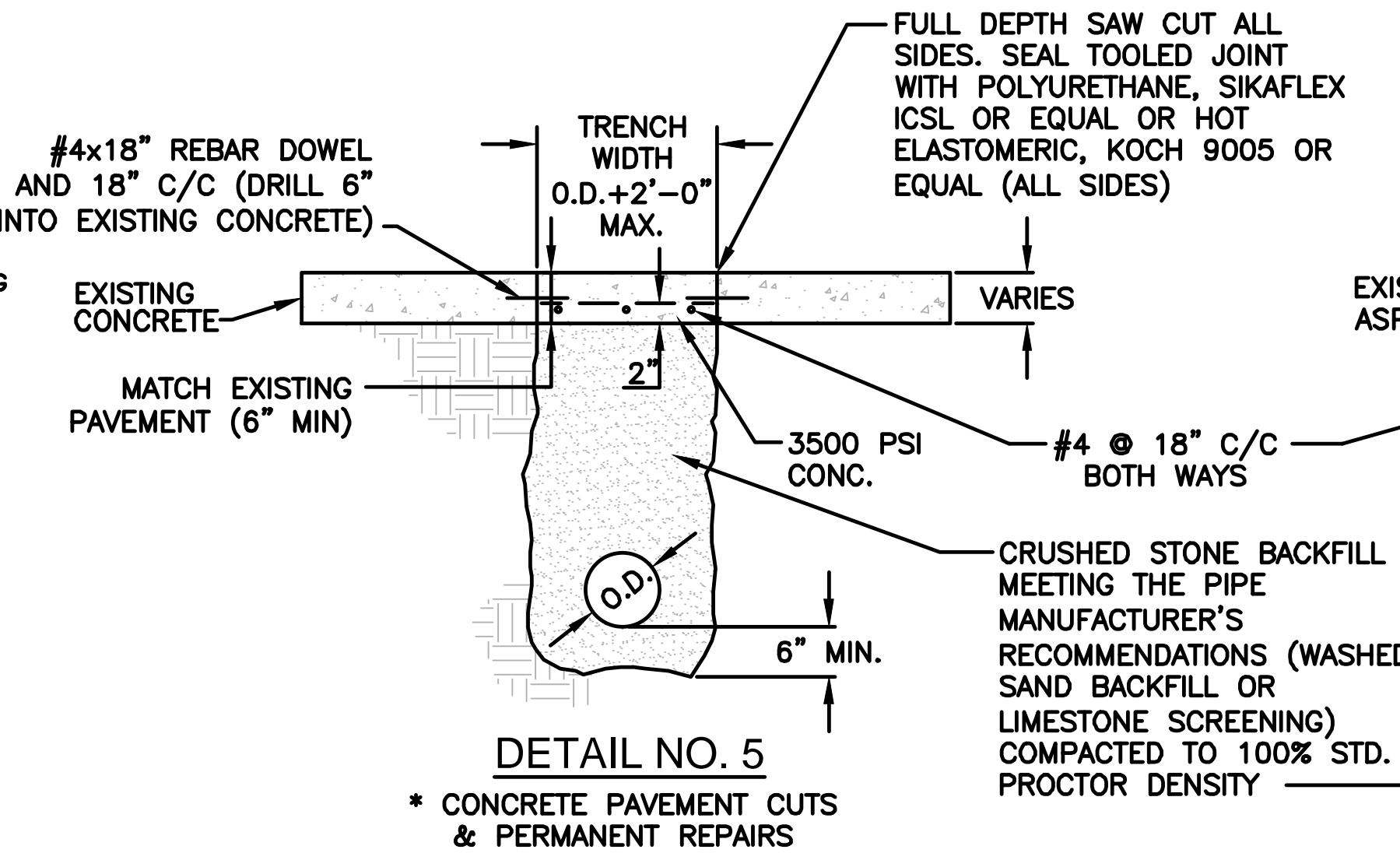
- 1. MINIMUM COVER FOR WATER MAIN IS 30".
- 2. TAPPING SLEEVES FOR ALL PIPE SIZES SHALL BE BOLTED TYPE, HEAVY DUTY, MADE FROM DUCTILE IRON USING CADMIUM PLATED IRON BOLTS OR STAINLESS STEEL WITH STAINLESS STEEL BOLTS, ETC. FOR LARGER THAN 24" PIPE, EPOXY COATED TAPPING SLEEVES (150 PSI WORKING PRESSURE) ARE ALLOWED WITH STAINLESS STEEL NUTS AND BOLTS, ANODE PROTECTION, SAND BACKFILL AND 12 MIL THICKNESS OF FUSION BONDED EPOXY COATING (INTERIOR/EXTERIOR). ALL SLEEVES SHALL BE WRAPPED IN ACCORDANCE WITH NOTE 3. TAPPING SLEEVES AND VALVES SHALL HAVE POURED CONCRETE BLOCKING. TAPPING SLEEVES ARE NOT ALLOWED PER MAIN LINE SIZES 12" AND SMALLER, A TEE SHALL BE CUT IN FOR THIS CONNECTION.
- 3. ALL BELOW GRADE DUCTILE-IRON PIPE, HYDRANTS, FITTINGS AND OTHER APPURTENANCE SHALL BE WRAPPED IN POLYETHYLENE IN ACCORDANCE WITH AWWA C105 (ANSI A21.5).
- 4. FIRE HYDRANTS: RESTRAINED JOINTS SHALL BE UTILIZED WITH A VALVE AND HYDRANT TEE AS SHOWN. CONCRETE THRUST BLOCKING IS NOT REQUIRED, UNLESS RESTRAINED JOINTS CANNOT BE USED AS DETERMINED BY THE CITY ENGINEER.
- 5. IF THE WATER MAIN IS LESS THAN 2'-0" FROM BACK OF CURB THE EXCAVATION SHALL BE BACKFILLED WITH LIMESTONE SCREENINGS COMPACTED TO 95% STANDARD PROCTOR DENSITY.
- 6. ALL FIRE HYDRANTS SHALL BE MUELLER SUPER CENTURIAN 2000, US PIPE METROPOLITAN 250, OR CLOW MEDALLION.
- 7. ALL FITTINGS SHALL BE SUPPORTED WITH POURED CONCRETE BLOCKING. VALVES SHALL BE SUPPORTED WITH CONCRETE BLOCKS (4" MIN. THICKNESS), OR POURED CONCRETE.
- 8. PRIVATE FIRE HYDRANTS AND PRIVATE VALVES SHALL BE MARKED AS PRIVATE.
- 9. IF FIRE HYDRANT LEAD EXCEEDS 20' THEN A SECOND ISOLATION VALVE SHALL BE INSTALLED.
- 10. VALVE BOXES SHALL NOT BE PLACED IN SIDEWALKS.
- 11. VALVE BOXES SHALL BE ADJUSTED TO LEVEL WITH GROUND TO NO MORE THAN 2" ABOVE.



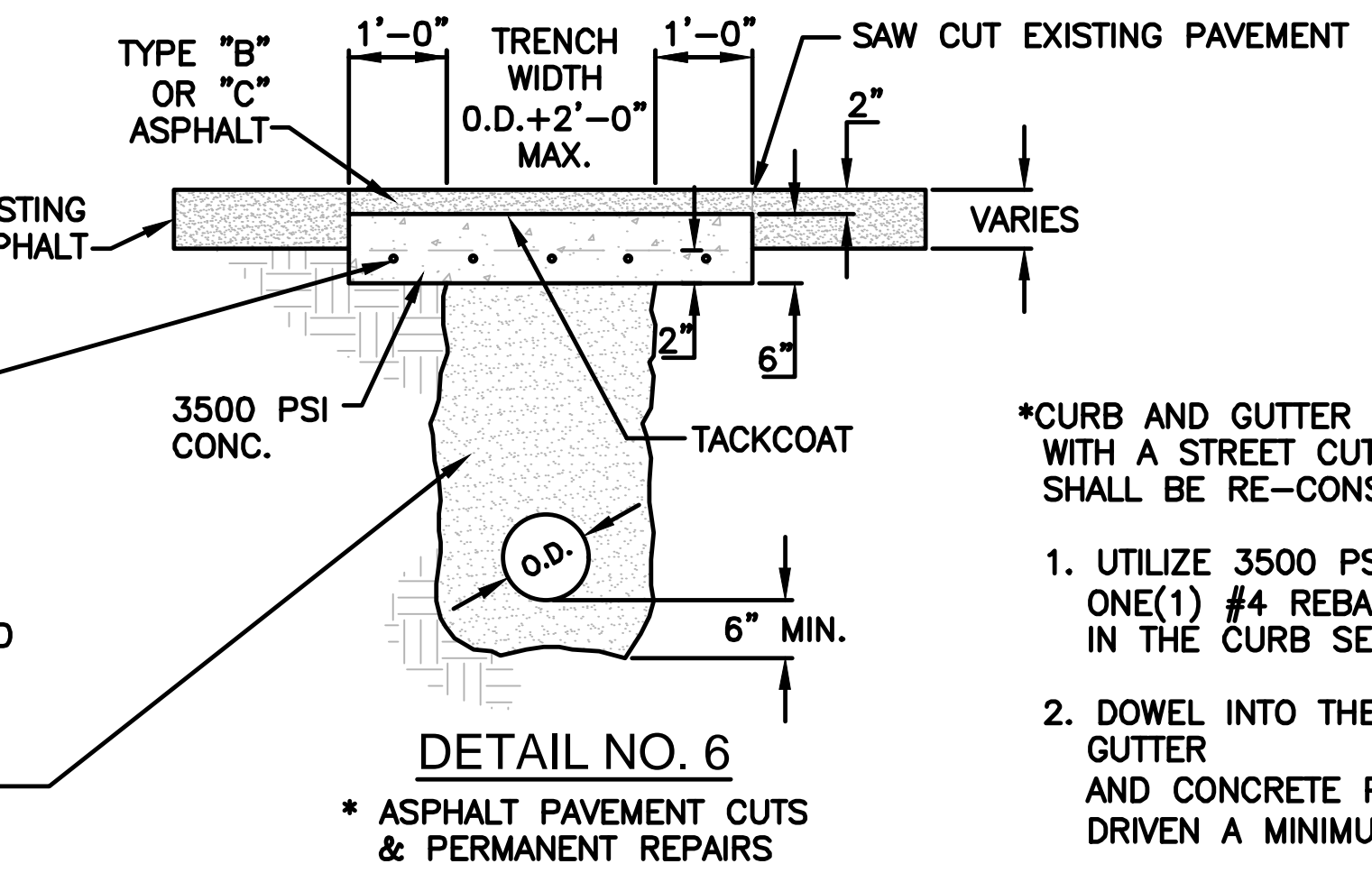
DETAIL NO. 4
2" BLOW-OFF FOR DEAD END WATER LINES



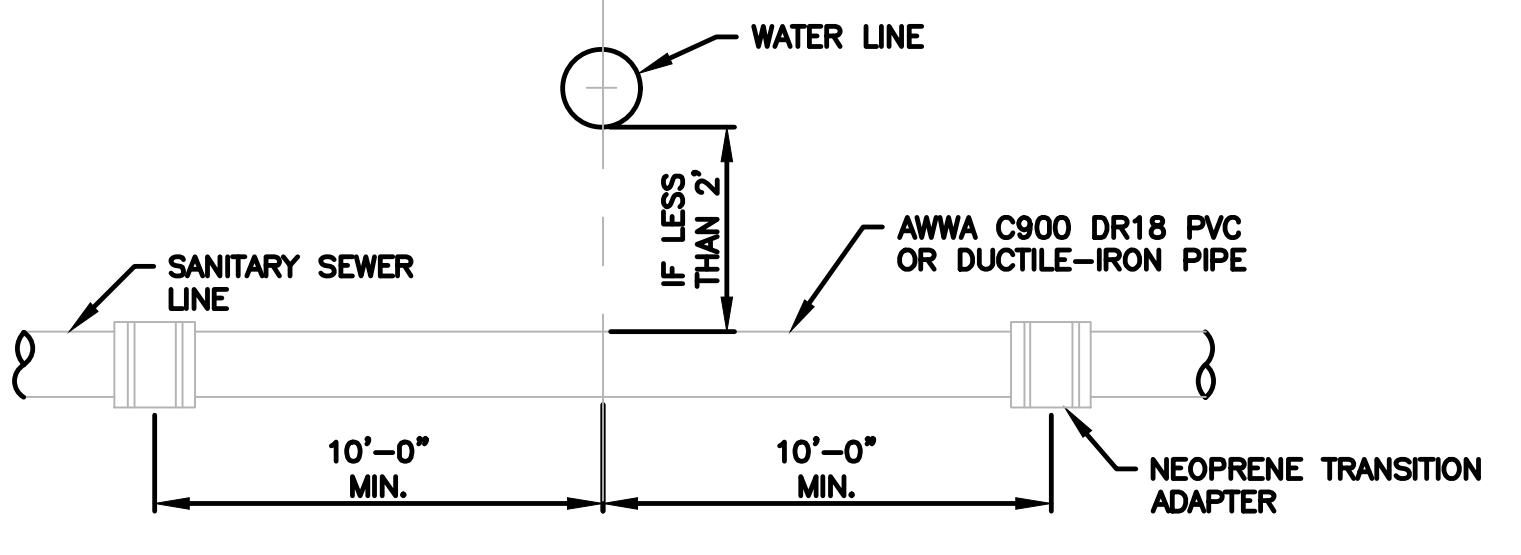
DETAIL NO. 2
THRUST BLOCKS FOR UPWARD THRUST



