Park Water Company
2409 S County Road 1110
Midland, TX 79706

January 19, 2023

Plan and Technical Review Section
Water Supply Division MC-159
TCEQ
P.O Box 13087
Austin, Texas 78711-3087

RE: Public Water System Plans for Renewal – Submittal Package Phase 5A West (E. CO. RD. 103 – S. CO. RD. 1129)

To whom it may concern:

Please find enclosed the submittal form with sealed engineering plans and specifications for a Distributing system modification to existing facilities.

Should you have any questions or require additional information, please do not hesitate to contact me at 432-664-2376 or [redacted]

Sincerely,
Park Water Company,

Jason Bethke,
CEO

TCEQ Public water system plan review submittal form
(Complete, Seal and Attach to Submittal Package)

WATER SYSTEM INFORMATION

Date:	01.19.2023				
TCEQ PWS Identification No.: (Facilities will be assigned this PWS No.)	1650167				
Water System Name:	Park Water Company				
Owner Information:					
Water System Owner:	Park Water Company				
Address:	2409 S County Road 1110, Midland, TX 79706			(AC) Phone:	(432) 664-2376
Responsible Official:	Jason Bethke			Title:	CEO
County (System Location):	Midland	Mechanism & Source of Financing: (i.e. loans, rates, self-financed, etc.)	Water and Wastewater Rates		
Subdivision Sec., Phase, Unit, Etc.					

ENGINEER INFORMATION

Engineer Name:	Christopher F. Lenz	Registration No.:	97947
Firm Name:	United Engineering Group	Firm No.:	F-10279
(AC) Phone:	480-705-5372	(AC) Fax:	N/A
Firm Address:	3205 W Ray Rd, Ste 1, Chandler, AZ 85226		

SUBMITTAL INFORMATION

Is this submittal for a new public water system?	Yes: ☐ No: ☒

If no, proceed to the Project Information section on Page 2. If no PWS number exists, the owner must submit a core data form and business plan, if required, in accordance with §290.39(f) and (g).

NEW (PROPOSED) WATER SYSTEMS

(Only complete this section if this submittal is for a NEW water system)

For new (proposed) system submittals, please provide 2 copies of the submittal and attach the following:

☐		A list of all water utilities within ½ mile of the proposed service area boundaries (reference 30 TAC 290.39(c)(1)).	
☐		Copies of written responses from each of the entities listed above (reference 30 TAC 290.39(c)(1)).	
☐		Copies of formal applications for service from each of the following (reference 30 TAC 290.39(c)(1)):	
	☐	Any municipality if the system is within its ETJ.	
	☐	Any district or other political subdivision whose corporate boundaries are within ½ mile of the proposed service area boundaries.	
	☐	Any other water service provider whose certificated service area boundary is within ½ mile of the proposed service area boundaries.	

TCEQ Public water system plan review submittal form
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☐	Documentation that all application requirements, including fee payments, are current.	
☐	Business plan: Please complete the financial ability form, provide a cost summary for the proposed project, and submit a business plan (reference 30 TAC 290.39 (f)). The business plan must confirm capital available to construct the system according to TCEQ requirements. Acceptable financial information can include some of the following: Financial statements (preferably audited), CPA compilation report, tax returns, statements of net worth, bank statements. If the project is being funded with loan proceeds, provide a loan commitment letter from the lender specific to this project. If the plan submittal is for a community system, also provide a copy of the Certificate of Convenience and Necessity (CCN) application submitted to the Public Utility Commission of Texas (PUC), and complete items referenced in 30 TAC 290.39 (f) (1 - 13).	
☐	Justification for constructing a separate system (if one of the entities listed above is willing to provide service).	
☐	TCEQ Core Data Form (No. 10400).	
☐	Emergency Preparedness Plan (No. 20536) if serving water in Harris or Fort Bend Counties and have overnight accommodations.	

Certificate of Convenience and necessity (CCN)

Certificates of Convenience and Necessity (CCN) applications are processed by the Public Utility Commission of Texas (PUC) and are required for privately owned systems and water supply corporations. If a CCN is required and a CCN does not exist, the applicant must obtain a CCN number or have the application accepted for filing at the PUC before a PWS project submittal can be technically reviewed. In addition, if a submittal is for a project located outside the CCN area, a CCN amendment application must be submitted before a project may be reviewed for construction approval. Please refer to PUC for additional information at: http://www.puc.texas.gov/industry/water/guidance/UtilRulesGuidance.aspx (Rules and Guidance for Water and Sewer Utilities).

