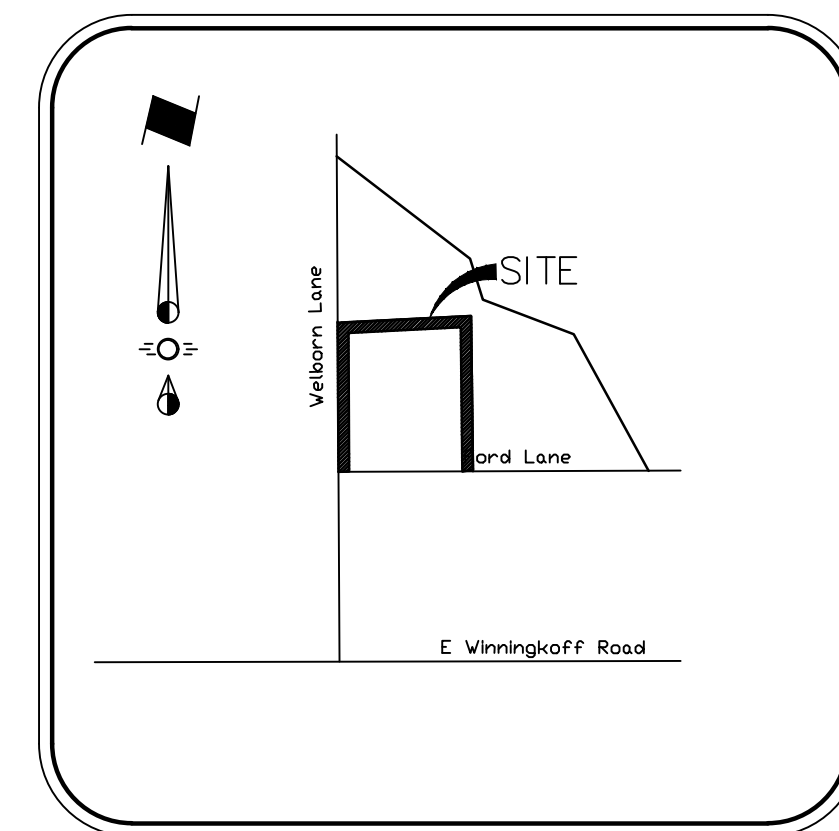


ENGINEERING PLANS

6-Inch Water Line Project Welborn Lane

Calvin Boles Survey, Abstract A-28

City of Lucas, Texas



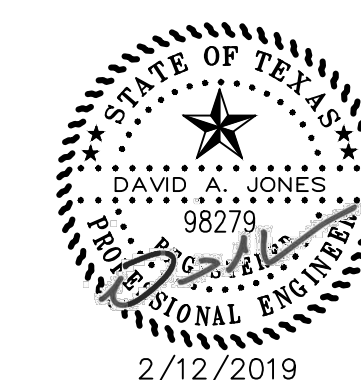
Vicinity Map
NTS

Index Of Drawings

- Cover Sheet
- General Notes
- Survey
- C 1 Overall Water Plan Layout
- C 2 Water Plan Sheet Index
- C 3 Water Plan Sheet 1
- C 4 Water Plan Sheet 2
- C 5 Water Plan Sheet 3
- C 6 Water Plan Sheet 4
- C 7 Details
- C 8 Details

Owner
Goose Real Estate, Inc.
1200 Kempton Park
Fairview, Texas 75069

Engineer
JP Engineering
4101 Hazelwood Drive - Fort Worth, Texas 76107 972-467-7505
Texas P.E. Firm Number 14021



This Record Drawing is a combination of the sealed engineering contract drawings for this project, modified by revision, change order, field order and information furnished by the contractor. The information shown on the Record Drawings is believed to be accurate based on information furnished by the contractor. The original sealed drawings are on file at the office of:
JP Engineering
4101 Hazelwood Drive
Fort Worth, Texas 76107
(214) 226-9609
Record Drawings Prepared On:
2/12/2019

REVISIONS	DATE	BY

GENERAL NOTES:

1. It is the CONTRACTOR's responsibility to maintain neat and accurate plans of record.
2. The CONTRACTOR is responsible for maintaining adequate site drainage throughout the duration of this project.
3. The CONTRACTOR is responsible for obtaining all necessary permits and approvals before construction begins.
4. The CONTRACTOR shall replace all fence removed during construction in as good as or better condition than before construction.
5. The CONTRACTOR shall take all necessary precautions to ensure that electric power and telephone poles are either moved to a safe location by the affected utility company or not disturbed during construction. All costs incurred for moving electric power and telephone poles shall be included in the price bid for the construction of the project.
6. The CONTRACTOR shall restore all property including driveways, public streets, sidewalks, public utilities, franchise utilities, private utilities, and all other improvements removed or damaged inside and outside the project limits during construction to as good as or better condition than before construction. Restoration shall be made immediately after the property no longer interferes with construction.
7. The information shown on these drawings concerning type and location of underground and other utilities is not guaranteed to be accurate or all-inclusive. The CONTRACTOR is responsible for making his own determinations as to the type and location of underground utilities and other utilities as may be necessary to avoid damage thereto.
8. The CONTRACTOR shall not place fill or waste material on any private property without prior written permission from the ENGINEER. No excess excavated material shall be deposited in low areas or along natural drainage ways that will restrict the natural flow of water. If the CONTRACTOR places excavated material in low areas that will cause flood damage, CONTRACTOR will be responsible for all damage resulting from such fill, and he shall remove the fill at CONTRACTOR's expense.
9. All streets within the scope of the Contract shall be kept accessible to fire trucks, ambulances and other emergency vehicles.
10. The CONTRACTOR shall be responsible for public safety during the duration of construction. All barricades, warning signs, lights, devices, etc., for the guidance and protection of traffic and pedestrians must conform to the installation shown in the current Texas Manual of Uniform Traffic Control Devices, as currently amended by the Texas Department of Transportation. CONTRACTOR shall at all times provide barricades, warning signs and lighting adequate to safeguard the public from any hazards resulting from open trenches during non-work hours.
11. Filter fabric fence for erosion control shall be provided in accordance with specifications and as shown on the plans and in accordance with the EPA regulations.
12. The CONTRACTOR shall use the public right-of-ways and existing utility easements for access to the job site.
13. The CONTRACTOR shall select the subcontractor to be utilized for testing and lab work. The CONTRACTOR shall be responsible for paying for testing and lab work. Selection of subcontractor for this purpose will be subject to approval by the OWNER. Testing referred to herein includes compaction and water pressure testing, which shall be required on this project. Testing shall include testing of concrete required to determine and ascertain that concrete strengths in specifications are attained for all concrete members on the project.
14. The CONTRACTOR shall keep excavated trenches free of groundwater during construction. If necessary, the CONTRACTOR shall utilize dewatering procedures in order to control groundwater during construction such that it does not affect his construction work.
15. The CONTRACTOR shall provide means for adequately controlling and avoiding soil erosion during construction. The CONTRACTOR shall not store spoil in drainage ways during construction.
16. All disturbed earth areas are to be finish graded to original or proposed contours, fertilized and either hydromulched with bermuda seed or covered with block sod according to NCTCOG specifications immediately after construction. Backfill to be select material free of rock and other debris. CONTRACTOR shall thoroughly water the hydromulch or block sod immediately after placement. Block sod shall match the existing type of grass on a case by case basis. There shall be no separate pay for matching each type of grass. The CONTRACTOR shall also be responsible for continued maintenance and watering of the newly hydromulched or sodded areas until the entire project is completed and accepted by the City of Lucas. Watering of the bermuda hydromulch or block sod shall be done in a manner and quantity as directed by City of Lucas field representative.
17. No existing sprinkler /irrigations systems have been shown on the plans; however, they may exist in certain areas. It is the CONTRACTORS responsibility to locate any existing irrigation systems within the project limits and determine if they will be affected by this construction. If CONTRACTOR encounters any sprinkler systems during construction, he shall repair and/or replace in as good as or better condition than before construction.
18. The CONTRACTOR shall maintain adequate sanitary facilities for use by workers throughout construction.
19. The CONTRACTOR shall conform to the Occupational Safety and Health Administration's (OSHA) standards for trench safety that are in effect during the period of construction.
20. All materials and workmanship shall conform to the City of Lucas Standards and Specifications and the North Central Texas Council of Government (NCTCOG) Standards and Specifications, except as noted. In the event of a conflict, the City of Lucas Standards and Specifications shall govern.
21. No existing trees shall be removed without approval of the City of Lucas.
22. CONTRACTOR shall provide all necessary construction staking.
23. CONTRACTOR's working hours shall be in accordance with the provisions of the current City Ordinance governing hours of construction work in the City.

24. Driveways affected by construction shall be replaced with driveway of same type material and surface as that removed for installation of water line. Driveway culverts shall be removed when necessary to allow for construction of water line. Culverts are to be replaced in the same location if condition of culvert is deemed satisfactory by OWNER. If culvert cannot be salvaged, a new culvert of the same type removed will be installed by the CONTRACTOR. Driveways that are disturbed during construction shall be restored to as good as or better condition than they were prior to construction and materials utilized to restore the driveway shall be the same material as what the driveway is presently made of.

25. All concrete shall have a minimum compressive strength of 4000 psi at 28 days (minimum 6 sacks of cement per cubic yard) unless otherwise noted. All reinforcing steel and dowel bars in pavement shall be supported and maintained at the correct clearances by the use of bar chairs or other approved support.

26. All existing water lines and service lines to remain in service during construction. At times when water has to be cut-off, the CONTRACTOR shall coordinate with the City of Lucas to notify the affected area at least 48 hours prior to water cut-off.

27. The CONTRACTOR shall phase his daily work schedule so that all driveway crossings are to be complete prior to the end of the day. No driveway crossings are to be left open overnight. During installation of the pipeline across driveways, the CONTRACTOR shall be prepared to provide access across trenches and driveways at all times in case of emergency.

28. Water line shall be polyvinyl chloride (PVC) AWWA C900. New water service line shall be copper pipe with compression type fittings. Main line valves and fittings shall be cast iron.

29. CONTRACTOR shall install isolation gate valves and fire hydrants at locations shown on plans unless otherwise directed by OWNER. OWNER may direct CONTRACTOR to locate valves and fire hydrants at locations other than those shown on plans. Also, OWNER may add additional isolation gate valves and fire hydrants as required for operational purposes.

30. The CONTRACTOR is responsible for keeping streets, parking areas, sidewalks, etc., adjacent to the project free of mud and debris from construction.

31. The CONTRACTOR shall assume responsibility for protection of all public utilities in the construction of this project. All manholes, valve boxes, fire hydrants, etc., must be adjusted to proper line and grade by the CONTRACTOR prior to and/or after placing any permanent paving. The CONTRACTOR shall also be responsible for support of existing utility poles, street signs, etc., when excavating in the vicinity of such poles.

32. The City of Lucas Public Works Department is to be notified 48 hours (2 working days) prior to any construction of paving and utilities in rights-of-way, easements and alleys.

33. Arrangements for water construction shall be made through the City of Lucas.

34. All utility locations of underground utility lines are approximate only. CONTRACTOR shall contact the proper utility companies at least 48 hours prior to construction, shall inform them of beginning of construction and shall make arrangements to have utilities located by flagging marking. Flagging of utilities shall be completed prior to construction.

35. PVC pipe shall be manufactured from a low filler PVC component capable of meeting the highest performance standards of the ASTM specifications.

36. Construction sites shall be secure at all times. Safety precautions shall be taken to protect the public from any injury which might result from construction activities.

37. As part of bid item, "EROSION CONTROL", the CONTRACTOR shall be responsible for implementing any and all erosion control measures as needed to control runoff of siltation from the project site. This shall include, but is not limited to, silt fencing, rock berms, inlet protection, etc. The CONTRACTOR shall maintain these erosion control measures as required until the construction is completed and sod has been placed over disturbed areas.

38. There is no separate pay resulting from any of the work required as a result of the requirements included in these general notes. All work required shall be included in the price bid for the project.

39. CONTRACTOR shall comply with all applicable Texas Department of Transportation (TXDOT) requirements when working on a TXDOT controlled right-of-way.

40. CONTRACTOR shall expose each existing pipeline to which a proposed pipeline will be connected and shall verify the horizontal and vertical location of the existing pipeline prior to the installation of the proposed pipeline.

41. Any proposed water lines to be installed across Ford Lane shall be installed without cutting and removing any road pavement.

42. The fittings for the proposed water line shall be AWWA C153 compact fittings.

43. All materials furnished and installed on this project shall be domestic materials and shall be in compliance with the appropriate AWWA Standards for such items.

44. Hydromulch or block sodding shall be installed to match surrounding areas where the ground is disturbed in the construction area. City reserves the right to provide direction with regard to areas to be hydromulched or sodded. The CONTRACTOR will receive payment only for the square feet of area actually hydromulched or sodded in the construction area.

45. Existing fire hydrants removed during construction shall be removed from the job site and delivered to a site within the City limits to be determined by the City.

46. If any conflicts with other utilities occur during the construction activities, the CONTRACTOR shall immediately notify the City's representative and shall make adjustments as necessary with City's concurrence.

47. No connections to other City water distribution lines shall be made on Fridays.

GENERAL TRAFFIC CONTROL NOTES

1. All temporary signs, markings, cones, channelizing devices, warning lights and barricades shall be in accordance with the current State of Texas Manual on Uniform Traffic Control Devices (MUTCD).

2. Type "A" warning lights shall be placed on all advance warning signs. In addition, flags shall be placed on all advance warning signs that detour traffic.

3. Any existing conflicting markings shall be removed prior to shifting traffic.

4. All temporary pavement markings required during construction shall be of the removable type. Temporary markings and striping may be required to transition travel lanes between construction phases. All pavement markings and striping shall be reflective.

5. The spacing of signs and channelization devices may be adjusted to fit the geometric conditions encountered, such as driveways, intersecting roadways, vertical and horizontal alignment, etc., as approved by the City of Lucas.

6. Advance warning signs shall not be displayed more than forty-eight (48) hours before physical construction begins. Signs may be erected up to one week before needed, if the sign face is fully covered.

7. Use of barricades, portable barrier rails, vertical panels, and drums shall be limited to the immediate areas of construction where a hazard is present. These devices shall not be stored along the roadway within thirty (30) feet of the edge of the traveled way before or after use unless protected by guardrail, bridge rail, and/or barriers installed for other purposes. These devices shall be removed from the construction work zone when the City of Lucas determines they are no longer needed. Where there is insufficient right-of-way to provide for this thirty (30) foot setback, the City of Lucas shall approve alternate locations.