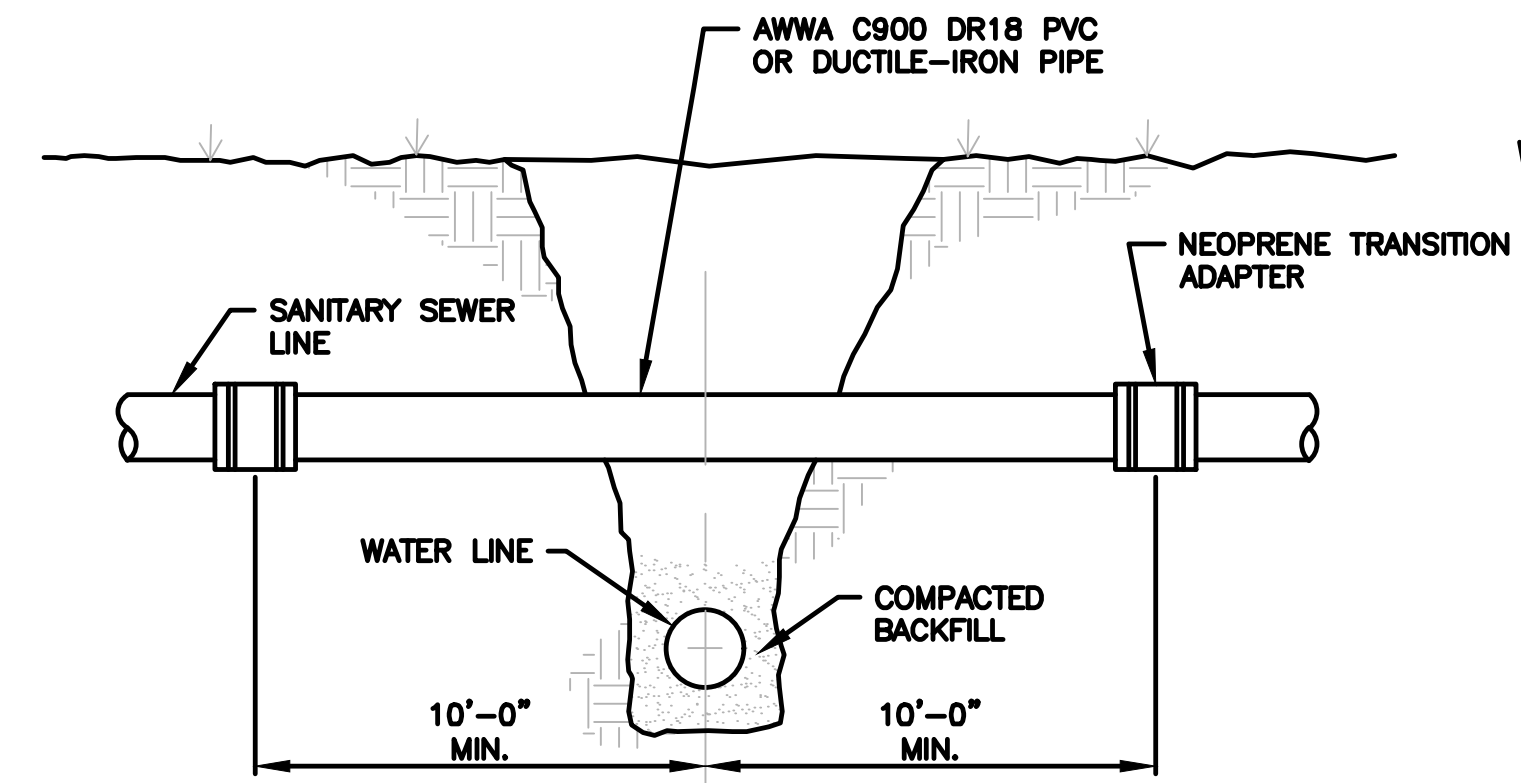
DETAIL NO. 5
* CONCRETE PAVEMENT CUTS & PERMANENT REPAIRS



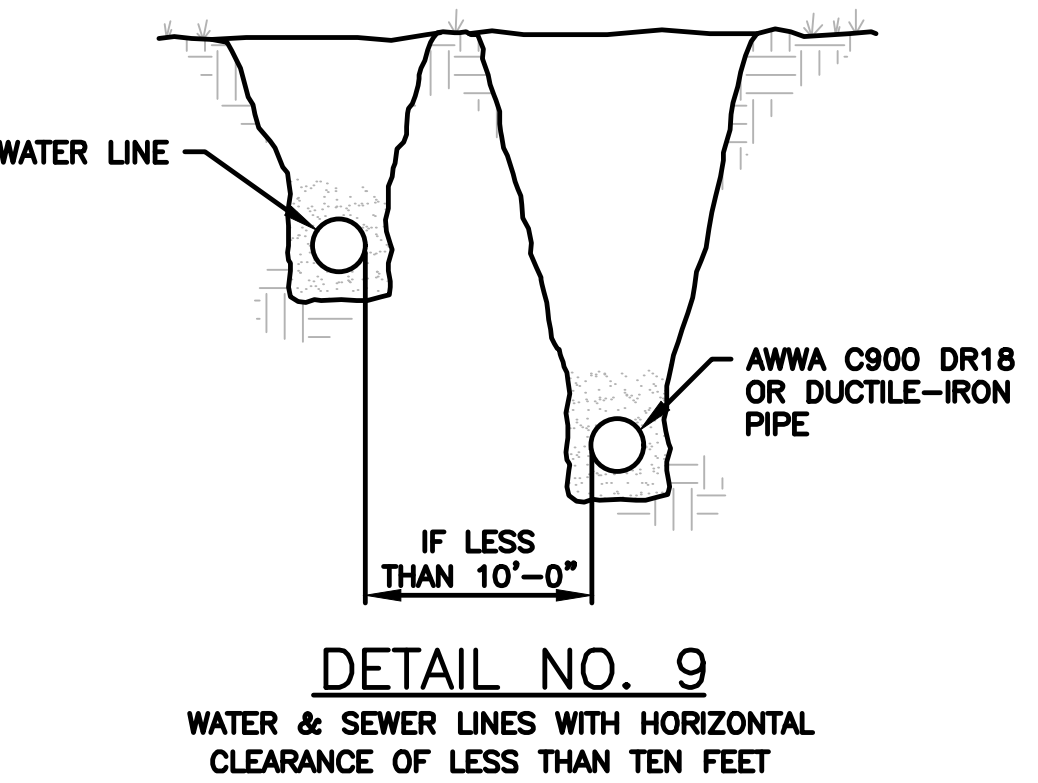
DETAIL NO. 6
* ASPHALT PAVEMENT CUTS & PERMANENT REPAIRS



DETAIL NO. 7
WATER & SEWER LINE CROSSING WHEN WATER LINE IS ABOVE THE SEWER LINE & VERTICAL CLEARANCE IS LESS THAN 2'-0"



DETAIL NO. 8
WATER & SEWER LINE CROSSING WHEN WATER LINE IS BELOW SEWER LINE



DETAIL NO. 9
WATER & SEWER LINES WITH HORIZONTAL CLEARANCE OF LESS THAN TEN FEET

*CURB AND GUTTER REMOVED IN CONJUNCTION WITH A STREET CUT OR PERMANENT REPAIRS SHALL BE RE-CONSTRUCTED AS FOLLOWS:

- 1. UTILIZE 3500 PSI P.C. CONCRETE WITH ONE(1) #4 REBAR PLACED LONGITUDINALLY IN THE CURB SECTION.
- 2. DOWEL INTO THE EXISTING CURB AND GUTTER AND CONCRETE PAVEMENT WITH #4 REBARS DRIVEN A MINIMUM OF 6" @ 18" C/C.
- 3. EXPANSION/CONTRACTION/CONSTRUCTION JOINTS SHALL BE CONSTRUCTED ACCORDING TO CITY OF LAWTON STANDARD DETAILS FOR SUBDIVISION STREETS.