Will the proposed PWS be owned by either an investor owned utility (IOU) or water supply corporation (WSC)? If yes, please indicate which type of entity _____.	YES: ☐ NO: ☐
Has a CCN application been submitted to the PUC? If yes, please provide the date of acceptance _____.	YES: ☐ NO: ☐
List the name, license number and class of the operator for the proposed system:	

Project Information

If a system does NOT have a PWS number, the sections above must be filled out

All engineering documents must be sealed, signed, and dated by a Texas registered professional engineer. An engineering report that includes the number of connections to be served must accompany each project. Please check each box that is applicable.

If this submittal is a revision of previously submitted plans, please provide the assigned TCEQ log number:	

	New Projects/Facilities		Modifications to Existing Facilities
☐	Water well construction – Proposed	☐	Surface water treatment plant modifications
☐	Well completion data for approved well	☐	Storage capacity modifications
☐	Ground water treatment plant – New	☒	Distribution system modifications
☐	Surface water treatment plant – New	☐	Pressure maintenance facilities modifications
☐	Proposed Innovative/Alternative Treatment	☐	Disinfection facilities or other modifications
☐	Request for rule exception		
☐	Preliminary engineering report without plans		

TCEQ Public water system plan review submittal form
(Complete, Seal and Attach to Submittal Package)

	☐	Texas Water Development Board Project No.:		
	☐	As-Built Plans & Engineering Report		
☐	Other (please describe):			

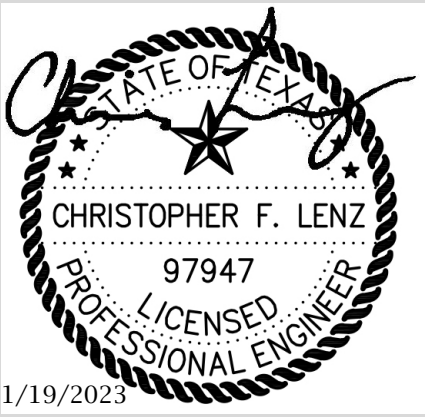
Signature and certification

The following certification indicates I have the authority to make submittals on behalf of the PWS referenced on Page 1. I hereby certify that the above information is, to the best of my knowledge, true and correct:

Engineer's Signature:		
Engineer's Printed Name:	Christopher F. Lenz	
Date:	1/19/2023	

Please call (512) 239-4691 if you have questions regarding this form. Your cooperation will help us provide better service. Additional helpful information and rules are available at the Public Water System Plan Review website.

Signature/P.E. Seal Required below:



1/19/2023

Project Indentification Form

Date	February 22, 2021
Project Name:	Potable Water E. Co. Rd. 103 – Phase 5A West
Project Description:	Seven hundred two (702) linear feet of three (3) inch potable water line from S. Co. Rd. 1130 traversing easterly along E. Co. Rd. 103 and northerly along S. Co. Rd. 1129.
Project Location:	Greenwood area east of Midland, TX
Timing:	Immediate and continuous; weather permitting
Owner's Representatives:	Trevor Hill Permian Basin Water Resources, LLC 2409 S County Road 1110 Midland, TX 79706
Contractor's Representative:	Jude DuBose IDIM Construction, LLC P.O. Box 909 Carencro, LA 70520

PERMIAN BASIN WATER RESOURCES, LLC
WATER SYSTEM IMPROVEMENTS

POTABLE WATER - PHASE 5A WEST
E. CO. RD. 103 - S. CO. RD. 1129
FEBRUARY 2021

ENGINEER:

UNITED ENGINEERING GROUP, LLC
3205 WEST RAY ROAD
SUITE 1
CHANDLER, AZ 85226
PHONE: (480) 705-5372

OWNER'S REPRESENTATIVE

TREVOR HILL
PERMIAN BASIN WATER RESOURCES, LLC
2409 S. COUNTY ROAD 1110
MIDLAND, TX 79706

CONTRACTOR'S REPRESENTATIVE

JUDE DUBOSE
IDIM CONTSTRUCTION, LLC
P.O. BOX 909
CARENCO, LA 70520

PROJECT DESCRIPTION:

INSTALL APPROXIMATELY SEVEN HUNDRED AND TWO FEET OF 3 INCH POTABLE WATER LINE. CONNECTING TO AN EXISTING 3" WATER LINE AT THE EAST SIDE OF SCR 1130 AND NORTH SIDE OF ECR 103, TRAVERSING EASTERLY WITHIN APPARENT MIDLAND COUNTY RIGHTS-OF-WAY AND/OR MIDLAND COUNTY ROADWAY & UTILITY EASEMENTS TO SCR 1129 AND TRAVERSING NORTH TO TERMINATING APPROXIMATELY 25 FEET PAST THE CUL-DE-SAC.