8. The posted speed for warning signage is to be determined at the site by the City of Lucas.

9. Reduced speed warning signage should be placed prior to and at regular intervals within the construction zone.

10. As part of the bid item, "Construction Barricading/Signing/Traffic Control," the CONTRACTOR is required to submit a traffic control plan for construction a minimum of 3 days prior to changes in traffic handling or movement. These plans are to be reviewed and approved by the City of Lucas prior to construction of that phase.

11. The CONTRACTOR shall accommodate existing traffic during construction and shall maintain at least one open lane of traffic at all times. Use of flag men, barricades, vertical panels, etc. shall be required and shall be considered subsidiary to "Construction Barricading/Signing/Traffic Control".

12. CONTRACTOR shall be required to place temporary pavement markings and/or buttons as needed to maintain traffic in a safe and efficient manner after removal of existing markings. These temporary markings shall not be paid for separately but shall be considered subsidiary to "CONSTRUCTION BARRICADING/SIGNING/TRAFFIC CONTROL".

Note:

1. Existing water lines shall remain in service until all new water lines are installed and ready for service. Once new water lines are all installed and ready for service, new water lines shall be placed in service and existing water service connections shall be switched over to the new water line where existing water lines are being replaced by the new water line.

2. CONTRACTOR shall install new 1" service lines from existing water meters to proposed water lines. Once CONTRACTOR has completed installation of the proposed water lines and the new water lines have been tested and disinfected and once all the bacteriological samples have passed and the water lines have been placed in service, the CONTRACTOR shall disconnect the old service lines and connect the new service lines to the existing water meters. The CONTRACTOR shall provide all labor and materials to install the new 1" service lines and connect the 1" service lines to existing water meters. These new 1" service lines include the following categories:

Short 1" service lines from proposed water line to existing meters where existing meters are on the same side of the road as the proposed water lines.

Long 1" service lines from proposed water line to existing meters where existing meters are on the opposite side of the road from the proposed water line.

3. For the service connections, CONTRACTOR shall furnish and install Ford brass taps and saddles (double saddles) or approved equal. The cost for the taps and saddles shall be included in the price bid for the service lines.

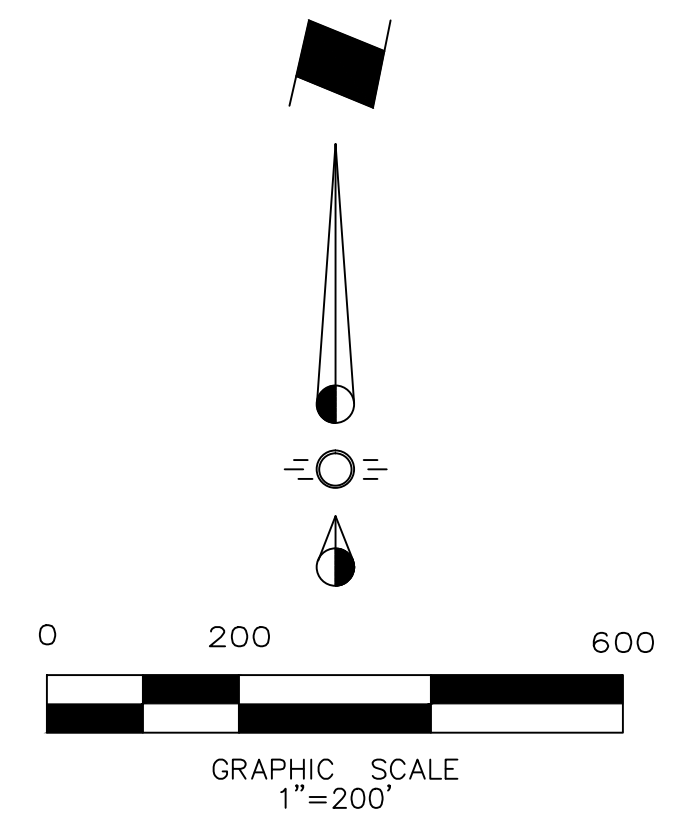


6 Inch Water Line Loop
 Welborn Lane
 City of Lucas, Texas
 GENERAL NOTES

No.	Date	Revision

Scale:
 File Name: General Notes
 Date: February 2018
 Project No.: 18002





North Texas Municipal Water District
No. 1,126, Pg. 248, CCLP

North Texas Municipal Water District
No. 1,126, Pg. 248, CCLP

North Texas Municipal Water District
No. 1,126, Pg. 252, CCLP

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North Texas Municipal Water District
No. 1,126, Pg. 252, CCLP

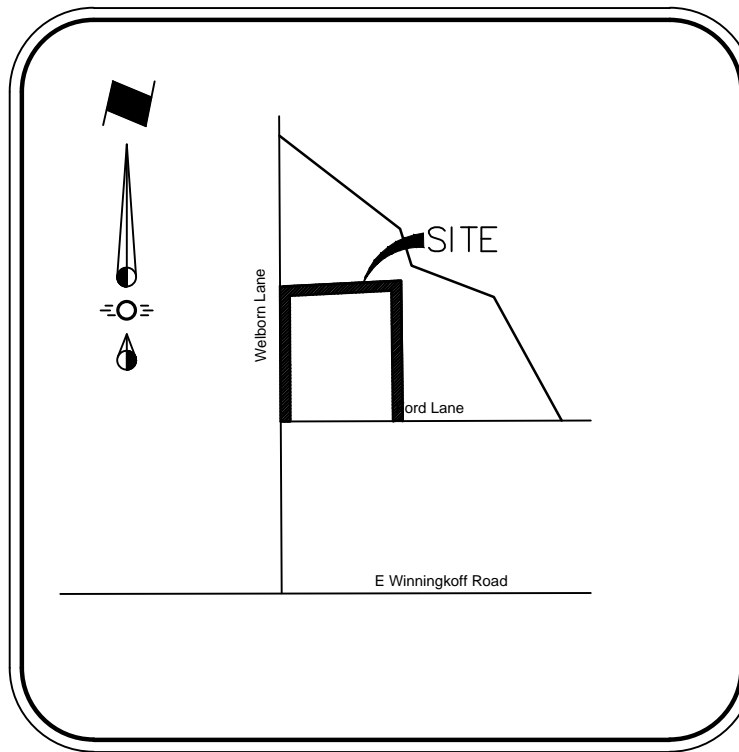
North Texas Municipal Water District
No. 1,126, Pg. 252, CCLP

North Texas Municipal Water District
No. 1,126, Pg. 252, CCLP

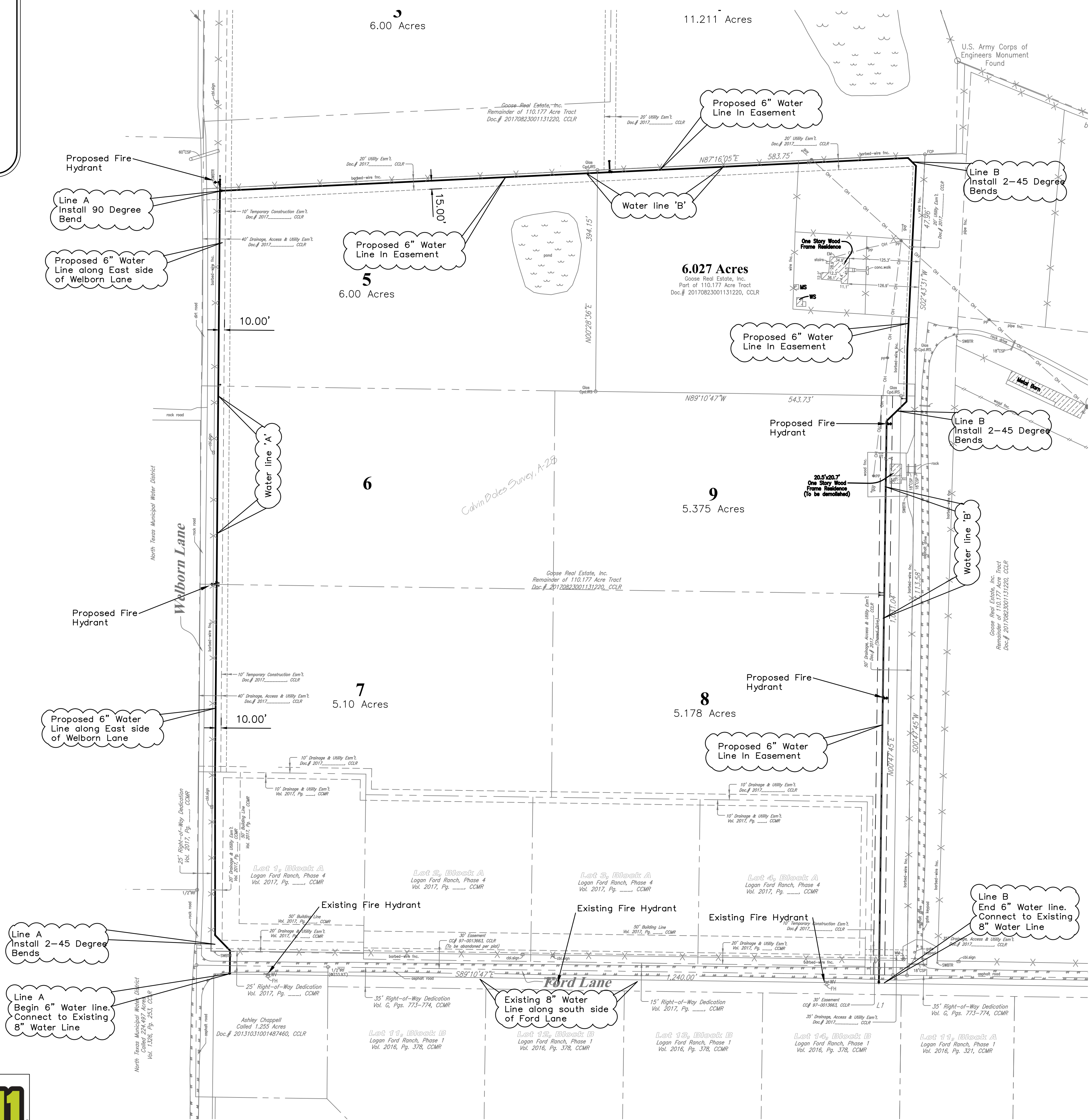
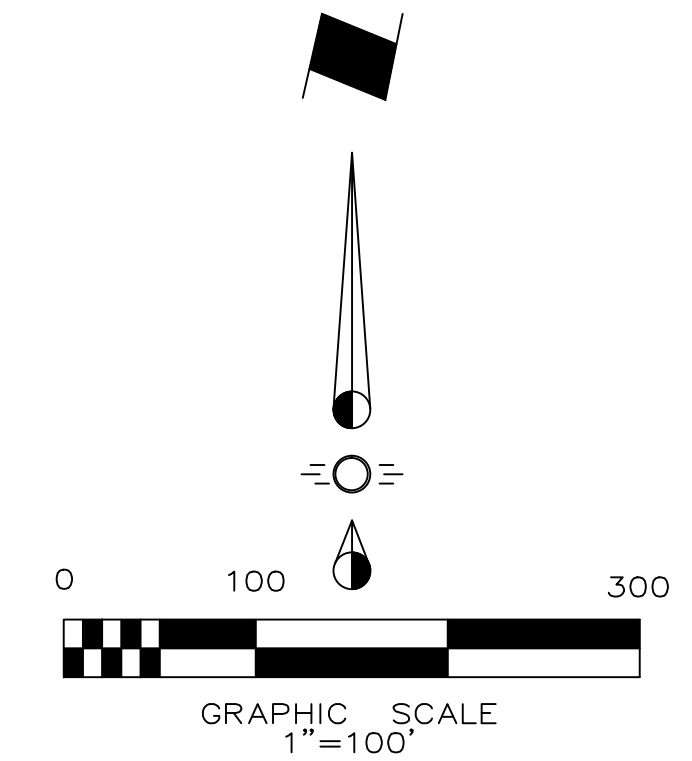
USA [Lake Loran Reservoir Project]
(Per Collin County Central Appraisal District)

USA [Lake Loran Reservoir Project]
(Per Collin County Central Appraisal District)

Christopher & Frances Hughes
3.989 Acres
Doc. # 2017022700292990, CCLP



Vicinity Map
NTS



Note:
This sheet is not intended for construction purposes. Showing overall project for clarity.

ENGINEER:
JP Engineering
4101 Hazelwood Drive
Fort Worth, Texas 76107
Phone (214) 226-9699
Contact: David Jones, P.E.

SURVEYOR:
Glas Land Surveying
2114 FM 1563
Wolfe City, Texas 75496
Phone (903) 496-2084
Fax (469) 547-0826
Contact: John Glas

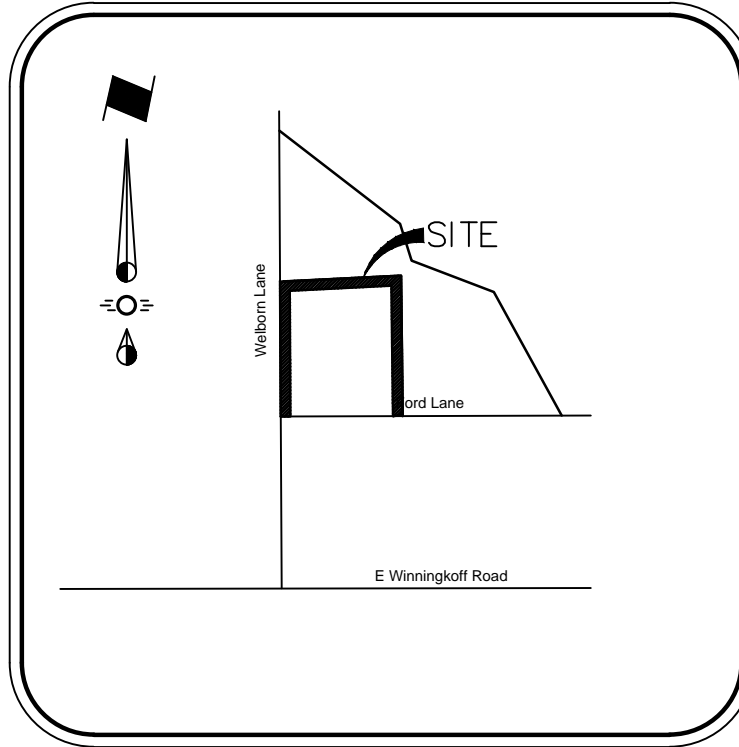


JP Engineering
4101 Hazelwood Drive - Fort Worth, Texas 76107 214-226-9699
Texas P.E. Firm Number 14021