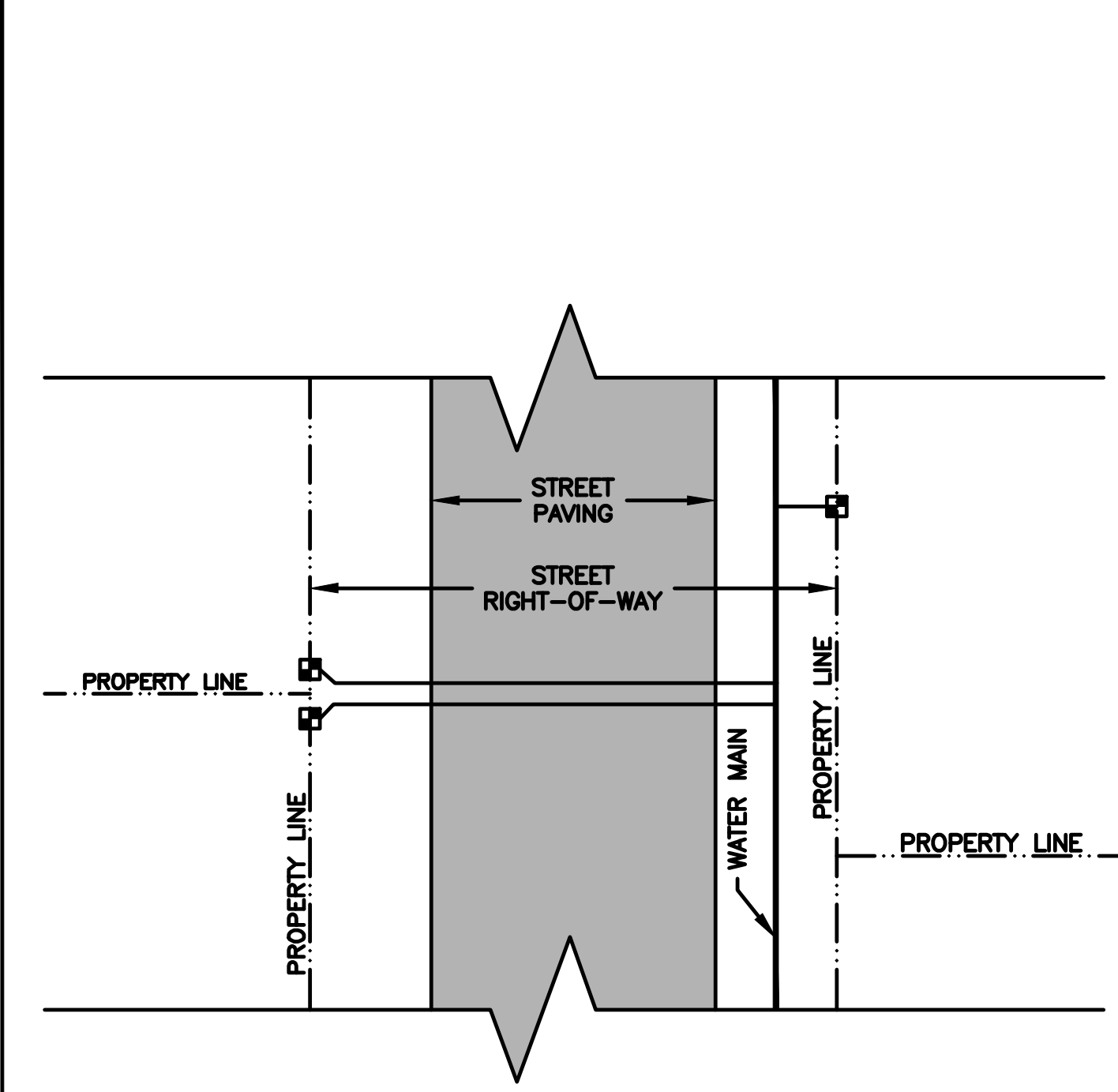
STANDARD DETAILS
WATER SYSTEM - 1

CITY OF LAWTON
ENGINEERING DIVISION

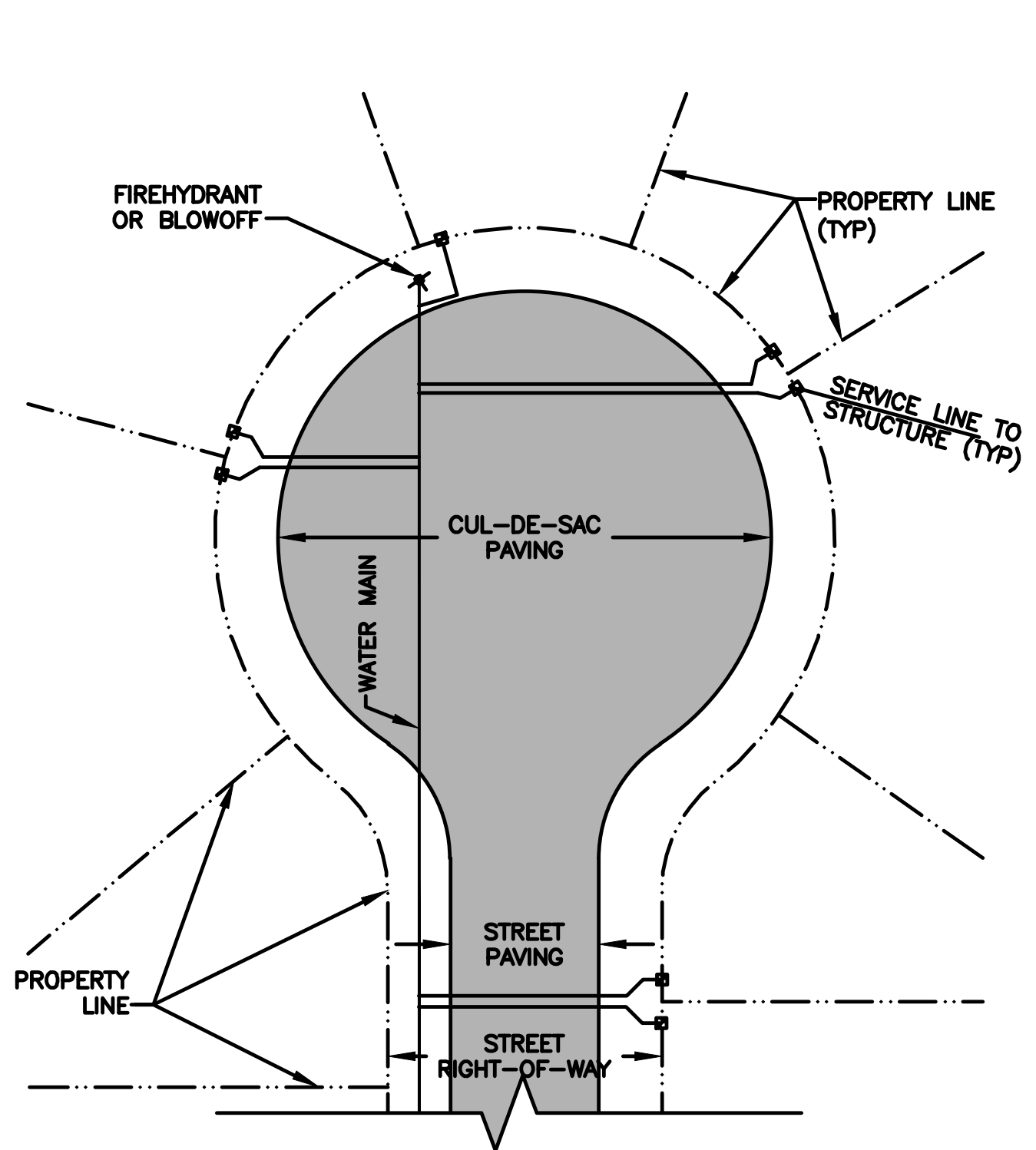
| | |
|--------------------------------|-------------------|
| PROJECT NO.: | DATE: |
| REVISION: CITY ENGINEER UPDATE | DATE: OCT 2004 |
| CITY ENGINEER UPDATE | DATE: MAY 2008 |
| CITY ENGINEER UPDATE | DATE: APRIL 2010 |
| CITY ENGINEER UPDATE | DATE: AUGUST 2010 |

DESIGNED BY: G. HENNESSEE DRAWN BY: S. MALICOAT AS BUILT DATE: SHEET OF

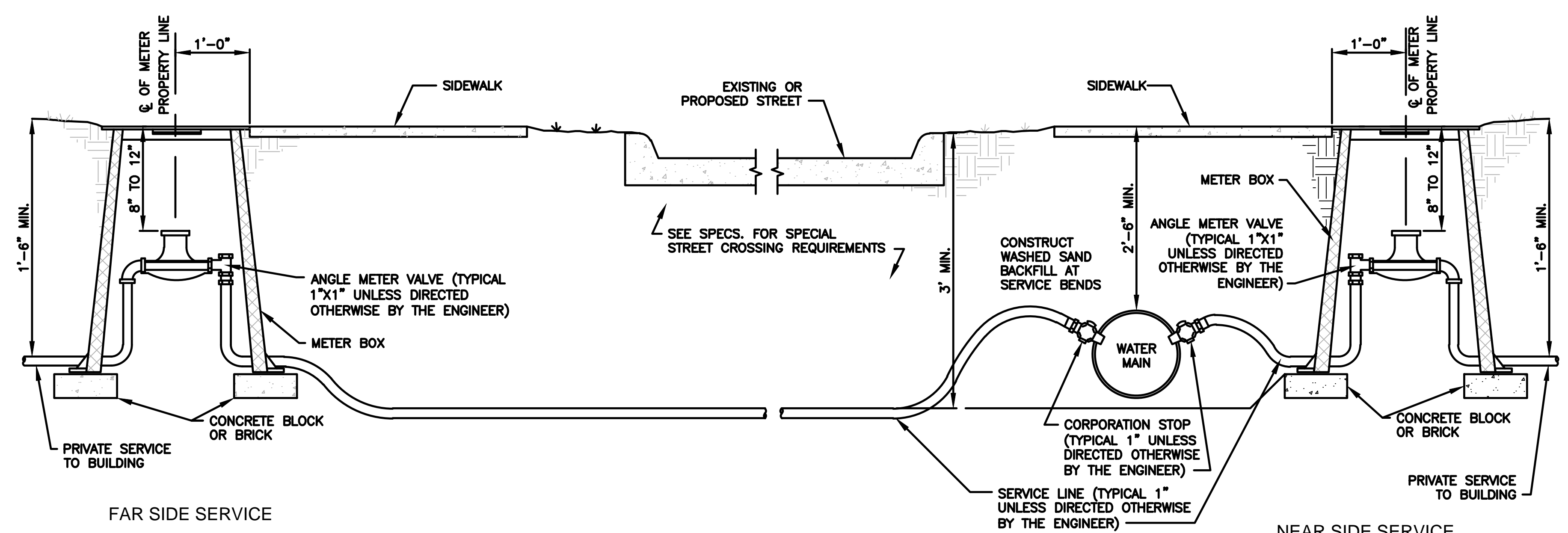
FILE NAME: LAYOUT - Water System - 1.dwg - Water Detail
PLOT DATE: 06/23/2023 09:56



DETAIL NO. 10
TYPICAL LAYOUT
WATER SERVICE
INSTALLATION



DETAIL NO. 11
CUL-DE-SAC LAYOUT
WATER SERVICE
INSTALLATION



DETAIL NO. 12
TYPICAL INSTALLATION
SINGLE FAMILY RESIDENTIAL WATER SERVICE
(SIZES FROM 1" TO 2")

WATER SERVICE INSTALLATION NOTES

- 1" SERVICE TAPS SHALL BE MADE BY DIRECT TAP OR WITH A TAPPING SADDLE FOR DUCTILE IRON PIPE. THREADED CONNECTIONS SHALL BE MADE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS AND UTILIZE TEFLON TAPE. SERVICE TAPS 1" AND UP TO 2" CAN BE MADE BY DIRECT TAP OR WITH A TAPPING SADDLE ON DUCTILE IRON PIPE. ON PVC PIPE, SERVICE TAPS 1" AND UP TO 2" SHALL BE MADE UTILIZING TAPPING SADDLES ONLY. SADDLES SHALL BE BRASS BODY DOUBLE STRAP/DOUBLE BOLT TYPES SUCH AS MUELLER BR2B OR STAINLESS STEEL DOUBLE BOLT WRAP AROUND TYPE SUCH AS FORD FS303. ALL SADDLES SHALL BE WRAPPED WITH POLYETHYLENE WRAP (AWWA C105/A21.5-05). ALL SADDLES SHALL BE BEDDED AND BACKFILLED WITH AN APPROVED WASHED SAND.
- SERVICE TAPS TO WATER MAIN SHALL BE LOCATED BACK OF CURB WHEN POSSIBLE. ALL TAPS SHALL BE MADE WHILE THE MAIN IS UNDER NORMAL OPERATING PRESSURE. POLYETHYLENE WRAP ON WATER MAIN SHALL BE REPAIRED AFTER TAP IS MADE.
- ALL SERVICES SHALL BE 1" UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
- METER BOX/VAULT SHALL NOT BE INSTALLED IN EXISTING OR PROPOSED SIDEWALKS, DRIVEWAYS, PAVEMENTS OR ANY TRAFFIC AREAS, UNLESS APPROVED OTHERWISE BY THE ENGINEER.
- CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SERVICE ITEMS EXCEPT FOR THE METER WHICH SHALL BE INSTALLED BY THE FIELD SERVICE BRANCH OF THE CITY'S FINANCE DEPARTMENT. METER BOX SHALL HAVE LOCKING CAST IRON VIEWING PORT. USE BROOKS MODEL 1419 OR APPROVED EQUAL FOR 1" SERVICE, MODEL 1730 OR APPROVED EQUAL FOR 1-1/2" AND 2" SERVICES NON-TRAFFIC LOCATIONS. USE METER BOX WITH TRAFFIC RATED COVER AS APPROVED BY THE ENGINEER FOR TRAFFIC LOCATIONS.
- SERVICES THAT ARE 3" THRU 6" SHALL BE INSTALLED ACCORDING TO DETAIL NO. 13. REFER TO TABLE 3 FOR METER VAULT DIMENSIONS. METER VAULTS FOR METER SIZES GREATER THAN 6" SHALL BE AS APPROVED BY THE CITY ENGINEER. ALL PIPING INSIDE METER VAULT SHALL BE DUCTILE IRON PIPE. ALL FITTINGS SHALL BE DUCTILE IRON MECHANICAL JOINT FITTINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR A COMPLETE INSTALLATION EXCEPT FOR METER AND STRAINER. METER AND STRAINER SHALL BE INSTALLED BY THE CITY'S WATER DISTRIBUTION DIVISION.
- IF THE TOP OF METER VAULT OR BOTTOM ARE NOT POURED MONOLITHICALLY WITH THE WALLS, KEED CONSTRUCTION JOINTS SHALL BE CONSTRUCTED AND SEALED WITH CONCRETE JOINT SEALER (ASTM DESIGNATION D 1850-67). ACCESS HATCH FOR METER VAULT SHALL BE 3'-6" X 3'-6" IN SIZE. BILCO TYPE "K" OR APPROVED EQUAL SHALL BE USED FOR NON-TRAFFIC LOCATIONS AND BILCO TYPE "J H20" OR APPROVED EQUAL SHALL BE USED FOR TRAFFIC LOCATIONS. HATCH SHALL BE CENTERED OVER THE METER.
- TOP OF METER VAULT FOR 3" AND LARGER SERVICE SHALL BE 4" ABOVE FINISHED GRADE AT NON-TRAFFIC LOCATIONS AND ADJACENT GROUND GRADED TO DRAIN.
- IF SITE CONDITIONS REQUIRE ABOVE GRADE CHECK VALVE INSTALLATION, A STRUCTURAL GRADE METAL BUILDING W/SLAB, PIPE INSTALLATION/HEATING, BOLLARDS FOR BUILDING PROTECTION AND 4" DRAIN W/BACK WATER VALVE & BOX DRAINING TO DRAINAGE CHANNEL/PIPE OR SANITARY SEWER MAIN SHALL BE PROVIDED (SEE 2003 IPC SECT. 715).
- PRIVATE WATER LINES PROVIDING FIRE PROTECTION ONLY SHALL HAVE REDUCED PRESSURE BACKFLOW PREVENTERS (FLANGED) WITH METEERED BYPASS WHICH MEET ASSE 1047, UL AND CSA CERTIFIED. PRIVATE POTABLE WATER LINES INCLUDING THOSE PROVIDING FIRE PROTECTION SHALL HAVE REDUCED PRESSURE BACKFLOW PREVENTERS (FLANGED) WHICH MEET ASSE 1013, AWWA C533(WITH GATE VALVES), UL AND CSA CERTIFIED.
- ALL WATER METERS SERVING CUSTOMERS OUTSIDE THE CITY LIMITS SHALL HAVE A BACKFLOW PREVENTER/VAULT. (SEE NOTE #10)
- ALL METER VAULTS AND BACKFLOW PREVENTER VAULTS SHALL BE CONSTRUCTED ON THE PROPERTY LINE.