SHEET INDEX:

SHEET W01.....COVER SHEET & GENERAL NOTES
SHEET W02.....KEY MAP
SHEET W03.....WATER PLAN
SHEET W04.....DETAILS

QUANTITIES:

ITEM:	QUANTITY:
3" PVC WATERLINE	702 LF
3" 45° BEND	2 EA
2" CORP STOP	1 EA

ENGINEER'S GENERAL NOTES:

1. ALL WORK REQUIRED TO COMPLETE THE CONSTRUCTION COVERED BY THESE PLANS SHALL BE IN ACCORDANCE WITH APPLICATORY COUNTY STANDARDS UNLESS SPECIFIED OTHERWISE ON THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS. CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH ALL REQUIRED STANDARD SPECIFICATIONS AND DETAILS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THESE PLANS.

2. THE CONTRACTOR IS RESPONSIBLE FOR ALL METHODS, SEQUENCING, AND SAFETY USED DURING CONSTRUCTION UNLESS SPECIFICALLY ADDRESSED OTHERWISE ON THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS.

3. THE CONTRACTOR IS TO COMPLY WITH ALL LOCAL, STATE, AND FEDERAL LAWS AND REGULATIONS APPLICABLE TO THE CONSTRUCTION COVERED BY THESE PLANS, INCLUDING BUT NOT LIMITED TO THE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS.

4. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING (AT THE CONTRACTOR'S SOLE EXPENSE) AND COMPLYING WITH ALL PERMITS AND LICENSES REQUIRED TO COMPLETE ALL WORK COVERED BY THESE PLANS. EACH BIDDING CONTRACTOR CERTIFIES, BY SUBMITTING A BID PROPOSAL FOR THE WORK COVERED BY THESE PLANS, THAT HE/SHE AND HIS/HER SUBCONTRACTORS HOLDS A CURRENT LICENSE(S) ISSUED BY THE STATE OF TEXAS REGISTRAR OF CONTRACTORS FOR THE WORK TO BE PERFORMED.

5. THE QUANTITIES AND SITE CONDITIONS DEPICTED ON THESE PLANS ARE FOR INFORMATIONAL PURPOSES ONLY AND ARE SUBJECT TO ERROR AND OMISSIONS. CONTRACTORS SHALL SATISFY THEMSELVES AS TO ACTUAL QUANTITIES AND SITE CONDITIONS PRIOR TO BIDDING THE WORK FOR THE CONSTRUCTION COVERED BY THESE PLANS. EACH BIDDING CONTRACTOR CERTIFIES, BY SUBMITTING A BID PROPOSAL FOR THE WORK COVERED BY THESE PLANS, THAT HE/SHE HAS THOROUGHLY EXAMINED THESE PLANS AND THE LOCATION WHERE THE WORK IS TO BE PERFORMED, IS FAMILIAR WITH LOCAL CODES, AND HAS READ AND THOROUGHLY UNDERSTOOD THE CONTRACT DOCUMENTS AS THEY RELATE TO THE WORK INVOLVED, TO THE MEASUREMENT AND PAYMENT FOR WORK, AND TO THE PHYSICAL CONDITIONS PREVALENT OR LIKELY TO BE ENCOUNTERED IN THE PERFORMANCE OF THE WORK AT SUCH LOCATION.

6. A REASONABLE EFFORT HAS BEEN MADE TO SHOW THE LOCATIONS OF EXISTING UNDERGROUND FACILITIES AND UTILITIES IN THE CONSTRUCTION AREA. CONTRACTORS ARE RESPONSIBLE FOR ANY DAMAGE TO UTILITIES AND/OR FACILITIES CAUSED DURING THEIR CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY DAMAGED UTILITY AND/OR FACILITY (AT THE CONTRACTOR'S SOLE EXPENSE) TO THE SATISFACTION OF THE OWNER OF THE UTILITY AND/OR FACILITY. THE CONTRACTOR SHALL CALL FOR BLUE STAKE 1-800-782-5348 OR 811 TWO WORKING DAYS PRIOR TO ANY EXCAVATION.