6 Inch Water Line Loop
Welborn Lane
City of Lucas, Texas
OVERALL WATER LINE LAYOUT

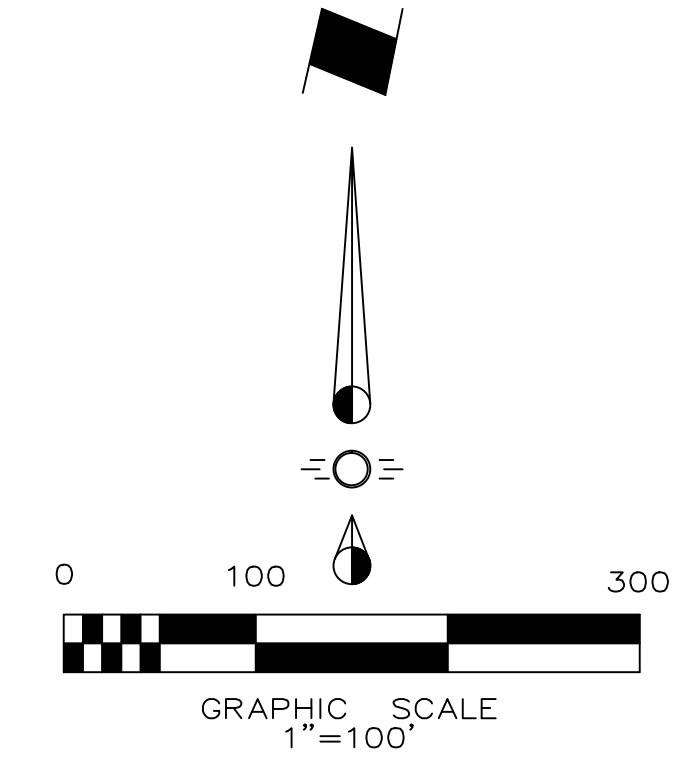
No.	Date	Revision

Scale: 1" = 100'
File Name: Water Layout
Date: March 22, 2018
Project No.: 18002



Vicinity Map
NTS

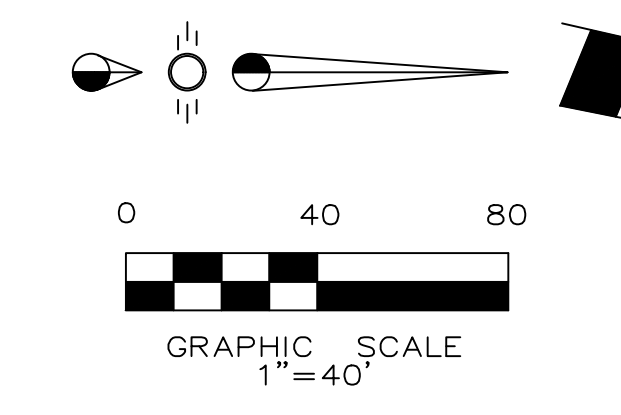
WATER PLAN 2



6 Inch Water Line Loop
Webborn Lane
City of Lucas, Texas
SHEET INDEX

No.	Date	Revision

Scale: 1" = 20'
File Name: Sheet Index
Date: March 22, 2018
Project No.: 18002

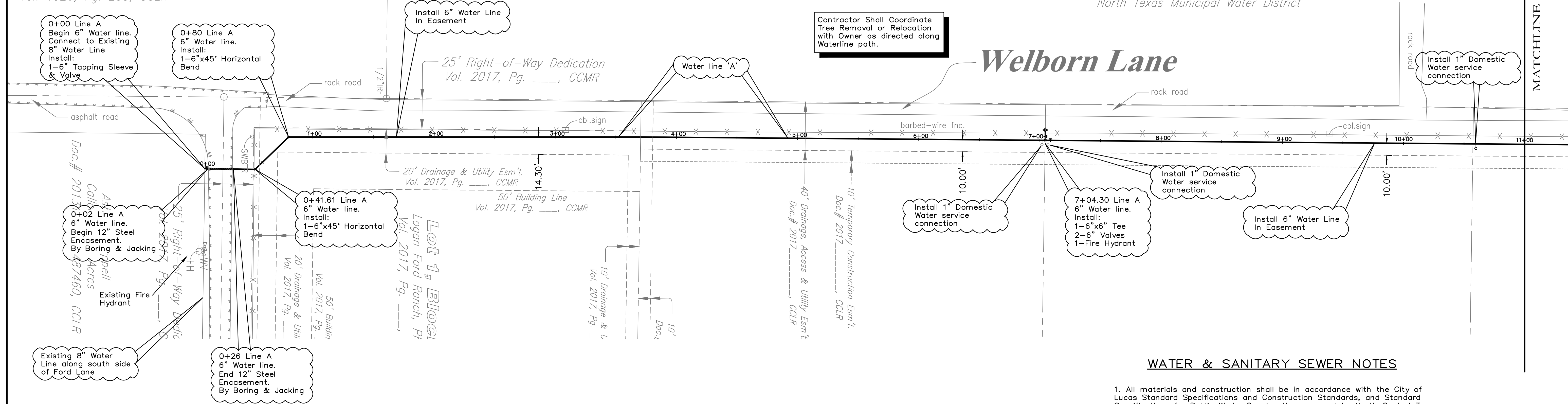


NOTE:
 EXISTING 8 INCH WATER LINE ALONG FORD LANE SHOWN AS APPROXIMATE ONLY. EXACT DEPTH, LOCATION AND ELEVATION UNKNOWN. NO AS-BUILTS AVAILABLE. CONTRACTOR SHALL FIELD VERIFY DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO WATER LINE CONSTRUCTION. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

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 Fort Worth, Texas 76107
 (214) 226-9699
 Record Drawings Prepared On:
 2/12/2019

North Texas Municipal Water District
 Called 224.497 Acres
 Vol. 1326, Pg. 253, CCLR

North Texas Municipal Water District



Welborn Lane

WATER & SANITARY SEWER NOTES

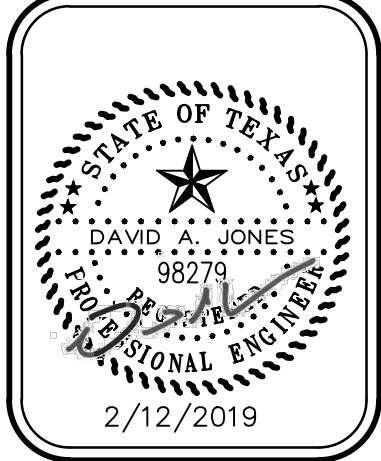
- All materials and construction shall be in accordance with the City of Lucas Standard Specifications and Construction Standards, and Standard Specifications for Public Works Construction prepared by North Central Texas Council of Governments (Latest Revision), and to the regulations of the Texas Commission on Environmental Quality.
- Existing utilities are shown schematically and are for the contractors guidance only. The location and/or elevation of existing utilities as shown on these plans are based on records of the various utility companies, and, where possible, measurements taken in the field. The contractor must call the appropriate utility company at least 48 hours prior to any excavation to request exact field location of utilities.
- The contractor shall be responsible for protecting all existing improvements in the construction of this project. The contractor is responsible for repairs of damage to any existing improvements during construction. Repairs shall be equal to or better than condition prior to construction.
- All water mains 6" and larger shall be Class 160 DR 18 PVC water pipe, conforming to AWWA C900 standards.
- Contractor shall be responsible for maintaining trench safety requirements in accordance with the latest standards of O.S.H.A. or any other agency having jurisdiction for excavation and trenching procedures. Contractor shall provide and implement a trench safety plan complying with O.S.H.A.
- Fire Hydrants Shall be Waterous or Approved equal per City requirements.
- Main Line valves shall be 6 inch Mueller resilient gate valves or Approved equal per City requirements.
- The contractor shall furnish & Install Tracer wire compatible with Radiodetection Digital PXL-2 pipe locator at minimum of 14 gauge wire.
- The contractor shall furnish & Install MEGA-LUGS on all bends, valves and other fittings that are required for the water line.
- The contractor shall refer to the General Notes within this Plan set as well as the Detail Sheet for additional Notes, Details & Requirements.

LEGEND

---	Proposed S.S. Line
---	Proposed Water Line
⊕	Proposed Fire Hydrant
⊕	Proposed Water Tee
⊕	Proposed Water Valve
⊕	Proposed Water Bend
⊕	Existing Fire Hydrant
SS	Existing S.S. Line
W	Existing Water Line
UE	Existing Underground Elec
GAS	Existing Gas Line

Note:
 Existing Utilities Shown Per As-Built Documents. Contractor to Field Verify Location and Depth of All Utilities On and Adjacent to the Site Prior to Construction and Notify Engineer of any Discrepancies.

JP Engineering
 4101 Hazelwood Drive - Fort Worth, Texas 76107 214-226-9699
 Texas P.E. Firm Number 14021



6 Inch Water Line Loop
 Welborn Lane
 City of Lucas, Texas
WATER PLAN 1

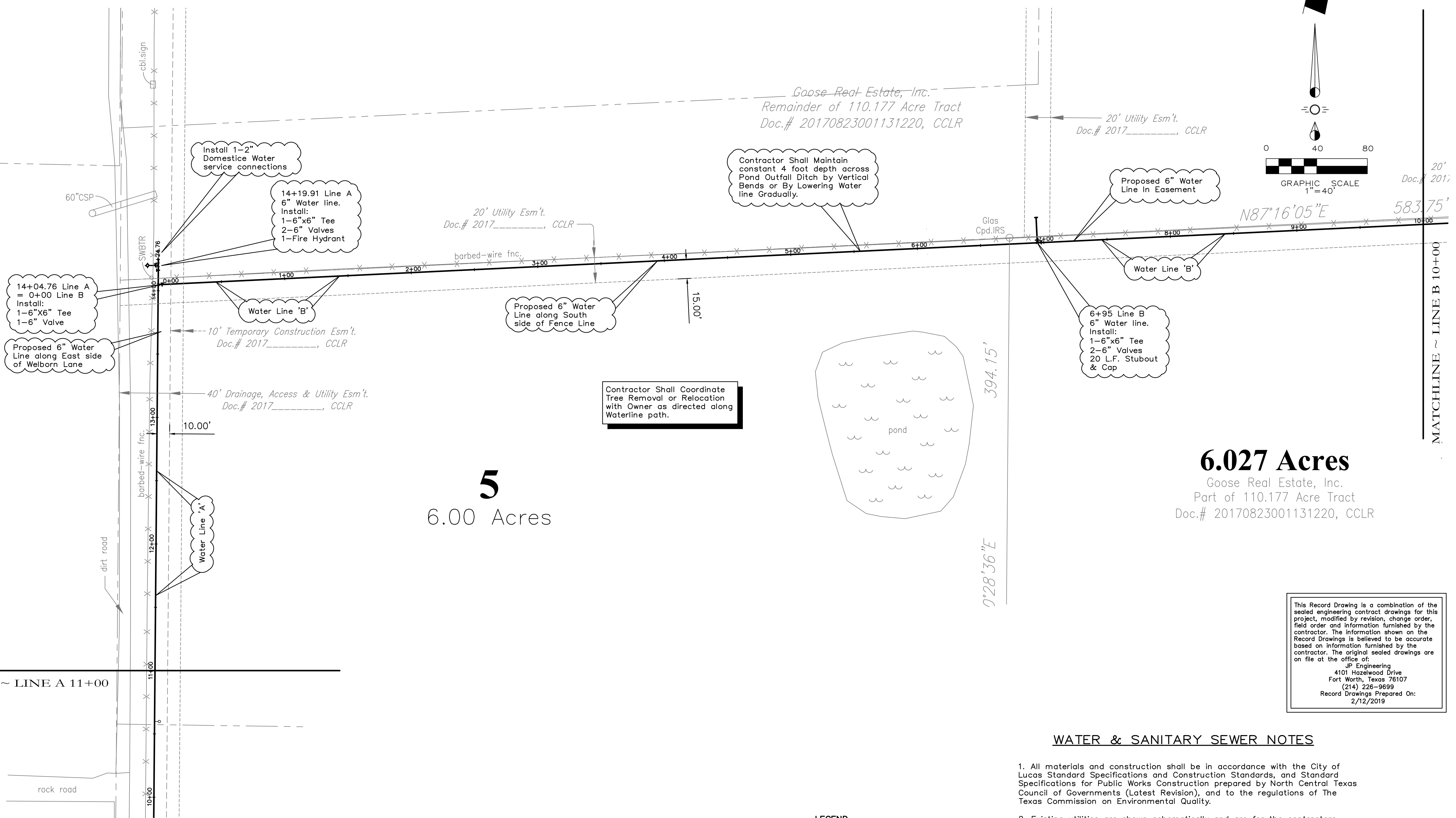
No.	Date	Revision

Scale: 1" = 40'
 File Name: Water Plan 1
 Date: March 22, 2018
 Project No.: 18002





MATCHLINE ~ LINE A 11+00



5
6.00 Acres

6.027 Acres

Goose Real Estate, Inc.
Part of 110.177 Acre Tract
Doc.# 20170823001131220, CCLR

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2/12/2019

WATER & SANITARY SEWER NOTES

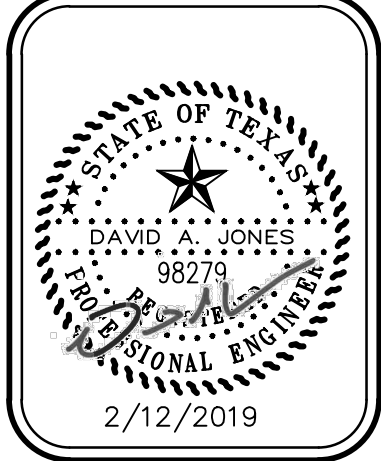
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- The contractor shall be responsible for protecting all existing improvements in the construction of this project. The contractor is responsible for repairs of damage to any existing improvements during construction. Repairs shall be equal to or better than condition prior to construction.
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- Contractor shall be responsible for maintaining trench safety requirements in accordance with the latest standards of O.S.H.A. or any other agency having jurisdiction for excavation and trenching procedures. Contractor shall provide and implement a trench safety plan complying with O.S.H.A.
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- Main Line valves shall be 6 inch Mueller resilient gate valves or Approved equal per City requirements.
- The contractor shall furnish & Install Tracer wire compatible with Radiodetection Digital PXL-2 pipe locator at minimum of 14 gauge wire.
- The contractor shall furnish & Install MEGA-LUGS on all bends, valves and other fittings that are required for the water line.
- The contractor shall refer to the General Notes within this Plan set as well as the Detail Sheet for additional Notes, Details & Requirements.

LEGEND

---	Proposed S.S. Line
---	Proposed Water Line
⊕	Proposed Fire Hydrant
⊕	Proposed Water Tee
⊕	Proposed Water Valve
⊕	Proposed Water Bend
⊕	Existing Fire Hydrant
SS	Existing S.S. Line
W	Existing Water Line
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Note:
Existing Utilities Shown Per As-Built Documents. Contractor to Field Verify Location and Depth of All Utilities On and Adjacent to the Site Prior to Construction and Notify Engineer of any Discrepancies.