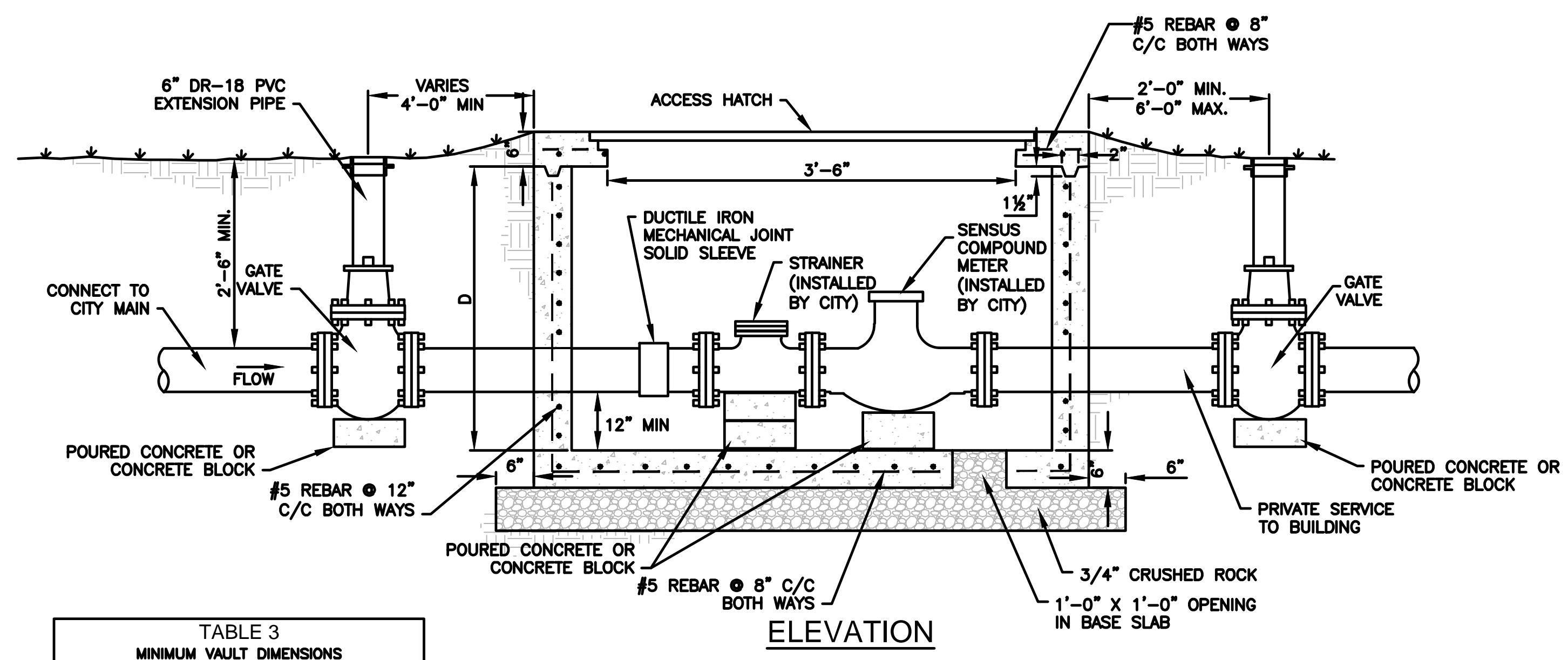
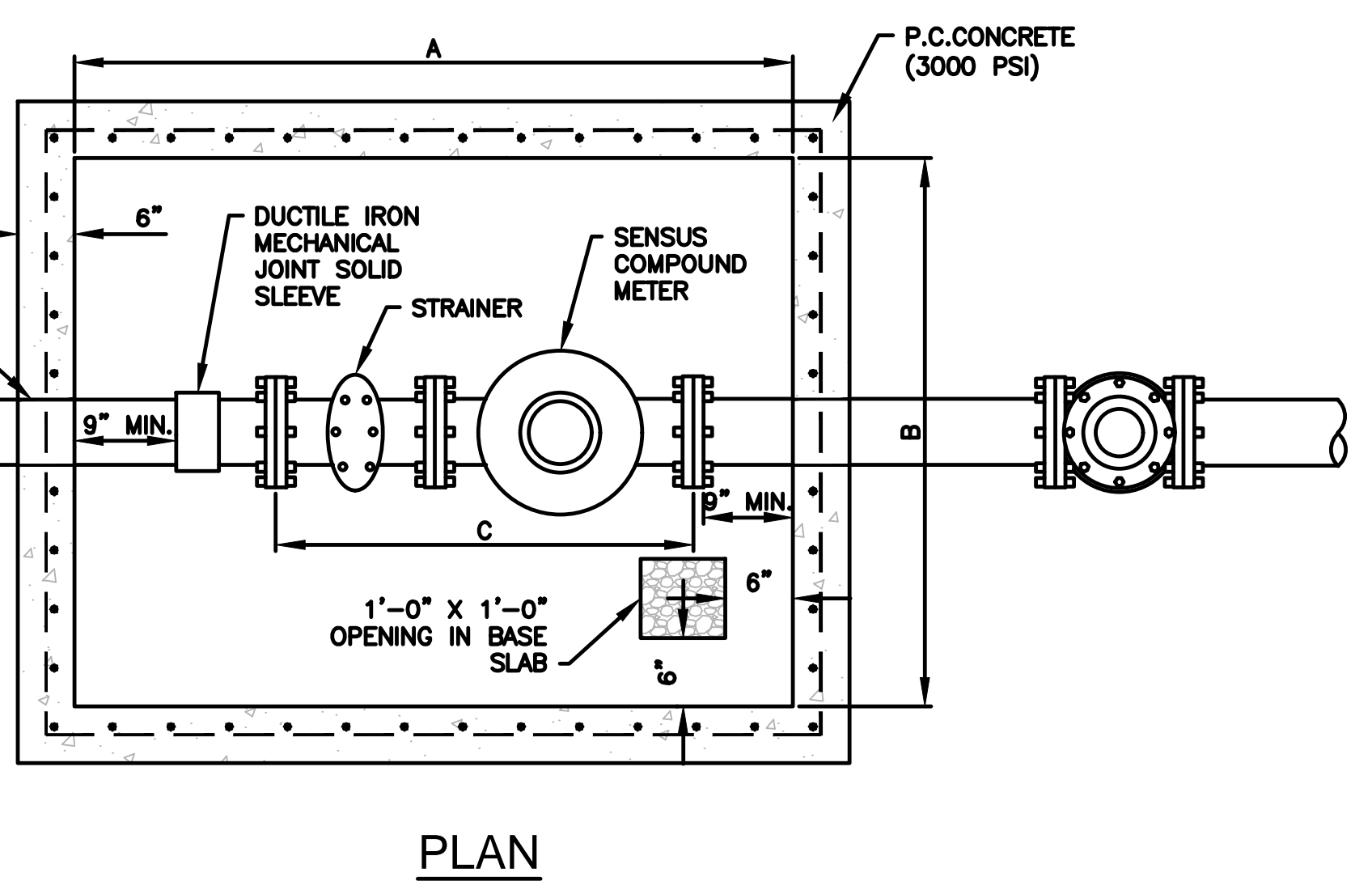
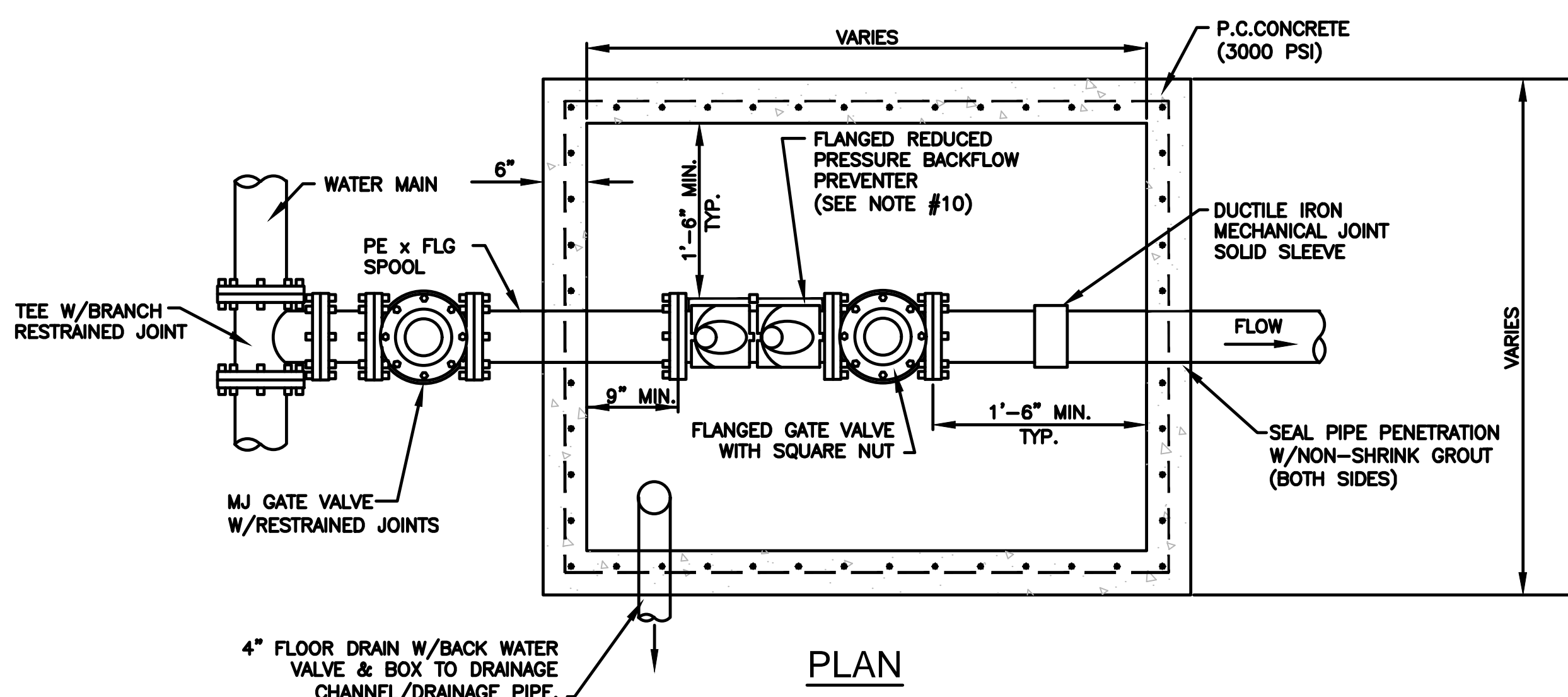
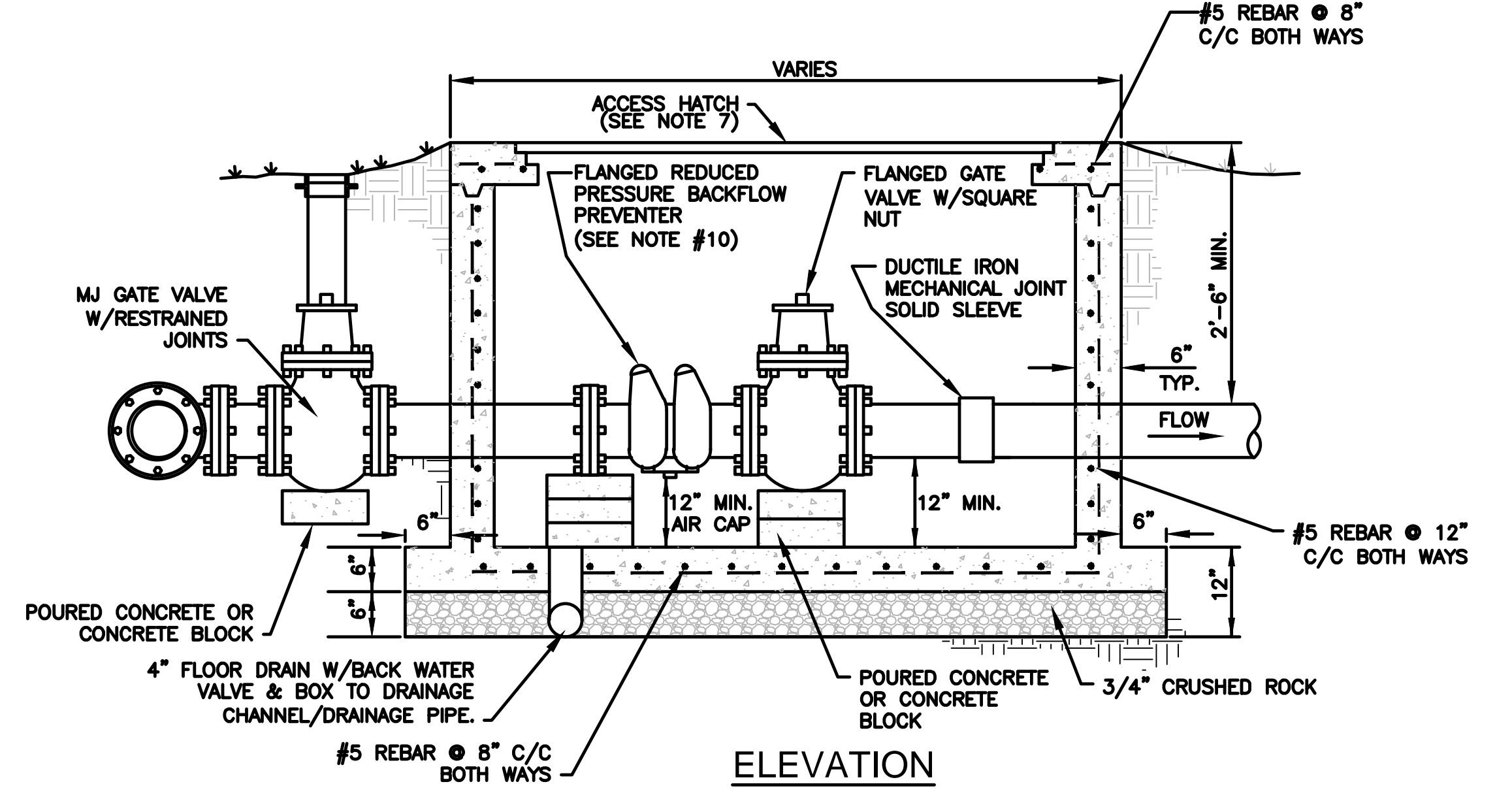


TABLE 3
MINIMUM VAULT DIMENSIONS

| METER SIZE | A | B | C | D |
|------------|--------|-------|-------|-------|
| 3" | 4'-10" | 4'-6" | 2'-0" | 4'-1" |
| 4" | 5'-3" | 4'-6" | 2'-5" | 4'-2" |
| 6" | 5'-7" | 4'-6" | 2'-9" | 4'-4" |



DETAIL NO. 13
TYPICAL INSTALLATION
MULTI-FAMILY / COMMERCIAL WATER SERVICE
(3" THRU 6")