7. DURING THE DEVELOPMENT OF THESE PLANS, EXISTING FACILITIES SUCH AS a)BURIED FACILITIES, b) STRUCTURALLY UNSOUND FACILITIES, c) LOW HANGING OVERHEAD UTILITY LINES AND d) UNLOCATED FACILITIES WERE NOT INVESTIGATED TO ANY DEGREE OF CERTAINTY SUCH THAT THESE PLANS REPRESENT THE TOTAL IMPACT OF THE PROPOSED WORK ON ALL EXISTING FACILITIES. THEREFORE, UNIDENTIFIED ADDITIONAL WORK AND/OR UTILITY RELOCATION MIGHT BE REQUIRED IN ORDER TO COMPLETE THE WORK COVERED BY THESE PLANS. THE CONTRACTOR SHALL NOTIFY THE CONTRACTING PARTY IMMEDIATELY UPON DISCOVERY OF ANY CONFLICT NOT IDENTIFIED IN THESE PLANS, AND THEN AWAIT DIRECTION FROM THE CONTRACTING PARTY PRIOR TO PROCEEDING WITH ANY RESOLUTION OF THE CONFLICT. THE CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION OF CONSTRUCTION AFFECTING UTILITIES AND THE COORDINATION OF ANY NECESSARY UTILITY RELOCATION WORK.

8. THE CONTRACTING PARTY AND/OR THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING, FROM AFFECTED LAND OWNERS, ALL EASEMENTS, PERMITS, RIGHTS, PERMISSIONS AND LICENSES NECESSARY TO PERFORM THE WORK SHOWN ON THESE PLANS.

9. CONTRACTOR TO USE ONLY APPROVED SET OF PLANS FOR CONSTRUCTION. ANY FAULTY CONSTRUCTION DUE TO THE USE OF NON-APPROVED PLANS SHALL BE RE-CONSTRUCTED AT CONTRACTOR'S EXPENSE. THESE PLANS ARE SUBJECT TO THE INTERPRETATION OF INTENT. THESE PLANS ARE SUBJECT TO THE INTERPRETATION OF INTENT BY THE ENGINEER. ALL QUESTIONS REGARDING THESE PLANS SHALL BE PRESENTED TO THE ENGINEER. ANYONE WHO TAKES UPON THEMSELVES THE INTERPRETATION OF THE DRAWINGS OR MAKES REVISIONS TO THE SAME WITHOUT CONFERRING WITH THE DESIGN ENGINEER SHALL BE RESPONSIBLE FOR THE CONSEQUENCES THEREOF.

10. THIS PROJECT MIGHT BE SUBJECT TO THE NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) REQUIREMENTS FOR CONSTRUCTION SITES UNDER THE ENVIRONMENTAL PROTECTION AGENCY (EPA) GENERAL PERMIT FOR TEXAS. THE ENGINEER SHALL BE RESPONSIBLE FOR PREPARING AND SUBMITTING ALL DOCUMENTS REQUIRED BY THE REGULATION, INCLUDING BUT NOT LIMITED TO SWPPP/SWMP, NOI AND NOT; UNLESS PROVIDED FOR ELSEWHERE BY THE CONTRACTING PARTY.

11. THE CONTRACTOR SHALL PROVIDE FOR TRAFFIC CONTROL IN CONFORMANCE WITH THE FEDERAL HIGHWAY ADMINISTRATION "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS". THERE WILL NOT BE A SEPARATE MEASUREMENT NOR PAYMENT FOR TRAFFIC CONTROL. TRAFFIC CONTROL IS INCIDENTAL TO THE WORK COVERED BY THESE PLANS.

12. THE CONTRACTOR SHALL PERFORM SITE CLEANUP AND DISPOSAL IN A LEGAL MANNER ON A DAILY BASIS OR AS DIRECTED BY THE CONTRACTING PARTY, ITS REPRESENTATIVE OR ANY GOVERNMENT AGENCY HAVING JURISDICTION. THERE WILL NOT BE A SEPARATE MEASUREMENT NOR PAYMENT FOR THIS WORK.

13. THE CONTRACTOR SHALL GIVE SEVENTY-TWO (72) HOURS NOTICE TO THE CONTRACTING PARTY WHEN HE/SHE REQUIRES THE SERVICES OF THE ENGINEER/SURVEYOR OR ANY OTHER PARTY PROPERLY AUTHORIZED FOR THE PURPOSE OF LAYING OUT ANY PORTION OF THE WORK.

14. THE CONTRACTOR SHALL PRESERVE ALL SURVEY CONSTRUCTION STAKES (SET FOR THE PURPOSE OF CONTROL LINES, LEVELS/GRADES, OR MEASUREMENT OF THE WORK) IN THEIR PROPER PLACES, UNTIL AUTHORIZED TO REMOVE THEM BY THE CONTRACTING PARTY. ANY EXPENSE INCURRED IN REPLACING ANY STAKES THAT THE CONTRACTOR OR HIS/HER SUBCONTRACTORS MAY HAVE FAILED TO PRESERVE WILL BE CHARGED TO THE CONTRACTOR.