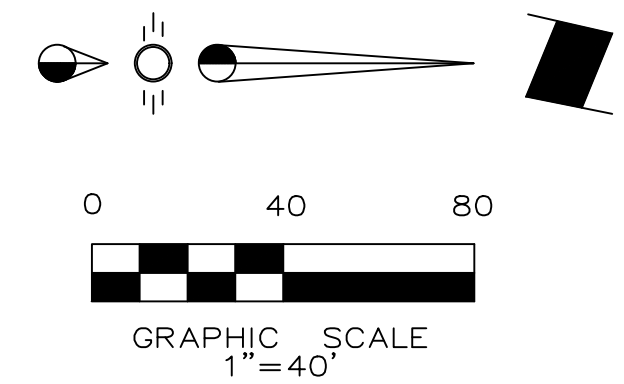
JP Engineering
4101 Hazelwood Drive - Fort Worth, Texas 76107 214-226-9699
Texas P.E. Firm Number 14021



6 Inch Water Line Loop
Welborn Lane
City of Lucas, Texas
WATER PLAN 2

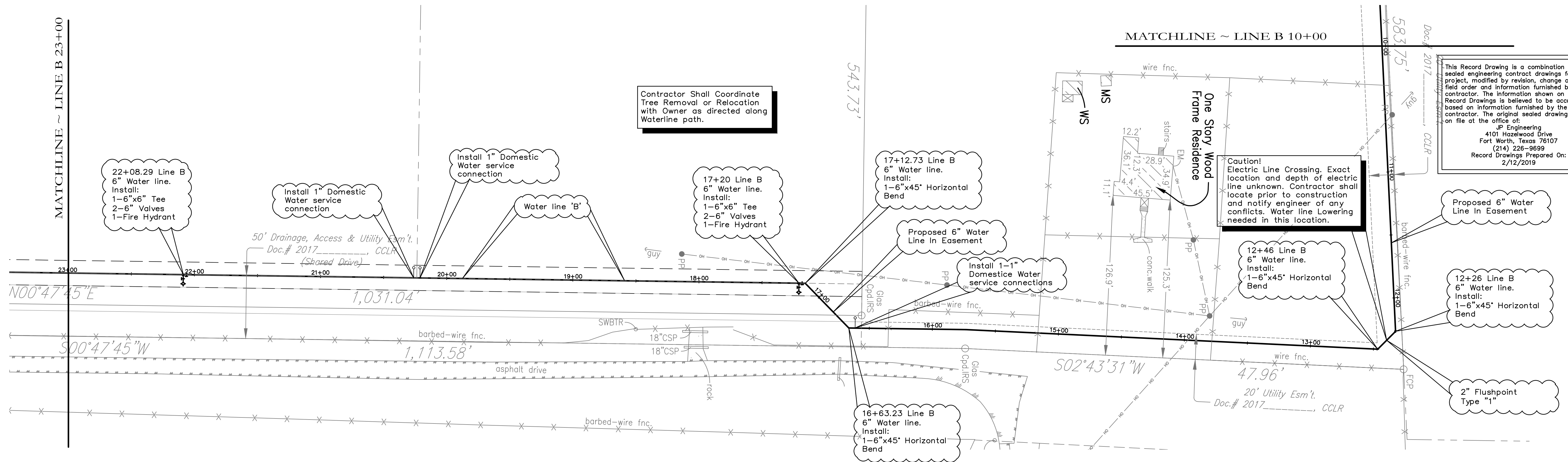
No.	Date	Revision

Scale: 1" = 40'
File Name: Water Plan 2
Date: March 22, 2018
Project No.: 18002



MATCHLINE ~ LINE B 23+00

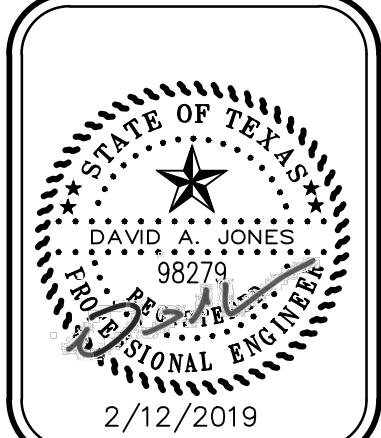
MATCHLINE ~ LINE B 10+00



Contractor Shall Coordinate Tree Removal or Relocation with Owner as directed along Waterline path.

Caution! Electric Line Crossing. Exact location and depth of electric line unknown. Contractor shall locate prior to construction and notify engineer of any conflicts. Water line Lowering needed in this location.

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WATER & SANITARY SEWER NOTES

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LEGEND

---	Proposed S.S. Line
---	Proposed Water Line
⊕	Proposed Fire Hydrant
+	Proposed Water Tee
+	Proposed Water Valve
+	Proposed Water Bend
⊕	Existing Fire Hydrant
SS	Existing S.S. Line
W	Existing Water Line
UE	Existing Underground Elec
GAS	Existing Gas Line

Note:
Existing Utilities Shown Per As-Built Documents. Contractor to Field Verify Location and Depth of All Utilities On and Adjacent to the Site Prior to Construction and Notify Engineer of any Discrepancies.



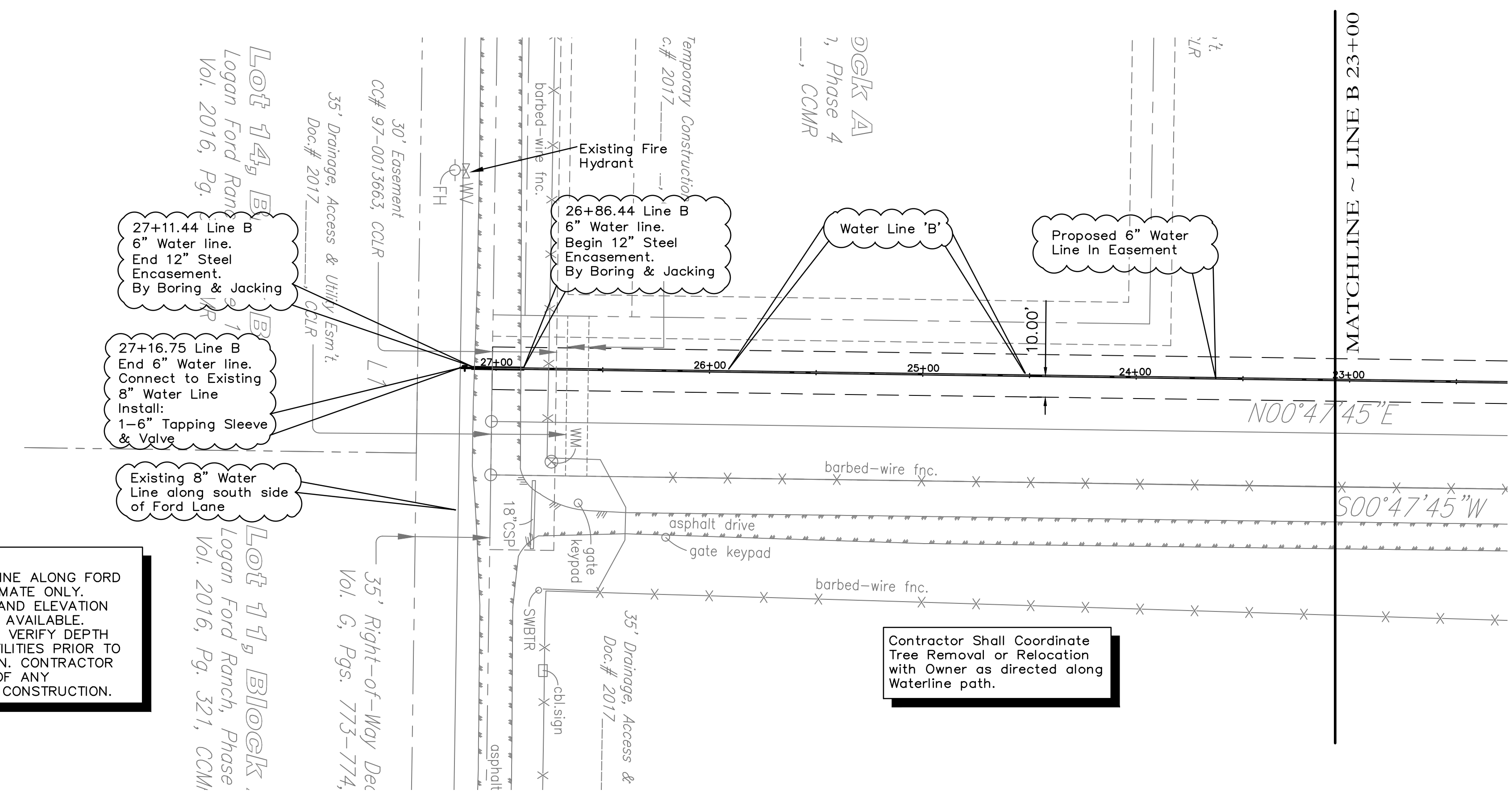
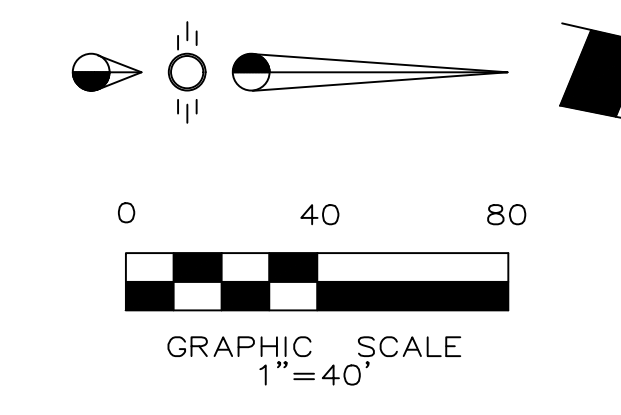
6 Inch Water Line Loop
Welborn Lane
City of Lucas, Texas
WATER PLAN 3

No.	Date	Revision

Scale: 1" = 40'
File Name: Water Plan 3
Date: March 22, 2018
Project No.: 18002

Sheet C5 of 8

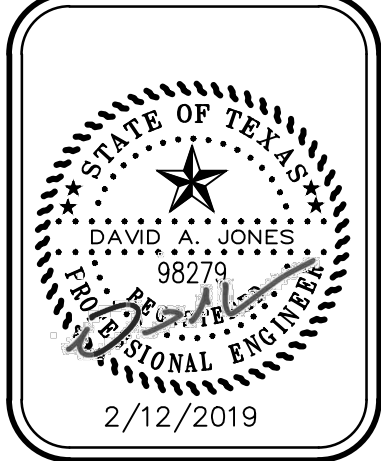
JP Engineering
4101 Hazelwood Drive - Fort Worth, Texas 76107 214-226-9699
Texas P.E. Firm Number 14021



NOTE:
EXISTING 8 INCH WATER LINE ALONG FORD LANE SHOWN AS APPROXIMATE ONLY. EXACT DEPTH, LOCATION AND ELEVATION UNKNOWN. NO AS-BUILTS AVAILABLE. CONTRACTOR SHALL FIELD VERIFY DEPTH AND LOCATION OF ALL UTILITIES PRIOR TO WATER LINE CONSTRUCTION. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO CONSTRUCTION.

Contractor Shall Coordinate Tree Removal or Relocation with Owner as directed along Waterline path.

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JP Engineering
4101 Hazelwood Drive
Fort Worth, Texas 76107
(214) 226-9699
Record Drawings Prepared On:
2/12/2019



JP Engineering
4101 Hazelwood Drive - Fort Worth, Texas 76107 214-226-9699
Texas P.E. Firm Number 14021

WATER & SANITARY SEWER NOTES

- All materials and construction shall be in accordance with the City of Lucas Standard Specifications and Construction Standards, and Standard Specifications for Public Works Construction prepared by North Central Texas Council of Governments (Latest Revision), and to the regulations of the Texas Commission on Environmental Quality.
- Existing utilities are shown schematically and are for the contractors guidance only. The location and/or elevation of existing utilities as shown on these plans are based on records of the various utility companies, and, where possible, measurements taken in the field. The contractor must call the appropriate utility company at least 48 hours prior to any excavation to request exact field location of utilities.
- The contractor shall be responsible for protecting all existing improvements in the construction of this project. The contractor is responsible for repairs of damage to any existing improvements during construction. Repairs shall be equal to or better than condition prior to construction.
- All water mains 6" and larger shall be Class 160 DR 18 PVC water pipe, conforming to AWWA C900 standards.
- Contractor shall be responsible for maintaining trench safety requirements in accordance with the latest standards of O.S.H.A. or any other agency having jurisdiction for excavation and trenching procedures. Contractor shall provide and implement a trench safety plan complying with O.S.H.A.
- Fire Hydrants Shall be Waterous or Approved equal per City requirements.
- Main Line valves shall be 6 inch Mueller resilient gate valves or Approved equal per City requirements.
- The contractor shall furnish & Install Tracer wire compatible with Radiodetection Digital PXL-2 pipe locator at minimum of 14 gauge wire.
- The contractor shall furnish & Install MEGA-LUGS on all bends, valves and other fittings that are required for the water line.
- The contractor shall refer to the General Notes within this Plan set as well as the Detail Sheet for additional Notes, Details & Requirements.

LEGEND

---	Proposed S.S. Line
---	Proposed Water Line
⊕	Proposed Fire Hydrant
+	Proposed Water Tee
+	Proposed Water Valve
+	Proposed Water Bend
⊕	Existing Fire Hydrant
SS	Existing S.S. Line
W	Existing Water Line
UE	Existing Underground Elec
GAS	Existing Gas Line

Note:
Existing Utilities Shown Per As-Built Documents. Contractor to Field Verify Location and Depth of All Utilities On and Adjacent to the Site Prior to Construction and Notify Engineer of any Discrepancies.

ENGINEER:
JP Engineering
4101 Hazelwood Drive
Fort Worth, Texas 76107
Phone (214) 226-9699
Contact: David Jones, P.E.