DETAIL NO. 14
TYPICAL INSTALLATION
STANDARD BACKFLOW PREVENTER

STANDARD DETAILS
WATER SYSTEM - 2

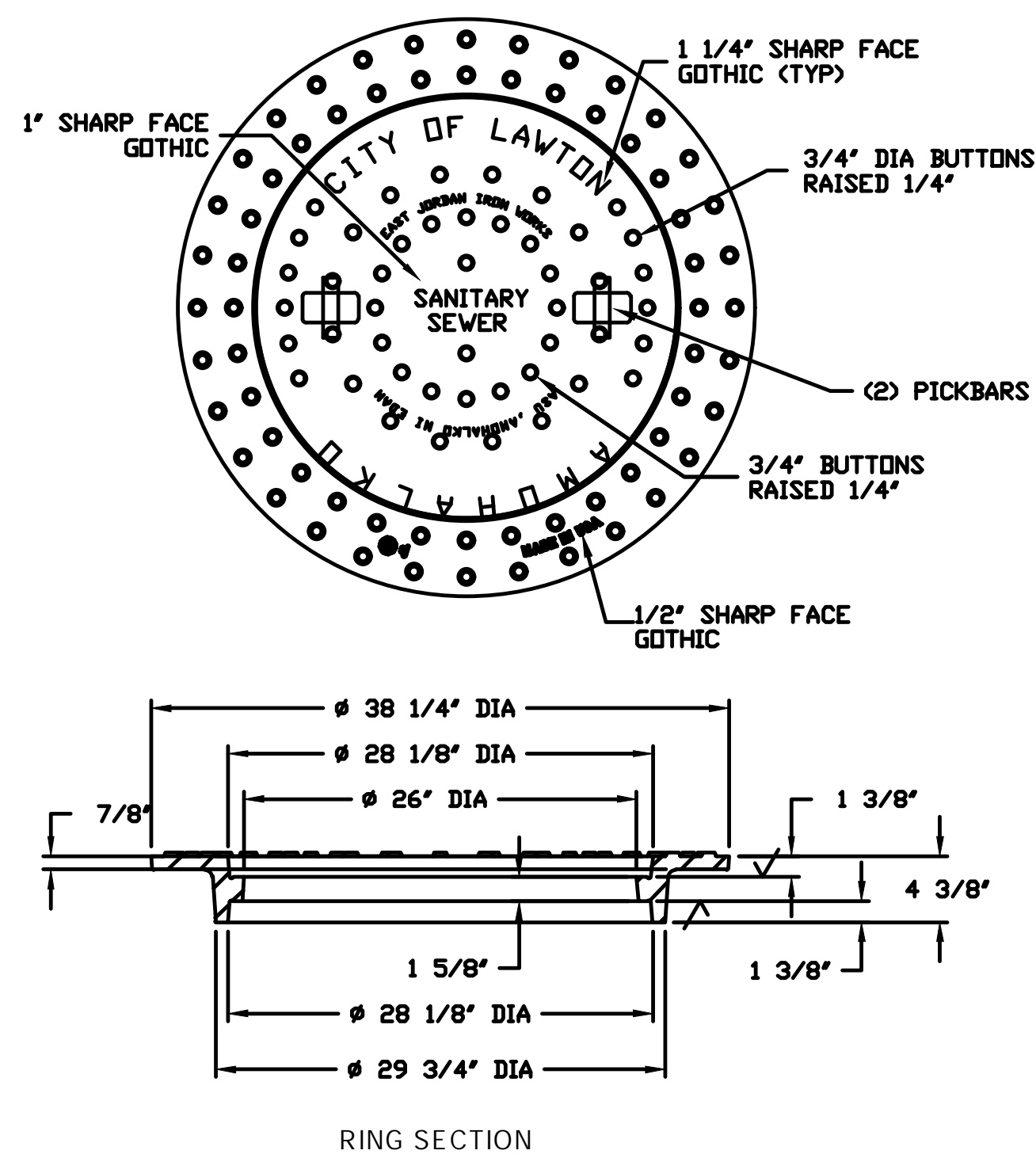
CITY OF LAWTON
ENGINEERING DIVISION

PROJECT NO.: _____ DATE: _____

FILE NAME: Water System 2.dwg

| REVISION | DATE |
|----------------------|---------------|
| CITY ENGINEER UPDATE | FEBRUARY 2009 |
| CITY ENGINEER UPDATE | MAY 2009 |
| CITY ENGINEER UPDATE | NOVEMBER 2010 |
| CITY ENGINEER UPDATE | JUNE 2015 |

DESIGNED BY: G. HENNESSEE DRAWN BY: S. MALICOAT PLOT DATE: 08/23/2023 SHEET OF



MANHOLE FRAME/COVER SPECIFICATIONS:

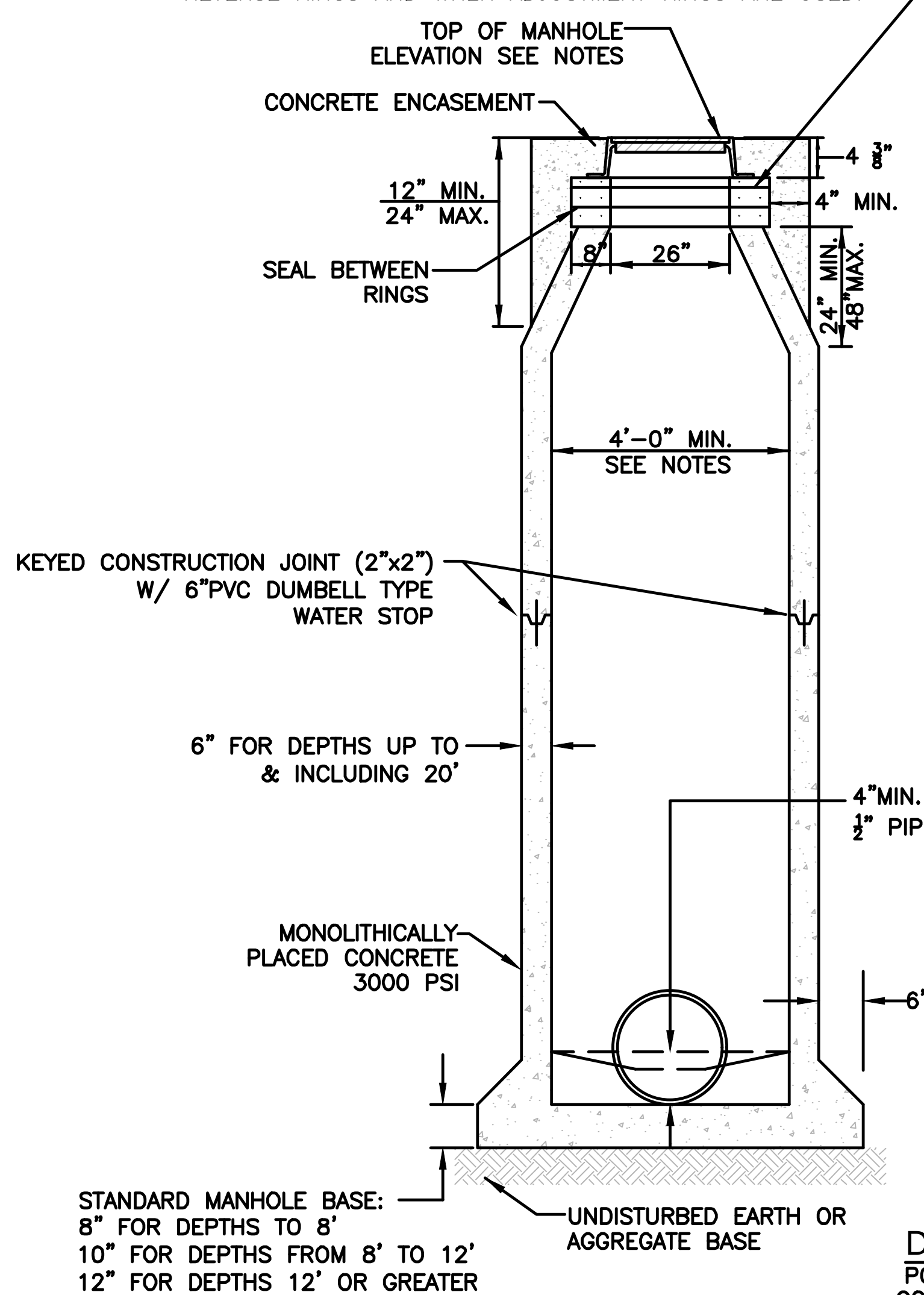
MANUFACTURER/MODEL:

EAST JORDAN IRON WORKS, INC
 EAST JORDAN, MI.
 1-800-626-4653
 MODEL 2100Z/A1 ASSEMBLY (375 LBS.)
 VENTED 2100B1 COVER
 UNVENTED 2100A1 COVER
 BOLTED TYPE 2100A1GS COVER
 OR APPROVED EQUAL