SURVEYOR:
Glas Land Surveying
2114 FM 1563
Wolfe City, Texas 75496
Phone (903) 496-2084
Fax (469) 547-0826
Contact: John Glas

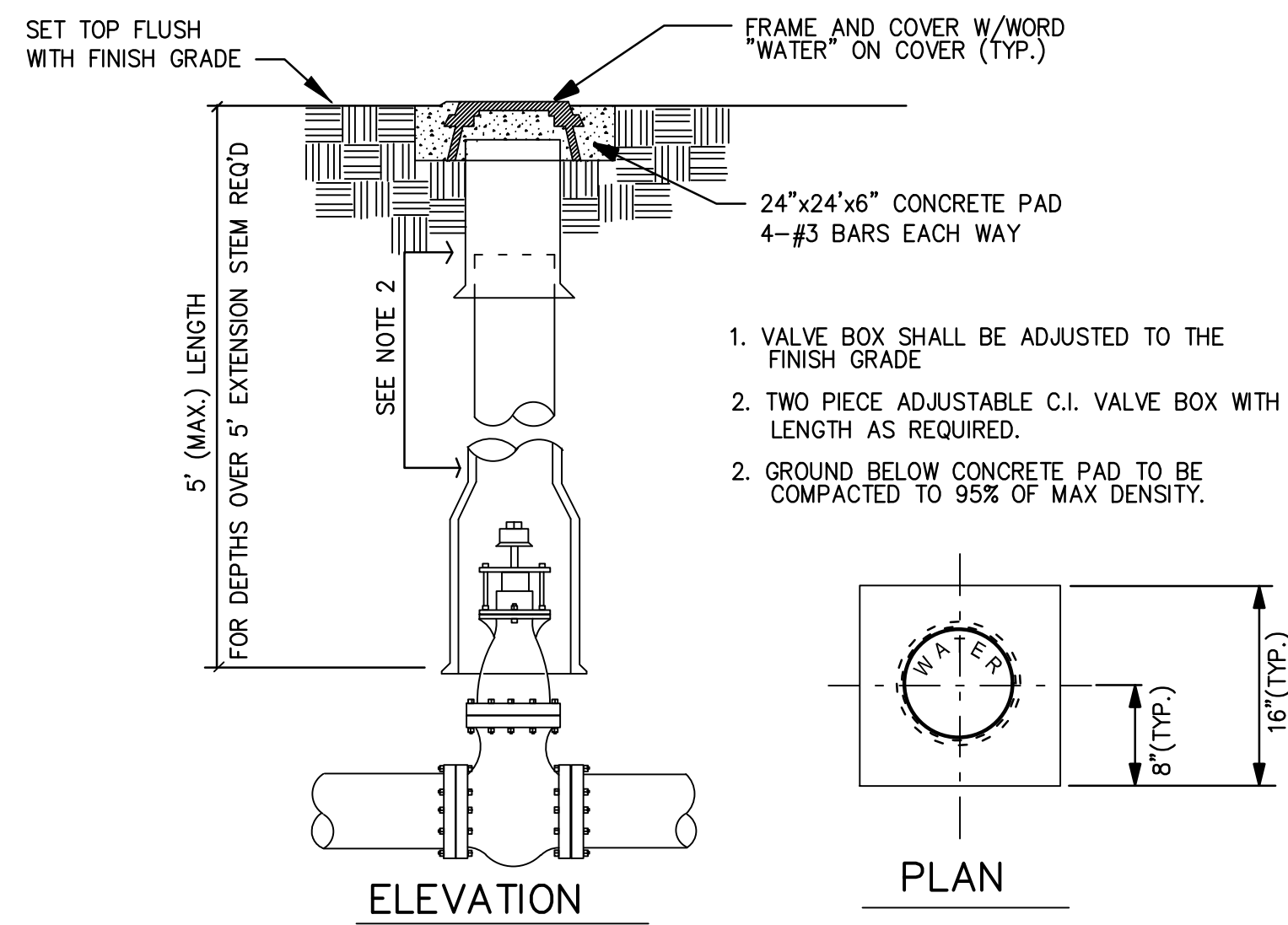


6 Inch Water Line Loop
Welborn Lane
City of Lucas, Texas
WATER PLAN 4

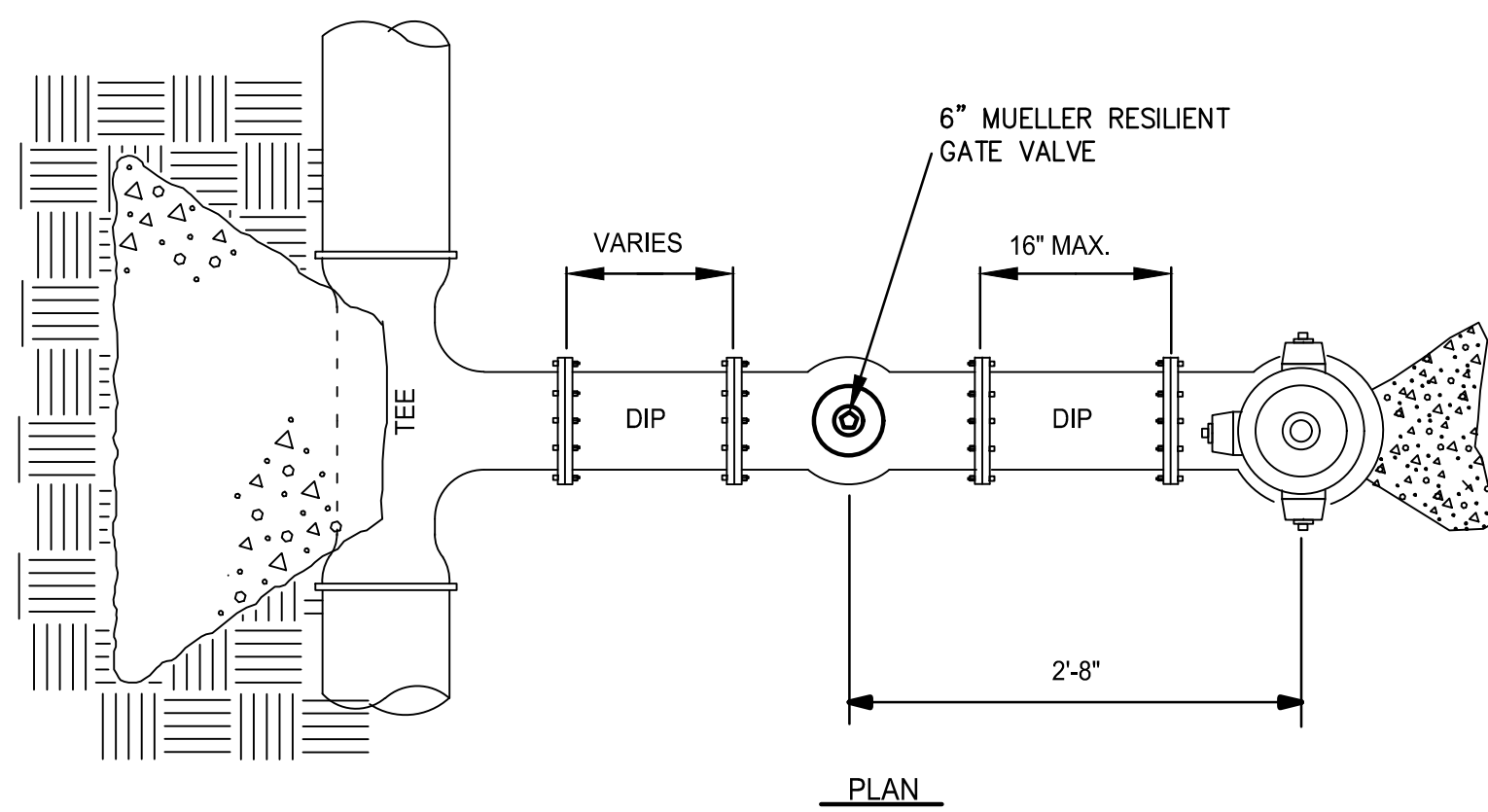
No.	Date	Revision

Scale: 1" = 40'
File Name: Water Plan 4
Date: March 22, 2018
Project No.: 18002

Sheet C6 of 8

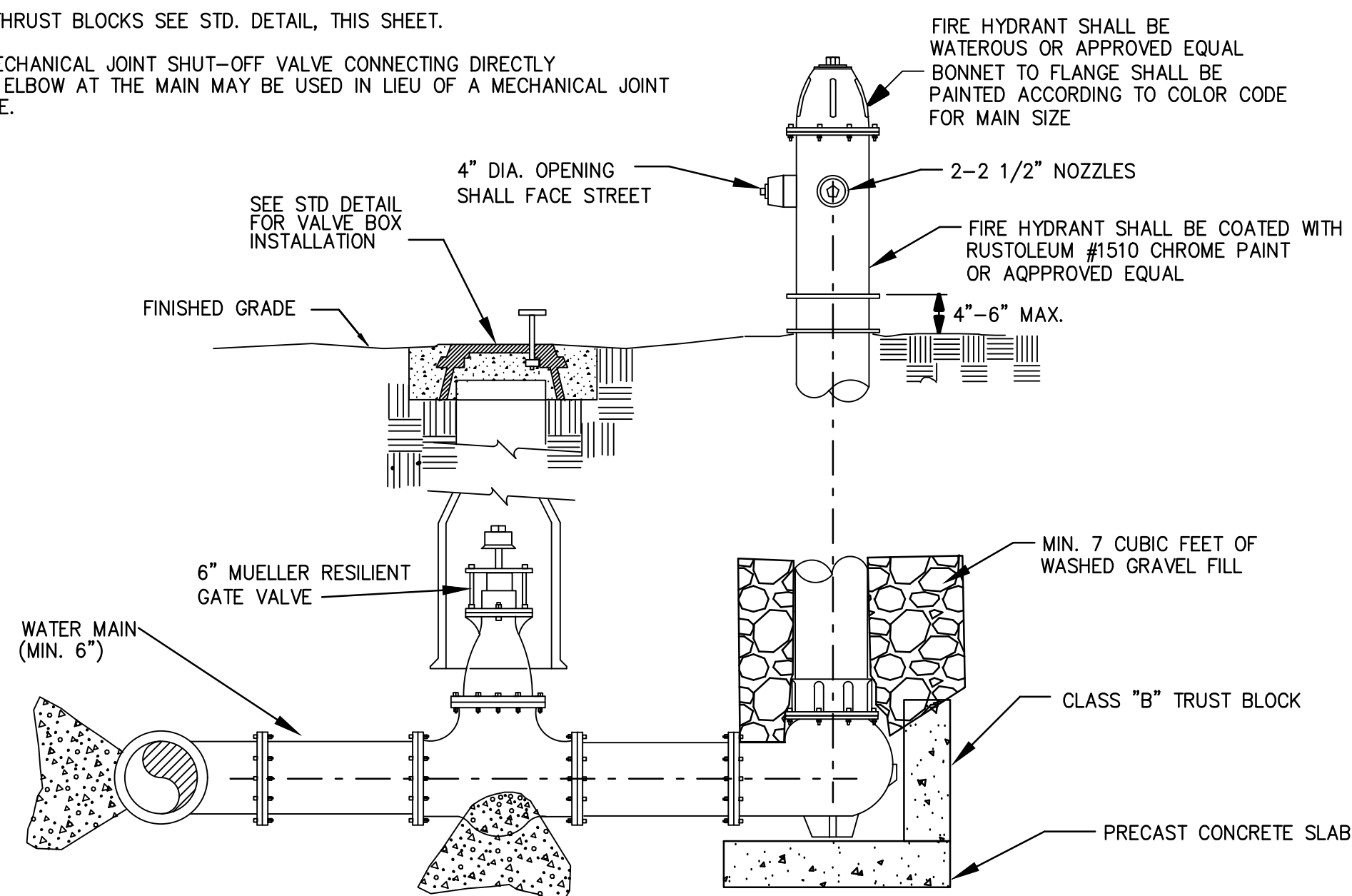


VALVE BOX & COVER
NO SCALE

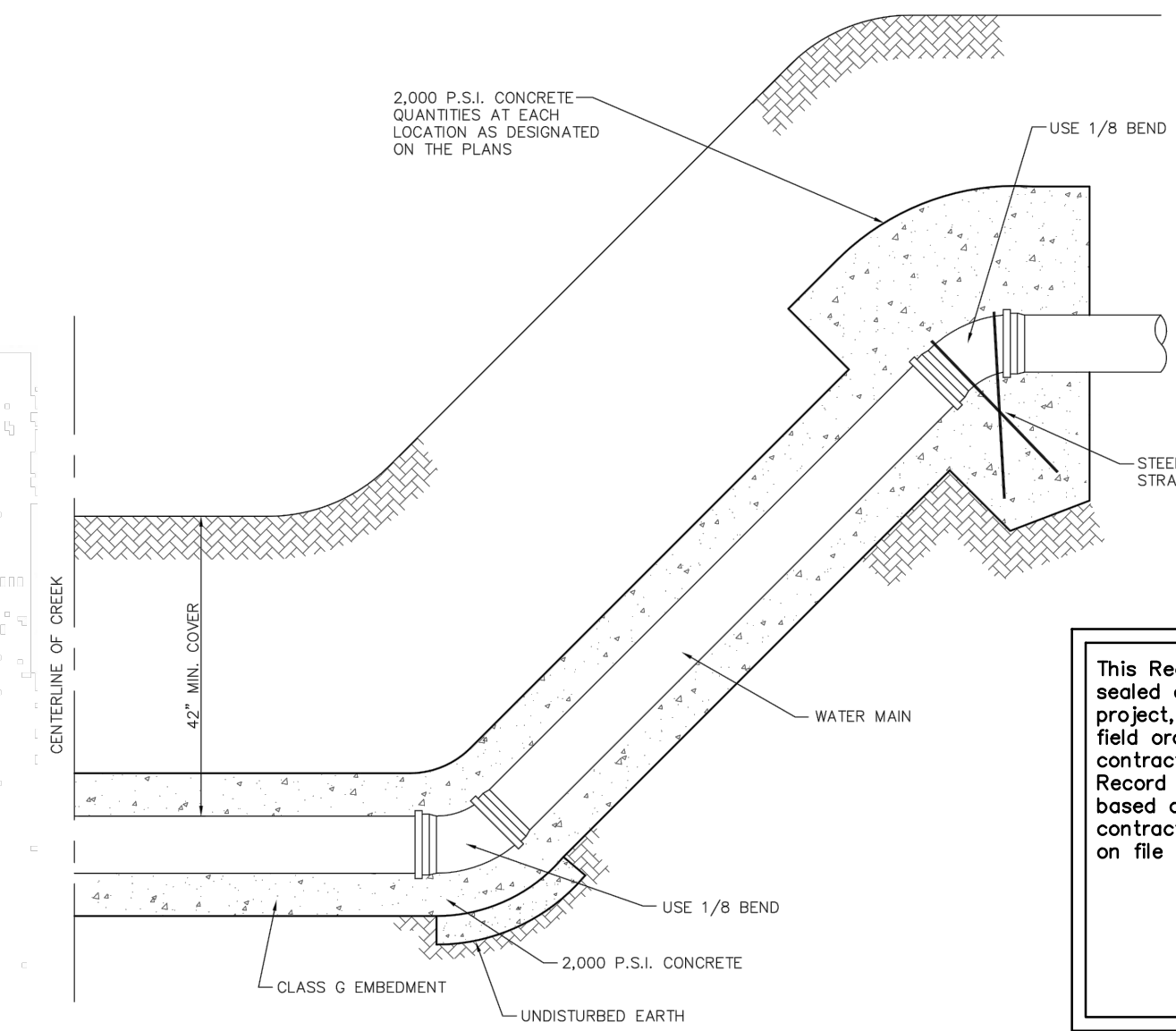
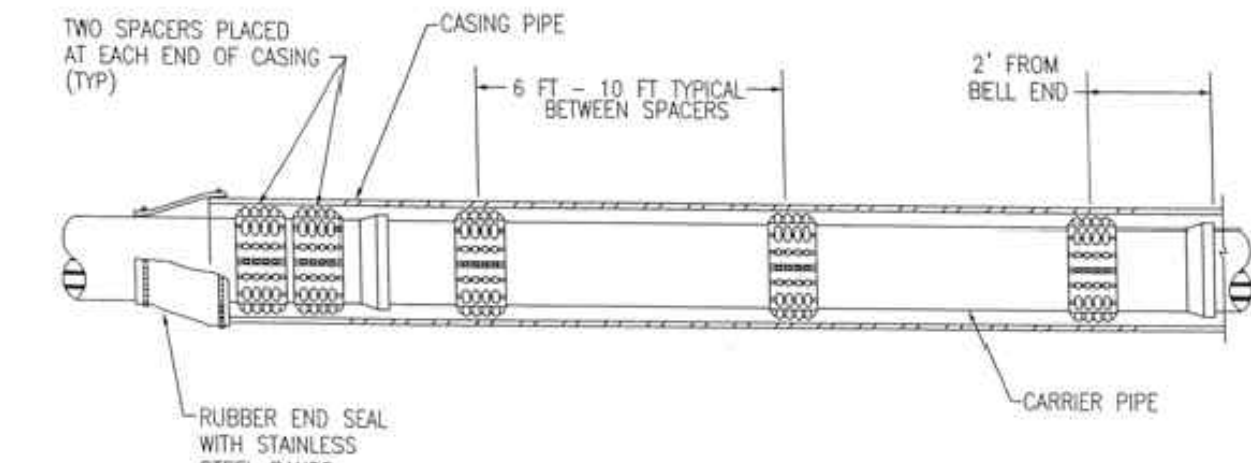
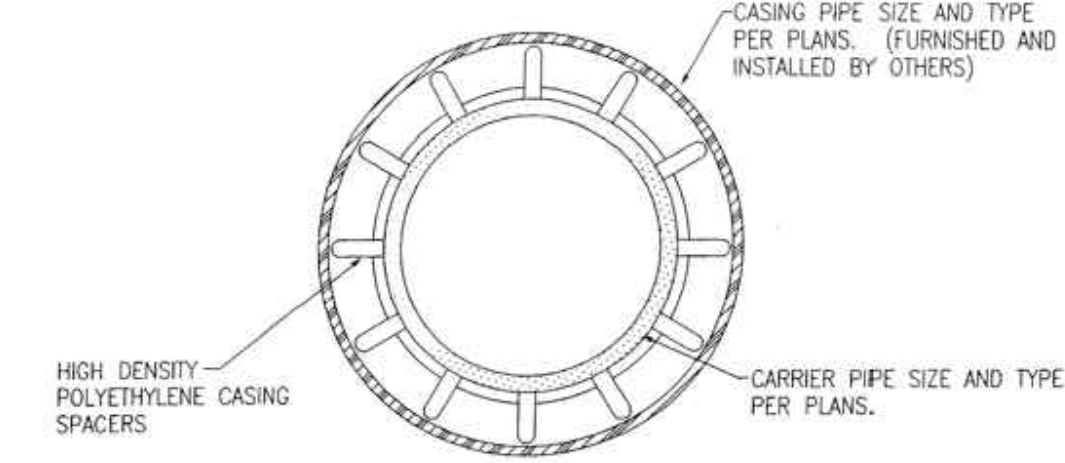
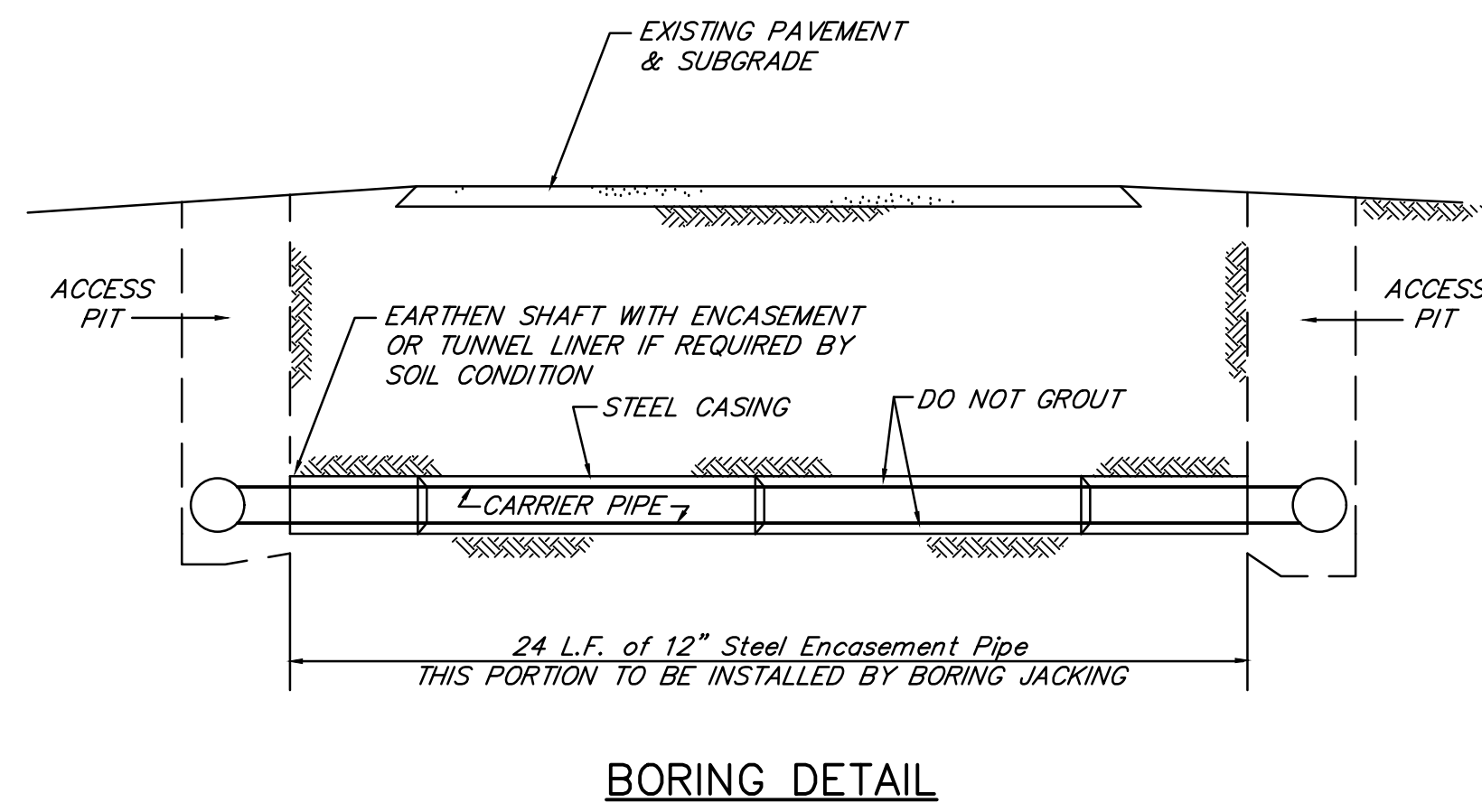


NOTES:

1. ALL JOINTS IN HYDRANT RUN-OUT TO BE MECHANICAL.
2. FOR CONCRETE THRUST BLOCKS SEE STD. DETAIL, THIS SHEET.
3. A FLANGE BY MECHANICAL JOINT SHUT-OFF VALVE CONNECTING DIRECTLY TO THE TEE OR ELBOW AT THE MAIN MAY BE USED IN LIEU OF A MECHANICAL JOINT SHUT-OFF VALVE.



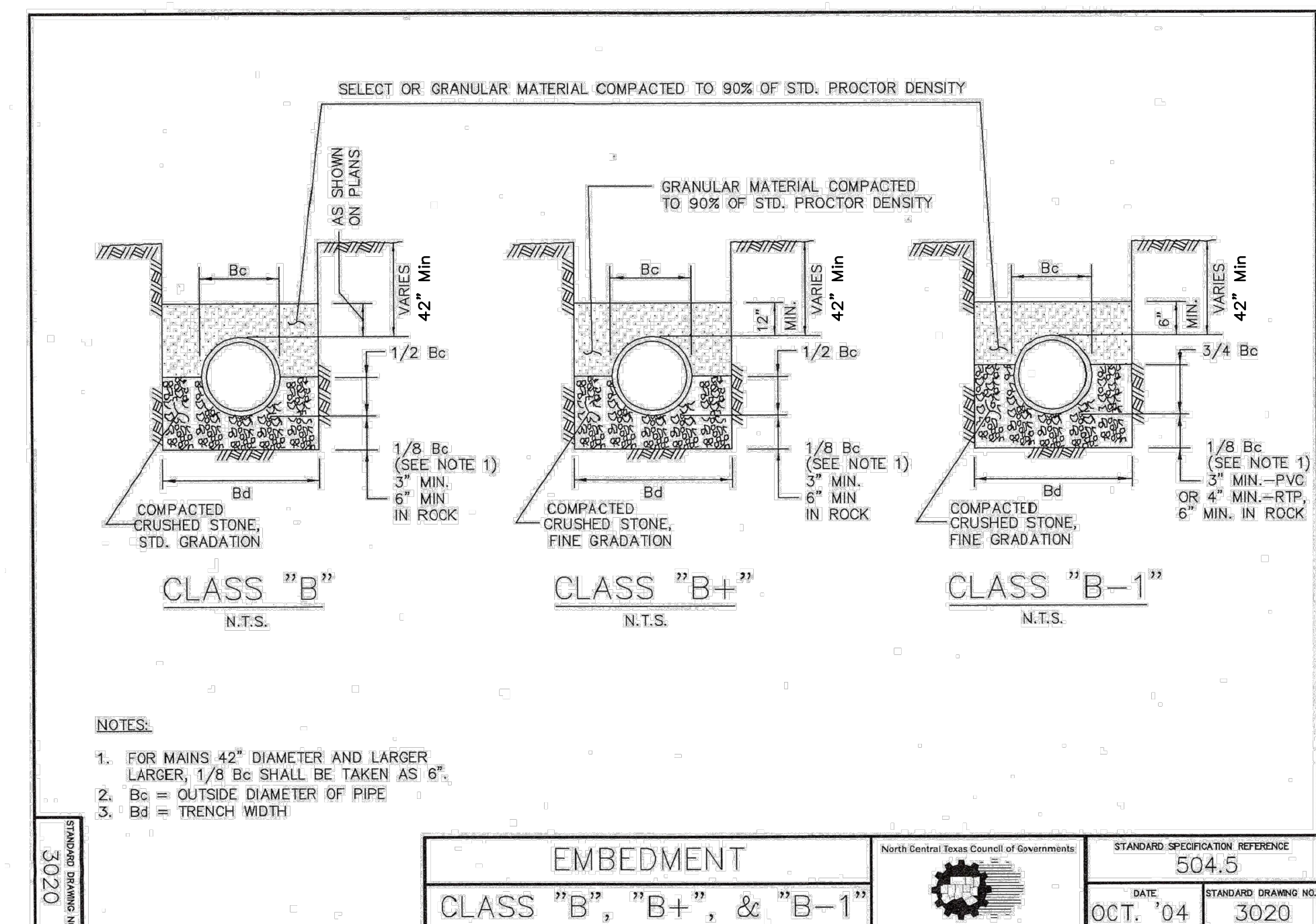
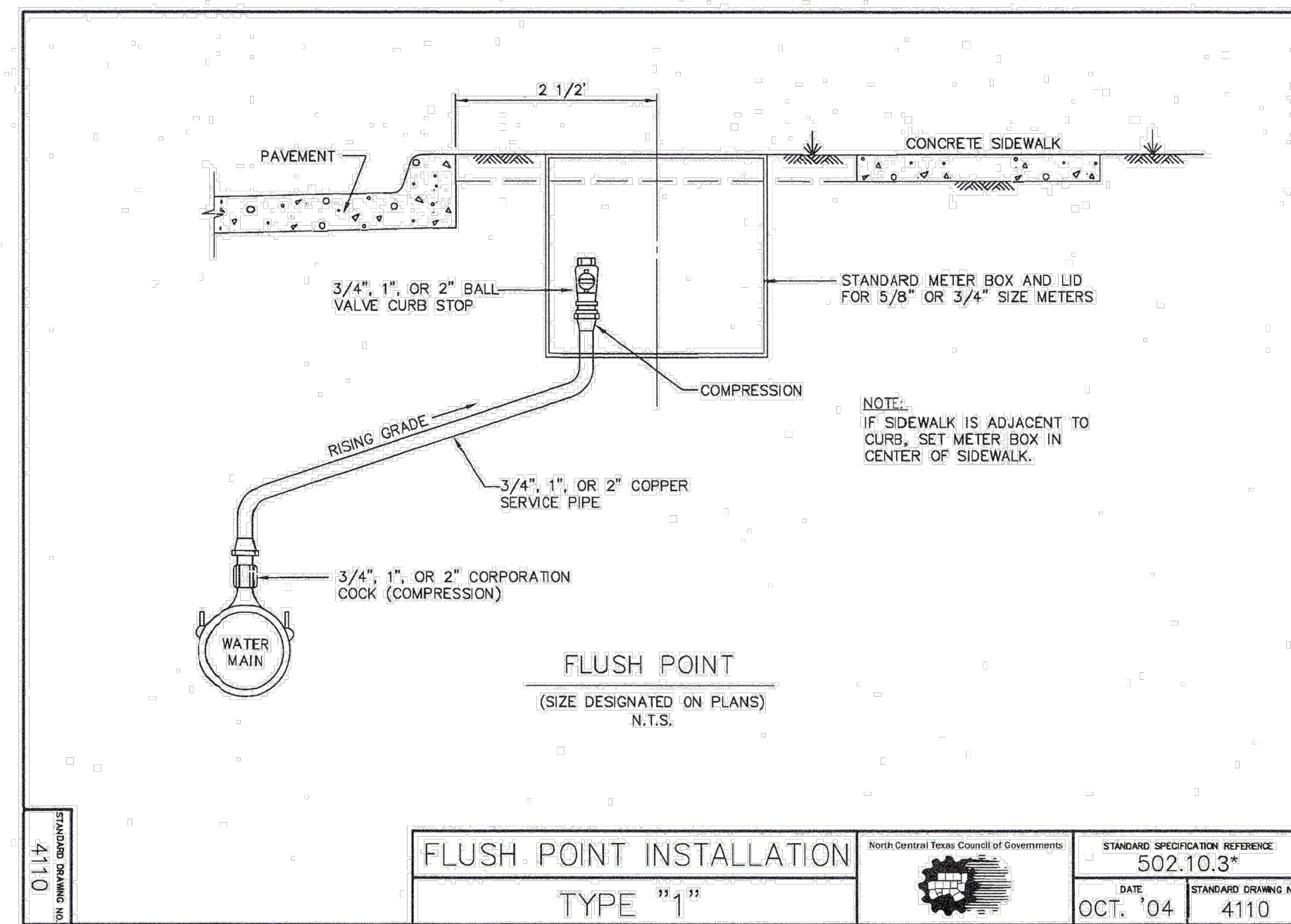
FIRE HYDRANT (DRY BARREL TYPE)
NO SCALE