***SPECIAL LETTERING:**

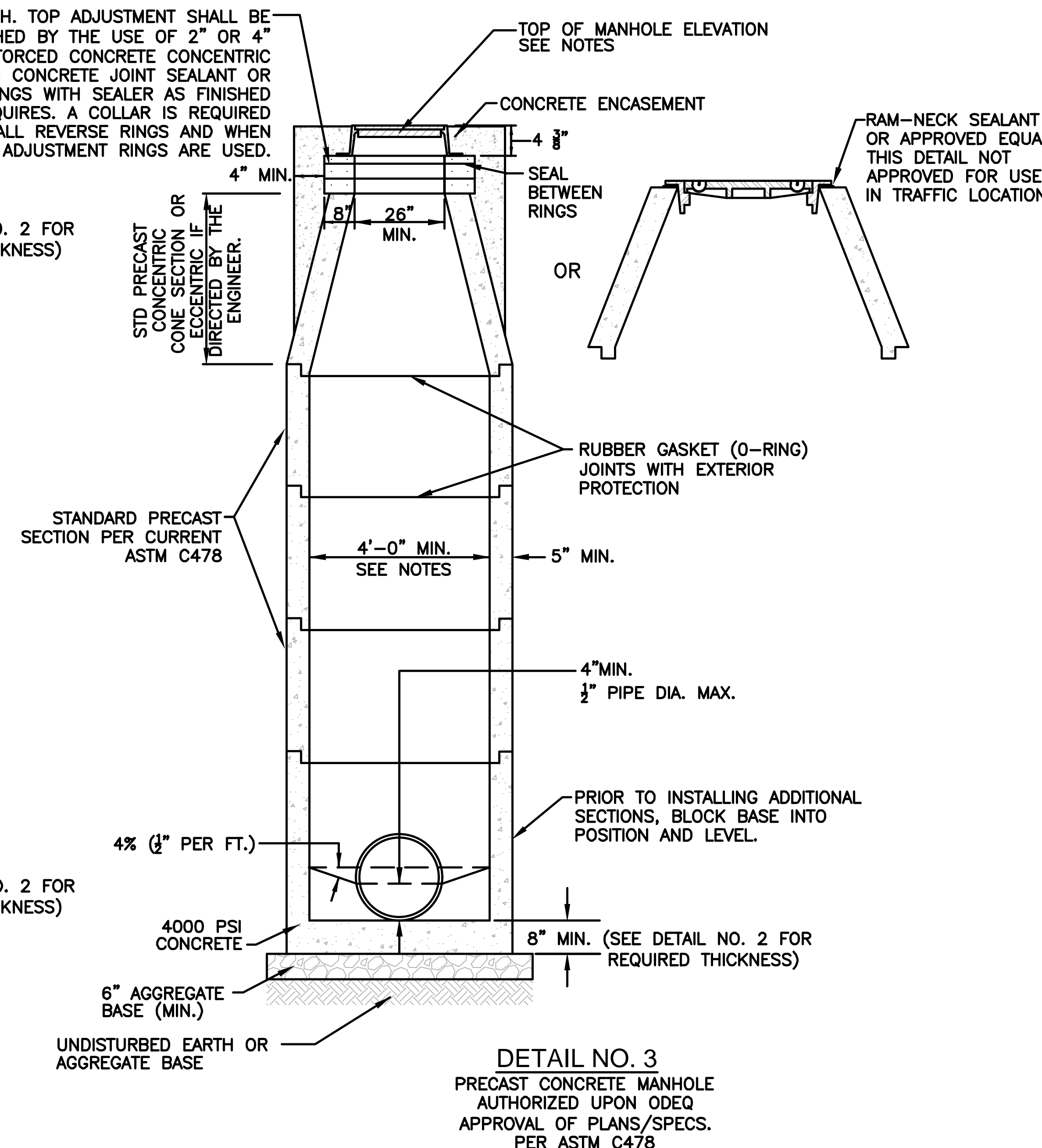
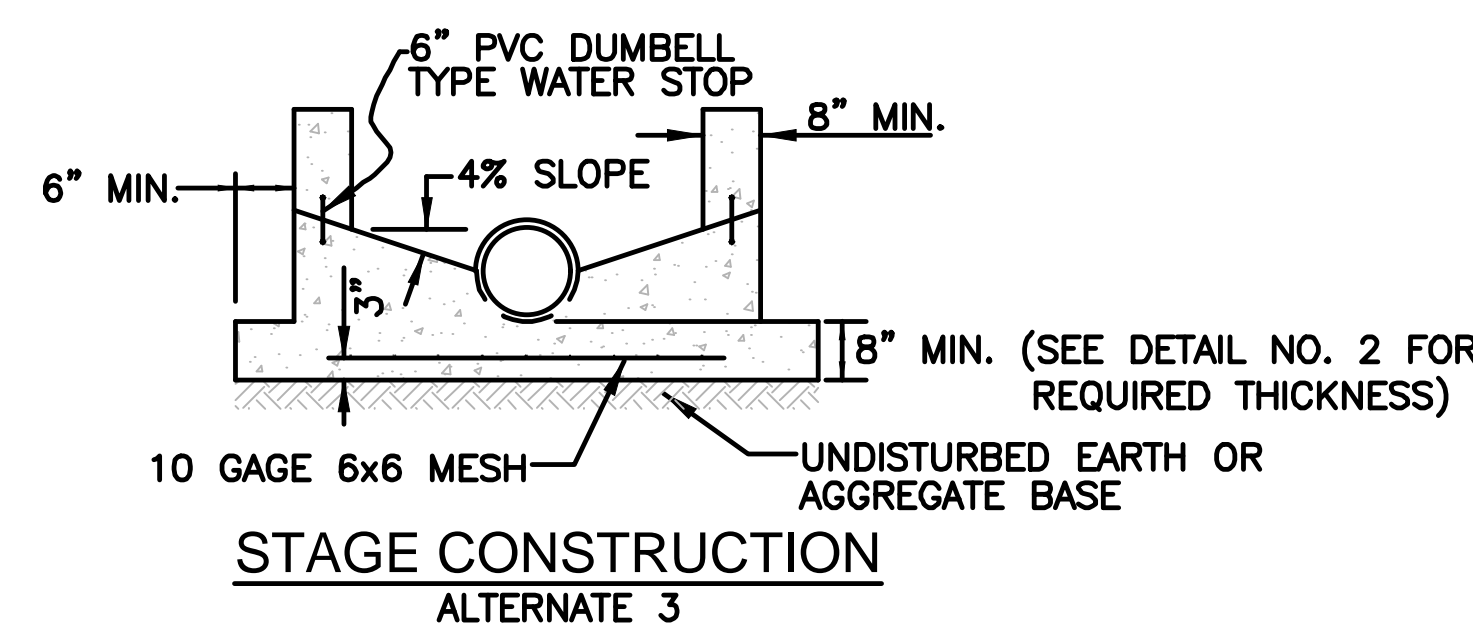
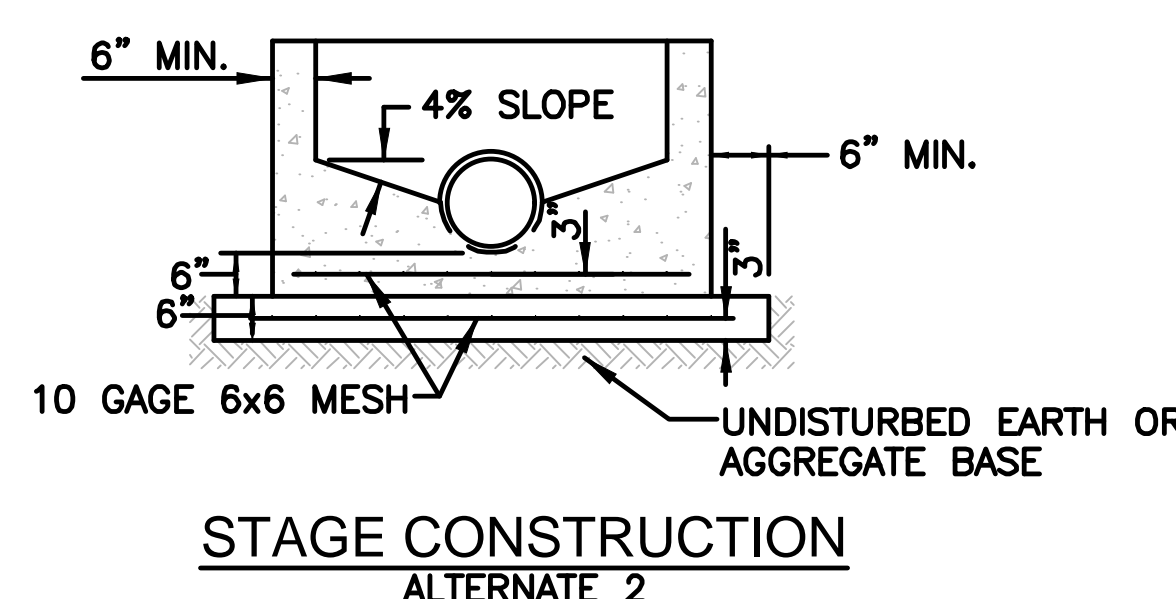
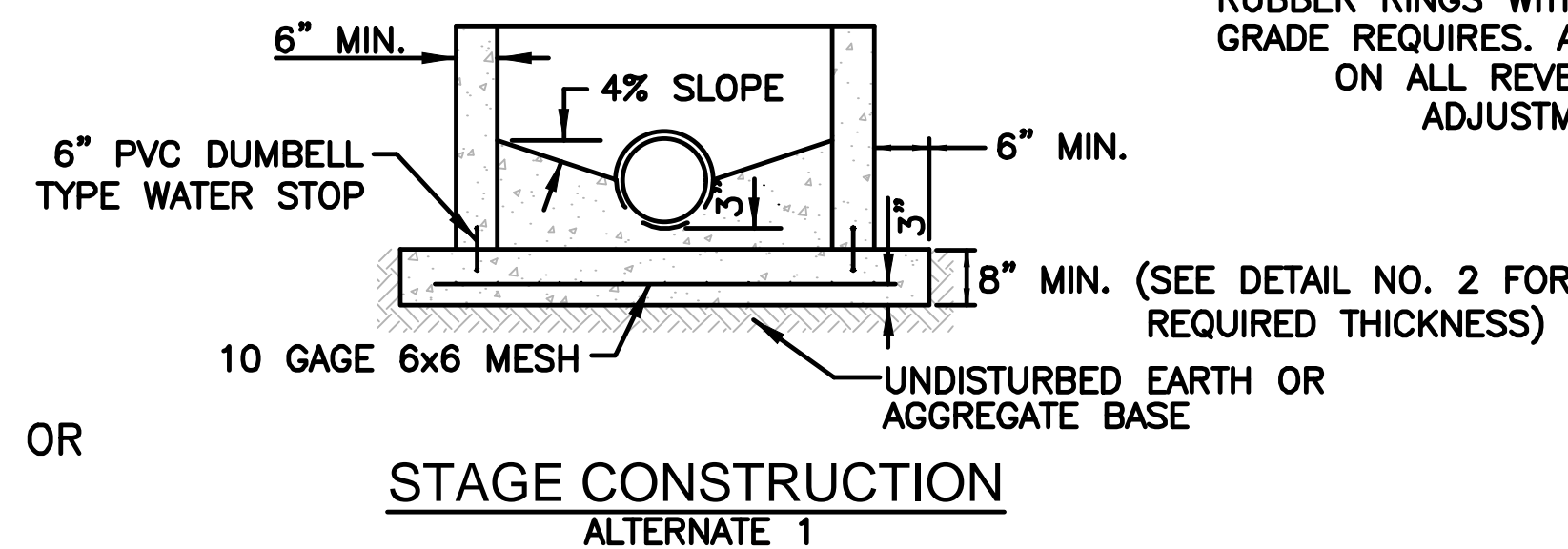
CITY OF LAWTON
 OKLAHOMA
 SANITARY SEWER

M.H. TOP ADJUSTMENT SHALL BE ACCOMPLISHED BY THE USE OF 2\"/>



DETAIL NO. 2
 POURED-IN-PLACE
 CONCRETE MANHOLE

M.H. TOP ADJUSTMENT SHALL BE ACCOMPLISHED BY THE USE OF 2\"/>



DETAIL NO. 3
 PRECAST CONCRETE MANHOLE
 AUTHORIZED UPON ODEQ
 APPROVAL OF PLANS/SPECS.
 PER ASTM C478

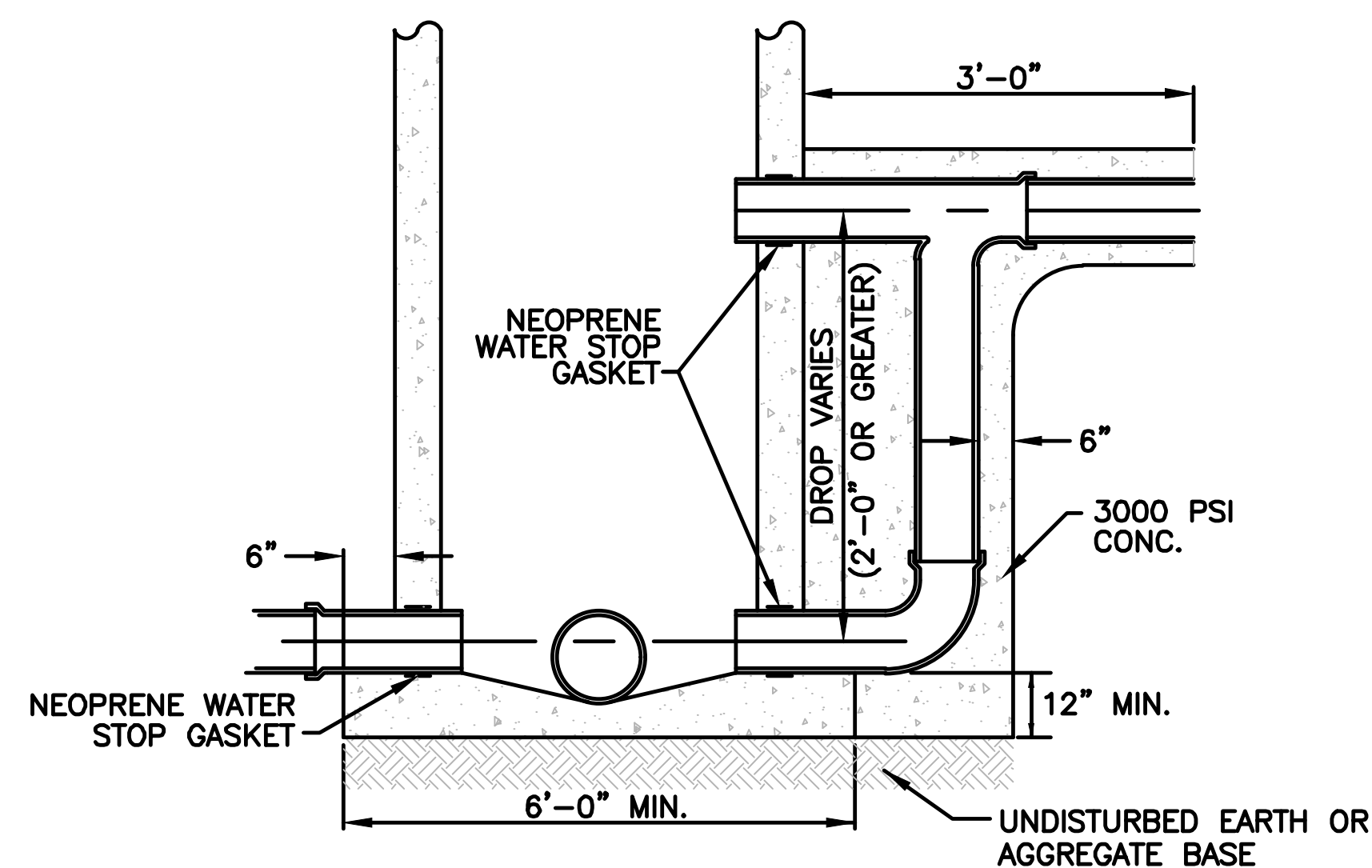
NOTES

1. THE BASE MAY BE POURED MONOLITHICALLY WITH THE WALLS OF ANY MANHOLE HAVING AN OVERALL DEPTH OF LESS THAN 8'-0".
2. A MINIMUM OF 24 HOURS SHALL ELAPSE BETWEEN POURING OF BASE AND WALLS.
3. THE VERTICAL DROP OF CONCRETE POUR SHALL NOT EXCEED 10 FEET WHEN POURING MANHOLE WALLS. MANHOLES REQUIRING DROPS GREATER THAN 10 FEET SHALL REQUIRE PLACEMENT OF CONSTRUCTION JOINTS.
4. ALL HONEYCOMBS IN THE INTERIOR AND EXTERIOR SURFACES OF THE MANHOLE WALLS SHALL BE GROUTED SMOOTH USING A MIXTURE PROPORTIONED BY WEIGHT AS FOLLOWS:
 1 POUND PORTLAND CEMENT
 2 POUNDS SAND
5. ALL INTERIOR SURFACES OF ALL MANHOLES SHALL RECEIVE 2 COATS (8 DRY MILS TOTAL) OF COAL TAR EPOXY AS MANUFACTURED BY TNEMEC OR CARBOLINE, OR EQUAL AS APPROVED BY THE CITY ENGINEER. A MINIMUM OF 24 HOURS SHALL ELAPSE BETWEEN COATS.
6. PORTLAND CEMENT CONCRETE SHALL MEET THE REQUIREMENTS OF SECTION 701, STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION, OKLAHOMA STATE HIGHWAY COMMISSION, LATEST EDITION. CALCIUM CHLORIDE SHALL NOT BE USED AS AN ADDITIVE.
7. MH SHALL CONFORM TO CURRENT ASTM C478.
8. MANHOLES LESS THAN 4'-6" IN HEIGHT SHALL HAVE A FULL 4' ID OR LARGER FROM TOP TO BOTTOM.
9. LOW SLUMP CONCRETE SHALL BE PLACED IN THE FOOTINGS AND LOWER WALLS AND SHALL BE PLACED AND VIBRATED IN 1' LIFTS.
10. AN INSPECTOR MUST BE PRESENT BEFORE AND DURING THE PLACING OF THE CONCRETE.
11. ALTERNATE 3 INVERT MUST BE FORMED AT TIME OF BOTTOM POUR.
12. IN PAVED STREETS, MANHOLES SHALL HAVE 4'X4'X8" CONCRETE COLLAR W/4-#6 REINFORCING BARS.
13. 8" TO 18" PIPE, 4' MANHOLE REQUIRED.
14. 21" TO 27" PIPE, 5' MANHOLE REQUIRED.
15. OVER 27" PIPE, MANHOLE I.D. SPECIFIED BY ENGINEER.
16. IF GRADE RINGS ARE USED A POUR IN PLACE CONCRETE COLLAR SHALL BE INSTALLED PER DETAIL 2 & 3.