CREEK CROSSING
NO SCALE

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Record Drawings Prepared On: 2/12/2019

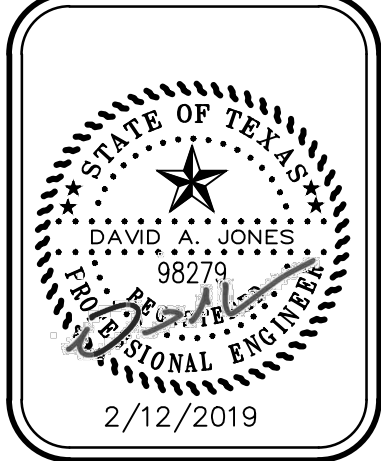


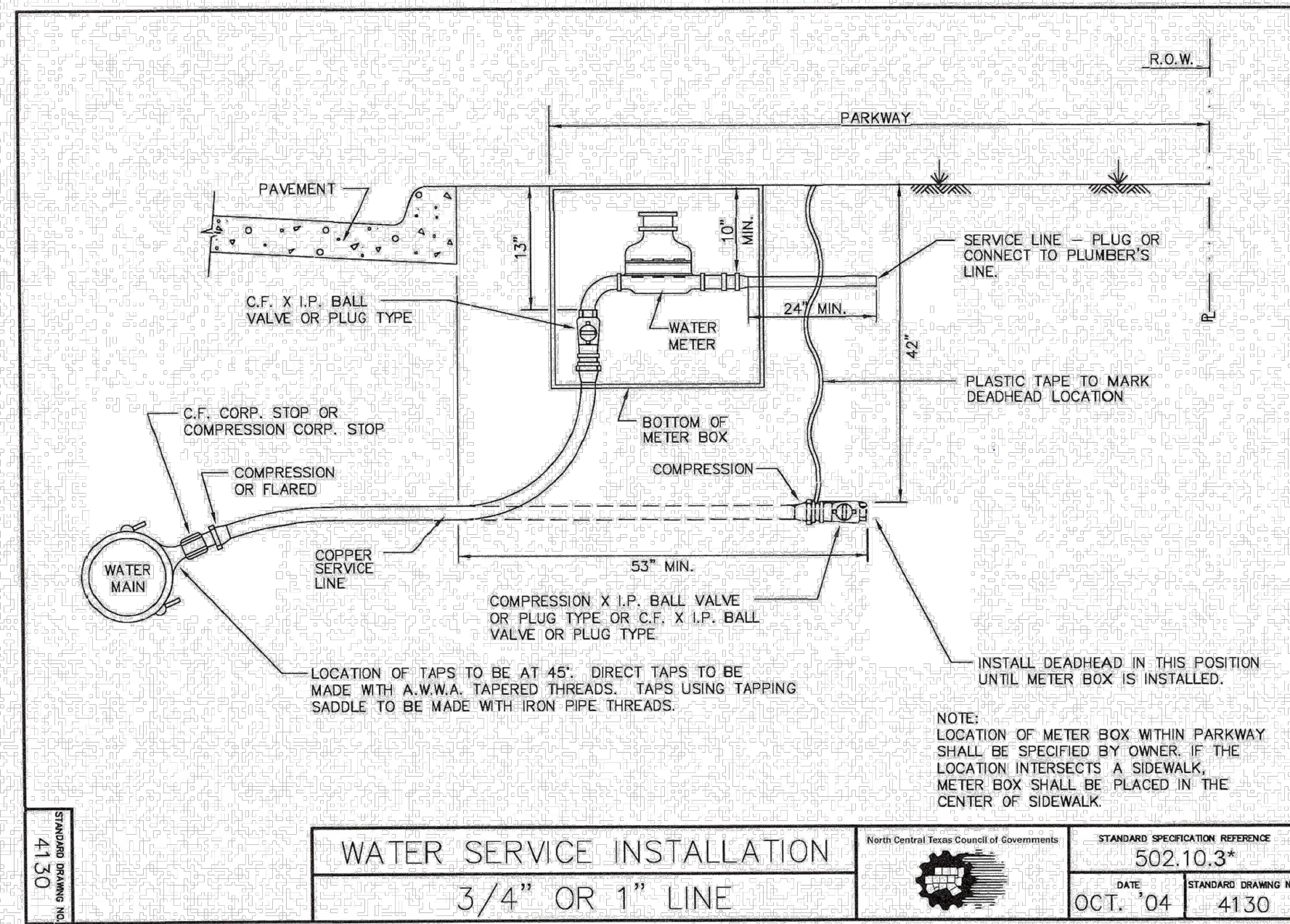
6 Inch Water Line Loop
Welborn Lane
City of Lucas, Texas

DETAILS 1

No.	Date	Revision

Scale: 1" = 20'
File Name: Details 1
Date: March 22, 2018
Project No.: 18002

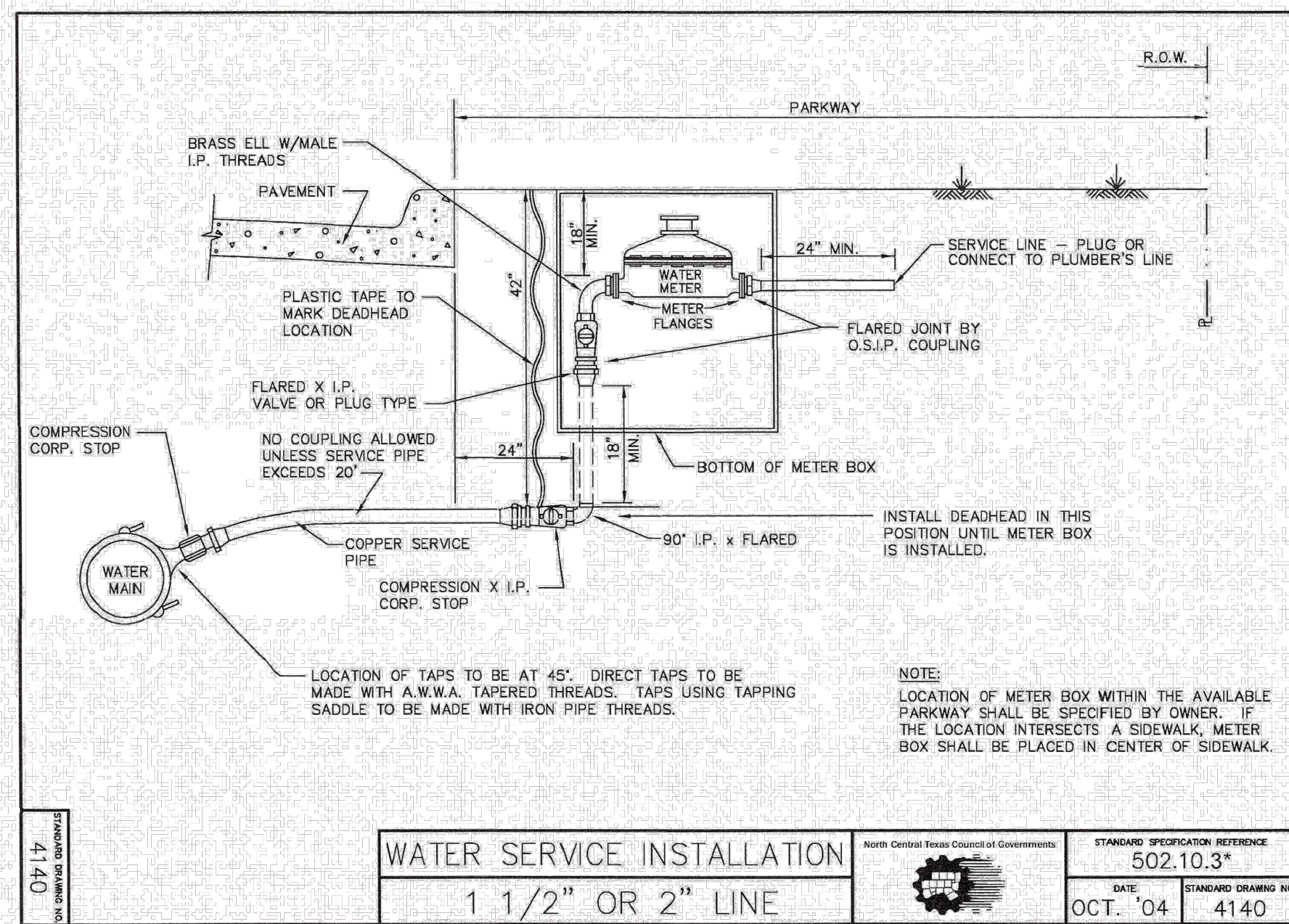




WATER SERVICE INSTALLATION
3/4" OR 1" LINE

STANDARD SPECIFICATION REFERENCE	502.10.3*
DATE	OCT. '04
STANDARD DRAWING NO.	4130

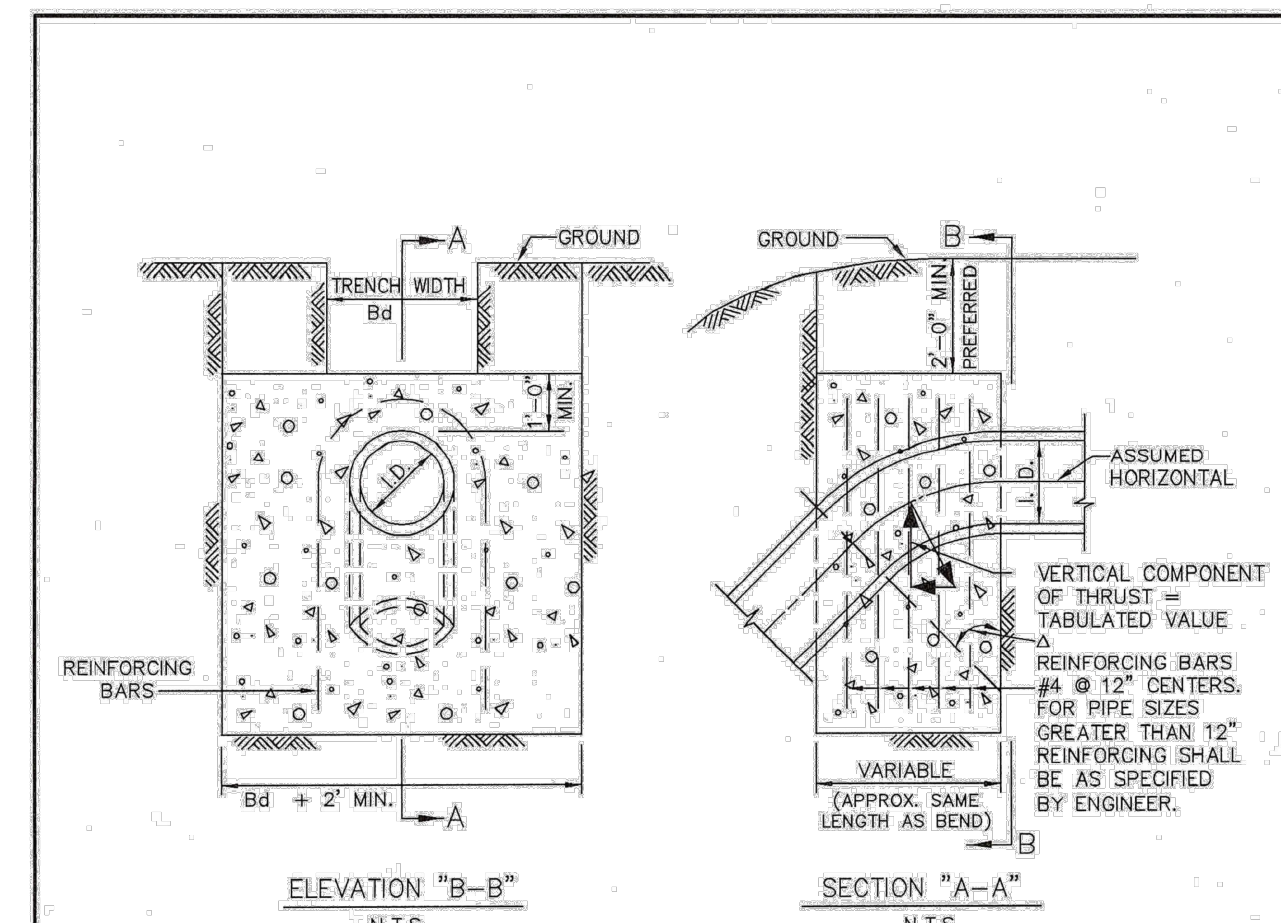
*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. Public Works Construction Standards North Central Texas, Fifth Edition.



WATER SERVICE INSTALLATION
1 1/2" OR 2" LINE

STANDARD SPECIFICATION REFERENCE	502.10.3*
DATE	OCT. '04
STANDARD DRAWING NO.	4140

*Section II Standard Drawings as of October 2004. Reference number only has been updated for Fifth Edition Specifications. Public Works Construction Standards North Central Texas, Fifth Edition.