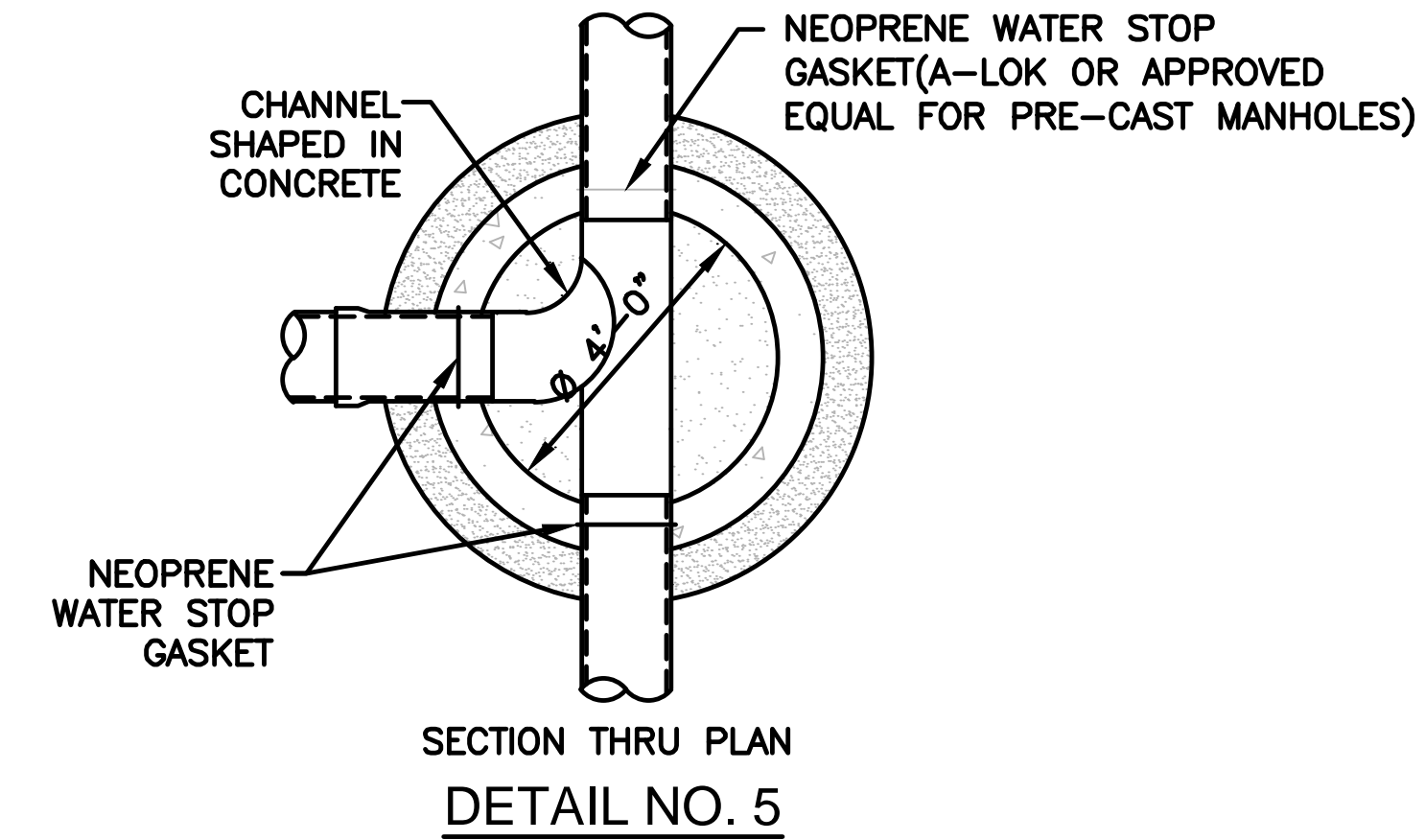
THE FOLLOWING CRITERIA SHALL BE UTILIZED TO ESTABLISH TOP OF MANHOLE(TMHE) ELEVATIONS AND COVER TYPES:

| LOCATION | TOP OF MANHOLE (TMH) | MH COVER TYPE |
|---|--|--|
| GRASSED AREA | 6" ABOVE FINISHED GRADE | VENTED TYPE WITH TWO (2) EPIC PICKHOLES AND 5/8" DIA. VENT HOLES 8 PLACES. |
| PAVED AREA | AT FINISHED GRADE WITH THE PAVEMENT | UNVENTED TYPE WITH TWO (2) |
| SUBDIVISIONS | GRASSED AREAS 6" ABOVE GRADE | EPIC PICKHOLES AND RESIDENTIAL SUBDIVISIONS |
| DRAINAGE LOCATION SUCH AS SWALE, CHANNEL ETC. | AT THE 100 YEAR FLOOD ELEVATION, IF HEIGHT FROM GROUND ELEVATION TO TMH DOES NOT EXCEED FOUR (4) FEET, OR | VENTED TYPE WITH TWO (2) EPIC PICKHOLES AND 5/8" DIA. VENT HOLES 8 PLACES. |
| | AT FOUR (4) FEET ABOVE GROUND ELEVATION, IF THE HEIGHT FROM THE GROUND ELEVATION TO THE 100 YEAR FLOOD ELEVATION IS GREATER THAN FOUR (4) FEET | BOLTED TYPE* |

* WHEN USING BOLTED TYPE COVERS, MANHOLES SHALL BE VENTED AT LEAST EVERY 1/4 MILE BY CONSTRUCTING A 2" DIA. VENT PIPE AS APPROVED BY THE ENGINEER.



DETAIL NO. 4
 POURED-IN-PLACE
 CONCRETE DROP MANHOLE
 (REQUIRED WHEN ELEVATION
 DIFFERENCE IS 2'-0" OR GREATER)



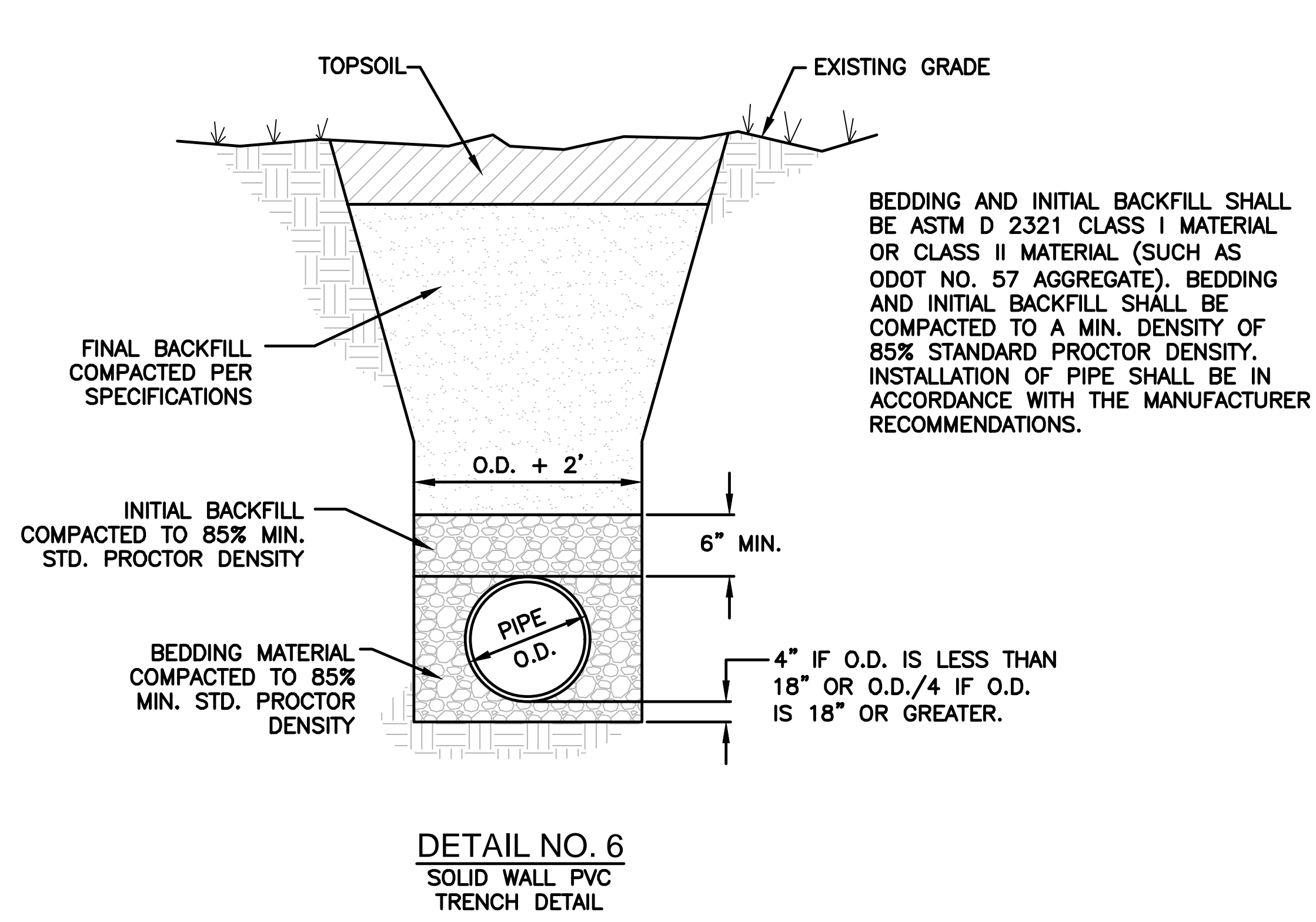
SECTION THRU PLAN
DETAIL NO. 5

STANDARD DETAILS
SANITARY SEWER SYSTEM-1

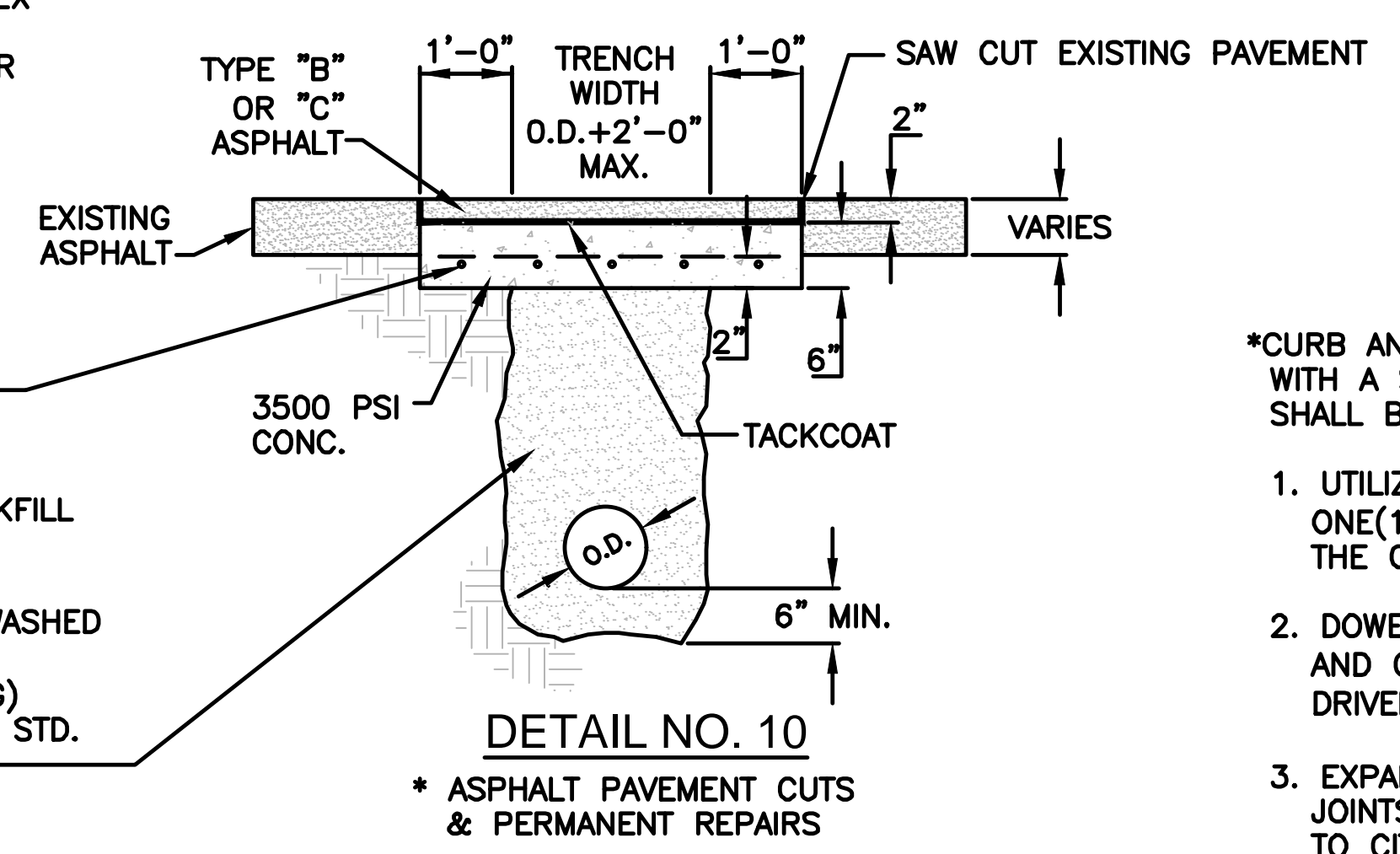
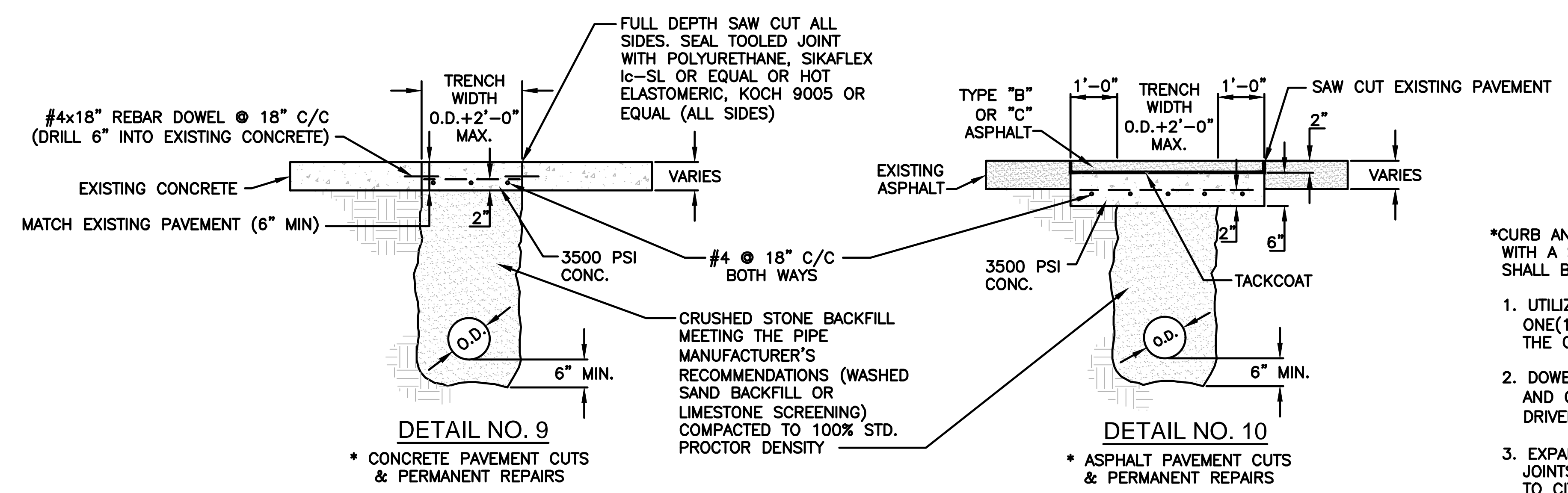
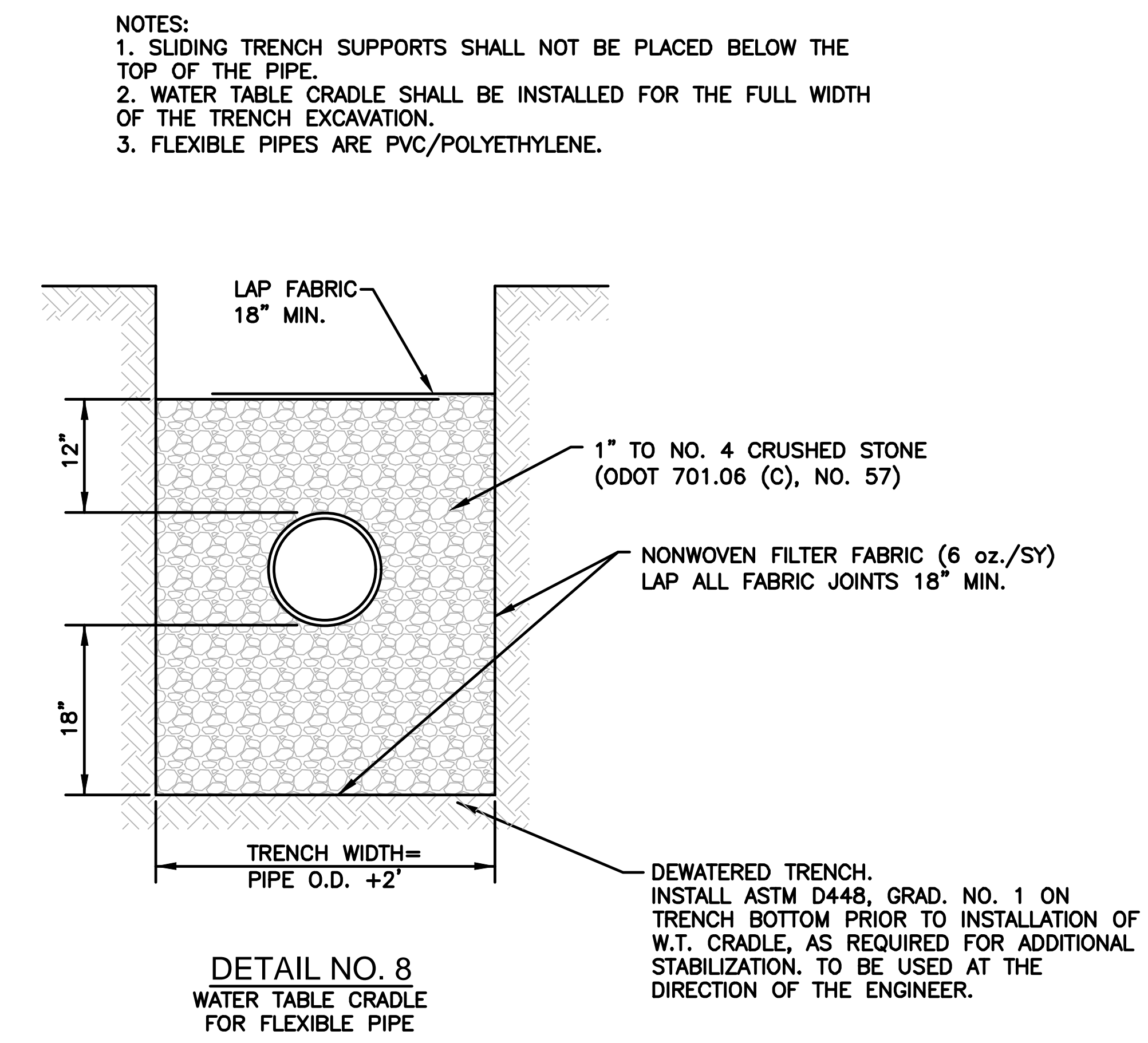
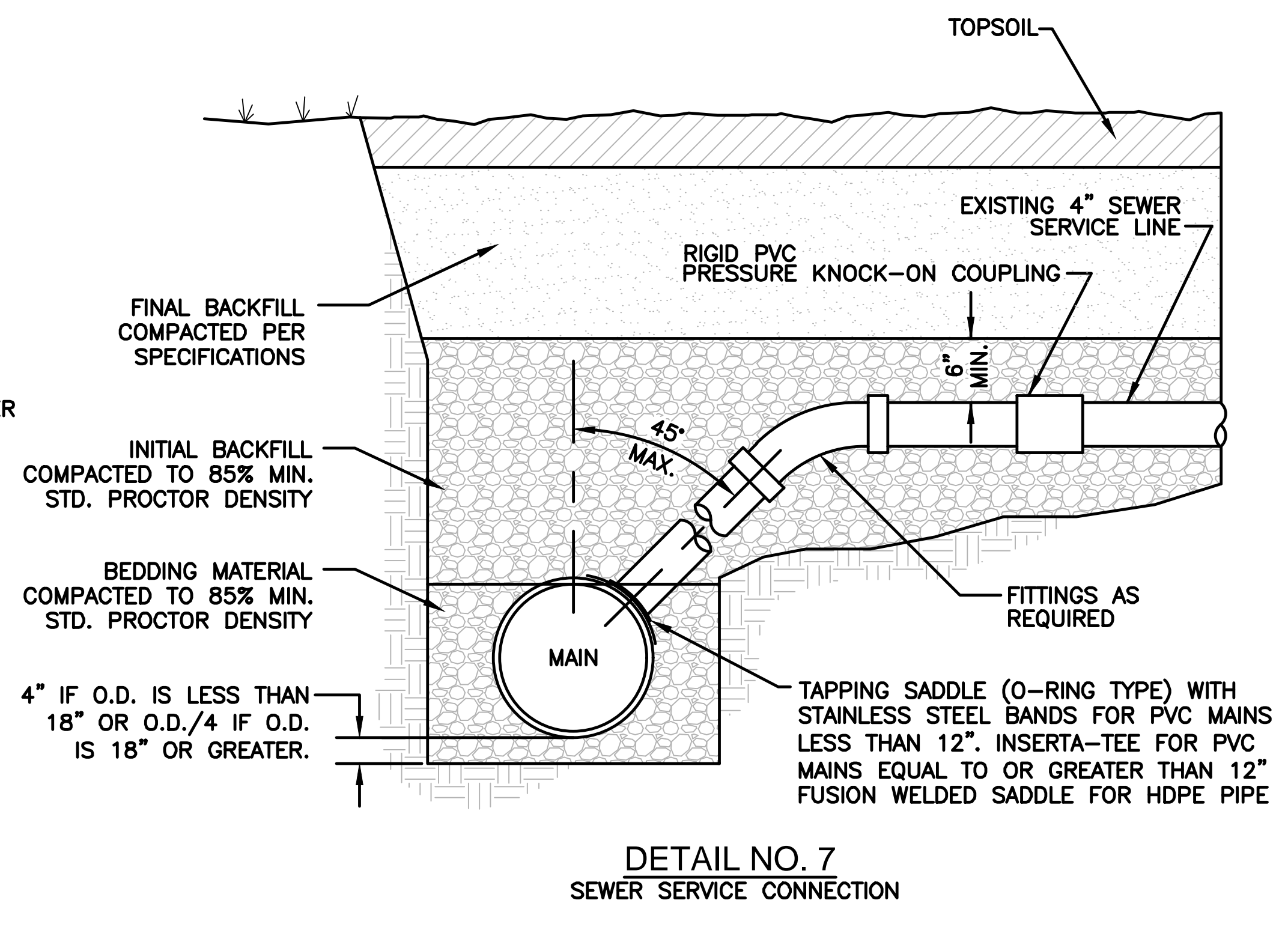
CITY OF LAWTON
ENGINEERING DIVISION

| | |
|----------------------|-------------------------------------|
| PROJECT NO.: | DATE: |
| REVISION | DATE |
| CHANGED NOTE 11 | JAN 2002 CITY ENGINEER APRIL 2010 |
| CHANGED NOTE 5&6 | DEC 2002 CITY ENGINEER MARCH 2011 |
| CITY ENGINEER UPDATE | MARCH 2003 CITY ENGINEER MARCH 2012 |
| CITY ENGINEER UPDATE | OCT 2004 CITY ENGINEER JULY 2012 |
| CITY ENGINEER UPDATE | JAN 2005 CITY ENGINEER AUGUST 2013 |
| CITY ENGINEER UPDATE | FEB 2009 CITY ENGINEER JULY 2014 |
| DESIGNED BY: | AS BUILT DATE: |
| G. HENNESSEE | S. MALICOATI |

ENGINEER _____
 SHEET _____ OF _____



BEDDING AND INITIAL BACKFILL SHALL BE ASTM D 2321 CLASS I MATERIAL OR CLASS II MATERIAL (SUCH AS ODOT NO. 57 AGGREGATE). BEDDING AND INITIAL BACKFILL SHALL BE COMPACTED TO A MIN. DENSITY OF 85% STANDARD PROCTOR DENSITY. INSTALLATION OF PIPE SHALL BE IN ACCORDANCE WITH THE MANUFACTURER RECOMMENDATIONS.



*CURB AND GUTTER REMOVED IN CONJUNCTION WITH A STREET CUT OR PERMANENT REPAIRS SHALL BE RE-CONSTRUCTED AS FOLLOWS:

1. UTILIZE 3500 PSI P.C. CONCRETE WITH ONE(1) #4 REBAR PLACED LONGITUDINALLY IN THE CURB SECTION.
2. DOWEL INTO THE EXISTING CURB AND GUTTER AND CONCRETE PAVEMENT WITH #4 REBARS DRIVEN A MINIMUM OF 6" @ 18" C/C.
3. EXPANSION/CONTRACTION/CONSTRUCTION JOINTS SHALL BE CONSTRUCTED ACCORDING TO CITY OF LAWTON STANDARD DETAILS FOR SUBDIVISION STREETS.

| | | | |
|---|-------------|----------------|---------------|
| STANDARD DETAILS SANITARY SEWER SYSTEM-2 | | | |
| CITY OF LAWTON ENGINEERING DIVISION | | | |
| PROJECT NO.: | DATE: | | |
| REVISION | DATE | REVISION | DATE |
| ADDED DETAIL 586 | SEPT 1998 | CITY ENGINEER | JAN 2005 |
| CHANGED NOTE 11 | SEPT 1998 | CITY ENGINEER | FEB 2005 |
| CHANGED NOTE 586 | JAN 2002 | CITY ENGINEER | APRIL 2010 |
| CITY ENGINEER UPDATE | DEC 2002 | CITY ENGINEER | NOVEMBER 2010 |
| CITY ENGINEER UPDATE | MARCH 2003 | CITY ENGINEER | FEBRUARY 2011 |
| CITY ENGINEER UPDATE | OCT 2004 | CITY ENGINEER | MARCH 2012 |
| DESIGNED BY: | DRAWN BY: | AS BUILT DATE: | ENGINEER |
| G. HENNESSEE | S. MALICOAT | | |