VERTICAL THRUST BLOCK
AT PIPE BEND

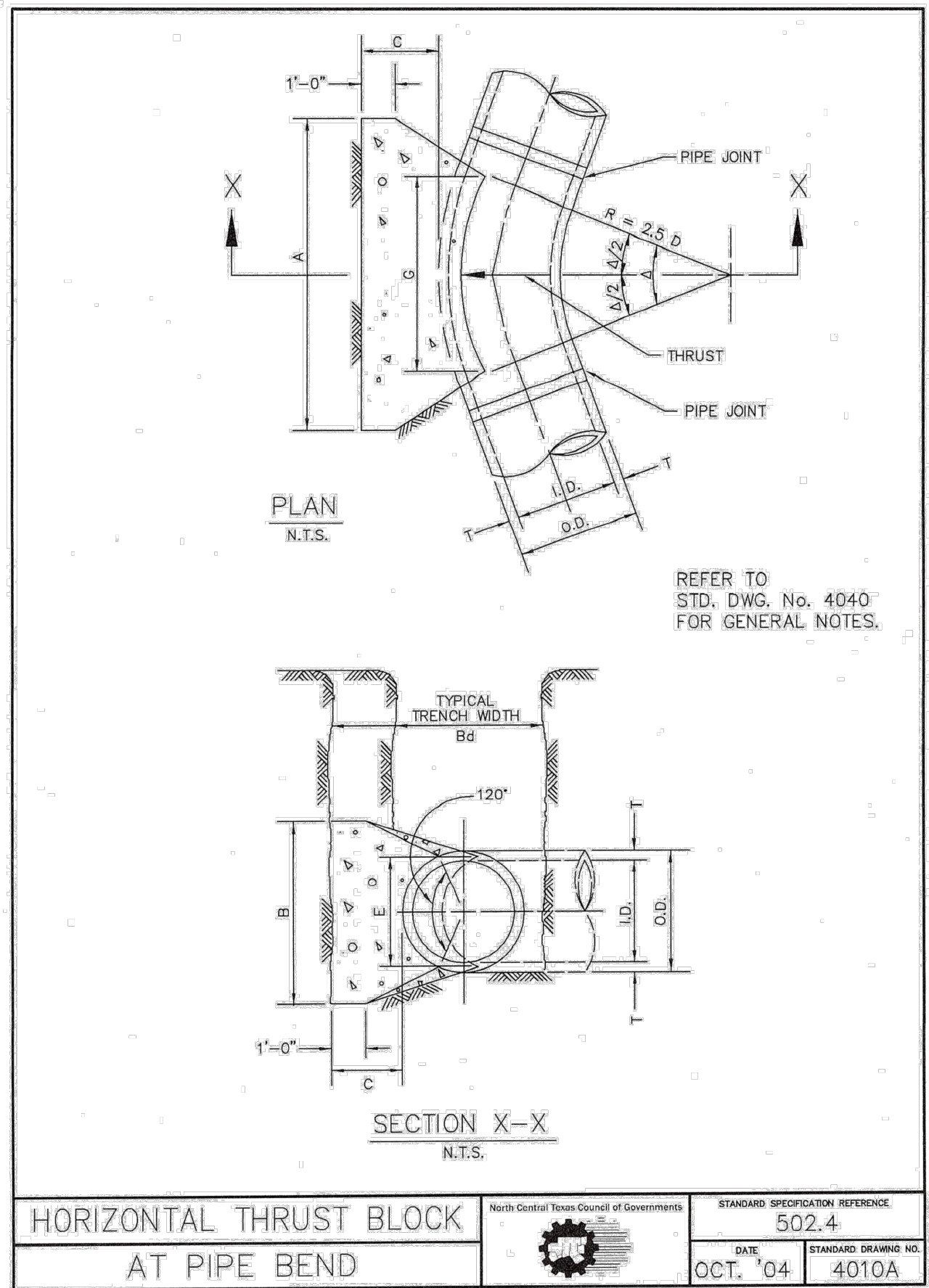
I.D. (IN.)	11.25"		22.50"		30"		45"		67.50"		90"		I.D. (IN.)
	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	THRUST (TONS)	VOL. (C.Y.)	
4.6,8	1.0	0.5	2.0	1.0	2.5	1.3	3.6	1.8	4.6	2.3	5.0	2.5	4.6,8
10,12	2.2	1.1	4.3	2.2	5.7	2.8	8.0	4.0	10.5	5.2	11.3	5.7	10,12
16,18	5.0	2.5	9.7	4.9	12.7	6.4	18.0	9.0	23.5	11.8	25.5	12.7	16,18
24	8.1	3.1	12.0	6.0	15.7	7.9	22.2	11.1	29.2	14.6	31.4	15.7	24
24	8.2	4.4	17.3	8.7	22.6	11.3	32.0	16.0	41.8	20.9	45.2	22.6	24
30	10.5	5.2	20.3	10.1	26.5	13.3	37.5	18.8	49.0	24.5	53.1	26.5	30
36	14.9	7.5	28.2	14.6	38.2	19.1	54.0	27.0	70.5	35.3	76.4	38.2	36
42	20.3	10.1	39.5	19.9	52.0	26.0	73.5	36.7	96.0	48.0	104.0	52.0	42
48	26.5	13.2	51.8	26.0	67.9	33.9	98.0	48.0	128.0	62.7	136.0	67.9	48
54	33.5	16.8	65.7	32.9	85.9	42.9	122.0	60.7	159.0	79.4	172.0	85.9	54
60	41.4	20.7	81.2	40.6	106.0	53.0	150.0	75.0	196.0	98.0	212.0	106.0	60
66	50.1	25.0	98.2	49.1	128.0	64.2	182.0	90.7	237.0	119.0	257.0	128.0	66
72	59.6	29.8	117.0	58.4	153.0	76.3	216.0	108.0	282.0	141.0	305.0	153.0	72
78	69.9	35.0	137.0	68.6	179.0	90.0	254.0	127.0	331.0	166.0	358.0	179.0	78
84	81.1	40.5	159.0	79.5	208.0	104.0	294.0	147.0	384.0	192.0	416.0	208.0	84
90	93.1	46.5	183.0	91.3	239.0	119.0	337.0	169.0	441.0	221.0	477.0	239.0	90
96	106.0	53.0	208.0	104.0	272.0	136.0	384.0	192.0	502.0	251.0	543.0	272.0	96

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2/12/2019

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Texas P.E. Firm Number 14021



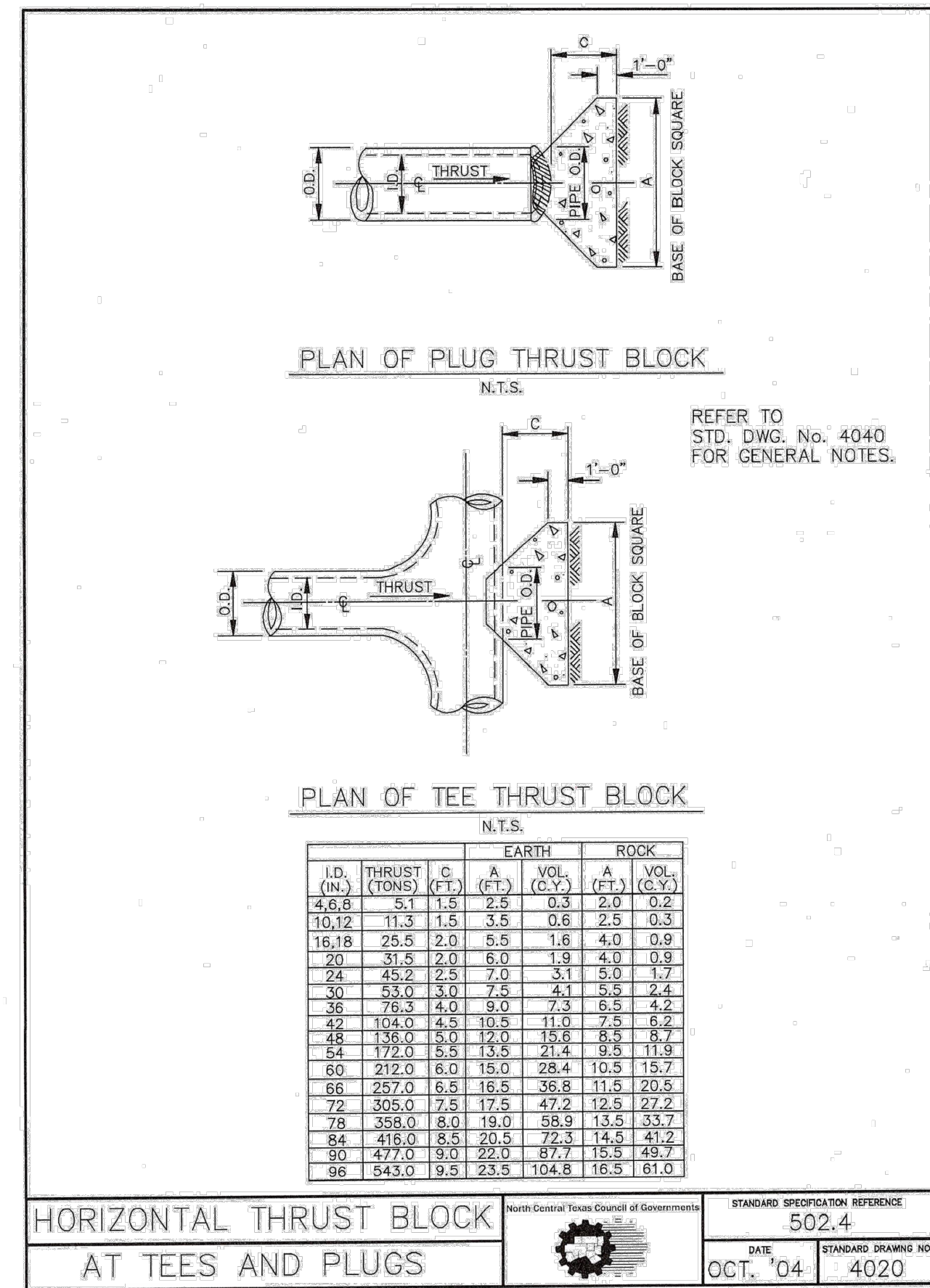
HORIZONTAL THRUST BLOCK
AT PIPE BEND

STANDARD SPECIFICATION REFERENCE	502.4
DATE	OCT. '04
STANDARD DRAWING NO.	4010A

I.D. (IN.)	Δ = 30°				Δ = 45°				Δ = 67.50°				Δ = 90°				
	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	G (FT.)	THRUST (TONS)	A (FT.)	B (FT.)	
4.6,8	1.0	2.6	2.0	1.5	0.2	1.0	1.5	0.1	4.6,8	1.5	3.9	2.0	0.2	1.5	1.0	0.1	
10,12	1.5	5.9	2.5	2.5	0.3	2.0	1.5	0.2	10,12	2.2	8.7	3.5	2.5	0.5	2.0	2.5	0.3
16,18	2.2	13.2	3.5	4.0	0.8	2.5	3.0	0.4	16,18	3.2	19.5	4.5	4.5	1.2	3.0	3.5	0.8
20	2.4	16.3	4.5	4.0	1.0	3.0	3.0	0.5	20	3.6	24.1	5.5	4.5	1.5	3.5	3.5	0.7
24	2.9	23.4	6.0	4.0	1.4	3.5	3.5	0.7	24	4.3	34.6	8.0	4.5	2.3	4.5	4.0	1.1
30	3.8	27.5	8.5	5.0	1.9	3.5	4.0	0.9	30	5.4	40.6	8.5	5.0	3.2	5.5	4.0	1.6
36	4.4	39.5	7.0	6.0	3.4	4.5	4.5	1.6	36	6.5	58.5	10.0	6.0	5.3	6.5	4.5	2.8
42	5.1	53.8	8.0	7.0	5.1	5.5	5.0	2.5	42	7.5	79.6	11.5	7.0	8.1	8.0	5.0	4.2
48	5.8	70.3	9.0	8.0	7.4	6.0	6.0	3.7	48	8.6	104.0	13.0	8.0	11.9	9.0	6.0	6.3
54	6.5	89.0	10.0	9.0	10.3	7.0	6.5	5.3	54	9.7	131.5	15.0	9.0	17.1	10.5	6.5	8.9
60	7.3	110.0	11.0	10.0	13.9	7.5	7.5	7.3	60	10.7	162.4	16.5	10.0	23.1	11.0	7.5	12.0
66	8.0	132.9	12.5	11.0	18.9	8.5	8.0	9.6	66	11.8	196.5	18.0	11.0	30.1	12.0	8.5	16.2
72	8.7	158.2	13.5	12.0	24.0	9.0	9.0	12.3	72	12.9	233.9	19.5	12.0	38.6	14.0	8.5	20.7
78	9.4	185.6	14.5	13.0	30.0	10.0	9.5	15.6	78	13.9	274.5	21.5	13.0	49.8	14.5	9.5	25.9
84	10.1	215.3	15.5	14.0	37.1	10.5	10.5	19.5	84	15.0	318.4	23.0	14.0	61.2	15.5	10.5	32.6
90	10.9	247.1	16.5	15.0	45.0	11.5	11.0	23.9	90	16.1	365.5	24.5	15.0	74.5	17.5	10.5	39.8
96	11.6	281.2	18.0	16.0	55.5	12.5	11.5	28.9	96	17.1	415.6	26.0	16.0	89.5	18.5	11.5	48.5

HORIZONTAL THRUST BLOCK
AT PIPE BEND

STANDARD SPECIFICATION REFERENCE	502.4
DATE	OCT. '04
STANDARD DRAWING NO.	4010C



HORIZONTAL THRUST BLOCK
AT TEES AND PLUGS

STANDARD SPECIFICATION REFERENCE	502.4
DATE	OCT. '04
STANDARD DRAWING NO.	4020

GENERAL NOTES FOR ALL THRUST BLOCKS:

- CONCRETE FOR BLOCKING SHALL BE CLASS "B".
- ALL CALCULATIONS ARE BASED ON INTERNAL PRESSURE OF 200 PSI FOR DUCTILE IRON, P.V.C., AND 150 PSI FOR CONCRETE PIPE.
- VOLUMES OF THRUST BLOCKS ARE NET VOLUMES OF CONCRETE TO BE FURNISHED. THE CORRESPONDING WEIGHT OF THE CONCRETE (CLASS "B") IS EQUAL TO OR GREATER THAN THE VERTICAL COMPONENT OF THE THRUST ON THE VERTICAL BEND.
- WALL THICKNESS (T) ASSUMED HERE FOR ESTIMATING PURPOSES ONLY.
- POUR CONCRETE FOR BLOCK AGAINST UNDISTURBED EARTH.
- DIMENSIONS MAY BE VARIED AS REQUIRED BY FIELD CONDITIONS WHERE AND AS DIRECTED BY THE ENGINEER. THE VOLUME OF CONCRETE BLOCKING SHALL NOT BE LESS THAN SHOWN HERE.
- THE SOIL BEARING PRESSURES ARE BASED ON 1000 LBS./S.F. IN SOIL AND 2000 LBS./S.F. IN ROCK.
- USE POLYETHYLENE WRAP OR EQUAL BETWEEN CONCRETE AND BEND, TEE, OR PLUG TO PREVENT THE CONCRETE FROM STICKING TO IT.
- CONCRETE SHALL NOT EXTEND BEYOND JOINTS.

THRUST BLOCK
GENERAL NOTES

STANDARD SPECIFICATION REFERENCE	502.4
DATE	OCT. '04
STANDARD DRAWING NO.	4040

6 Inch Water Line Loop
Welborn Lane
City of Lucas, Texas
DETAILS 2

No.	Date	Revision

Scale:
File Name: Details 2
Date: March 22, 2018
Project No.: 18002