15. IN ADDITION TO UTILITIES, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CARE AND PROTECTION OF ALL EXISTING PUBLIC AND PRIVATE IMPROVEMENTS IN THE WORK AREA. IMPROVEMENTS THAT HAVE BEEN REMOVED OR DAMAGED DURING THE COURSE OF CONSTRUCTION SHALL BE REPAIRED OR REPLACED, INCLUDING CLEANUP, TO THE SATISFACTION OF THE CONTRACTING PARTY, AT THE CONTRACTOR'S SOLE EXPENSE.

16. INCIDENTAL WORK MIGHT NOT BE SPECIFICALLY INDICATED ON THESE PLANS. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL SUPPLEMENTARY OR MISCELLANEOUS ITEMS, APPURTENANCES AND DEVICES INCIDENTAL TO, OR NECESSARY FOR, A SOUND, SECURE, COMPLETE, FUNCTIONAL AND ACCEPTABLE INSTALLATION, AT NO ADDITIONAL COST TO THE CONTRACTING PARTY.

17. ALL CONCRETE SHALL BE CLASS "A" AND REINFORCING STEEL SHALL BE GRADE 60 UNLESS NOTED OTHERWISE IN THESE PLANS OR ELSEWHERE IN THE CONTRACT DOCUMENTS.

18. ALL PRIMARY PARTIES HAVING INTEREST IN THE WORK COVERED BY THESE PLANS SHALL EXECUTE ALL CONTRACTS AND AGREEMENTS BETWEEN THE PARTIES PRIOR TO COMMENCING CONSTRUCTION. PRIMARY PARTIES INCLUDE, BUT ARE NOT LIMITED TO, THE CONTRACTING PARTY, THE CONTRACTOR, THE ULTIMATE OWNER OF THE ACCEPTED IMPROVEMENTS, THE INSPECTING ENGINEER AND THE TESTING LABORATORY.

19. THE CONTRACTING PARTY OR THE CONTRACTOR SHALL PAY FOR ALL INSPECTIONS FEES AND TESTING FEES. ALL FEES ARE TO BE PAID IN FULL, AS EVIDENCED BY SIGNED RELEASES, PRIOR TO THE ULTIMATE OWNER'S PARTIAL OR FINAL ACCEPTANCE OF ANY IMPROVEMENTS COVERED BY THESE PLANS.

20. WORK COVERED BY THESE PLANS SHALL BE INSPECTED BY AN TEXAS REGISTERED PROFESSIONAL ENGINEER. WORK SHALL ALSO BE TESTED BY A CERTIFIED TESTING LABORATORY. PRIOR TO PARTIAL OR FINAL ACCEPTANCE OF THE IMPROVEMENTS BY THE ULTIMATE OWNER AND/OR THE CONTRACTING PARTY, THE ENGINEER AND TESTING LABORATORY SHALL CERTIFY THAT THE WORK WAS SATISFACTORILY INSPECTED AND TESTED; AND, THAT THE WORK PERFORMED IS ACCEPTABLE.

21. IF THE CONTRACTOR ENCOUNTERS UNANTICIPATED CONDITIONS DURING CONSTRUCTION WHICH WERE BEYOND THE SCOPE OF THE ENGINEERS ORIGINAL DESIGN FOR THESE PLANS, THE CONTRACTING PARTY WILL SEE THAT REVISED AND OR SUPPLEMENTAL IMPROVEMENT PLANS ARE PREPARED AND SUBMITTED TO THE ULTIMATE OWNER FOR REVIEW AND APPROVAL.

22. THE CONTRACTOR SHALL COORDINATE HIS/HER WORK WITH ALL OTHER CONTRACTORS AND UTILITY COMPANIES INVOLVED IN THE ONGOING CONSTRUCTION AT THE SITE.

23. THE CONTRACTOR SHALL FURNISH, HAUL AND APPLY ALL WATER NECESSARY TO COMPLETE THE WORK COVERED BY THESE PLANS, INCLUDING THE CONTROL OF DUST FROM CONSTRUCTION ACTIVITIES IN ORDER TO MEET COUNTY AIR POLLUTION REGULATIONS. CONSTRUCTION WATER IS INCIDENTAL TO THE WORK BEING PERFORMED. THERE WILL NOT BE A SEPARATE MEASUREMENT NOR PAYMENT FOR WATER.

24. THE CONTRACTOR SHALL MAINTAIN THE CONSTRUCTION SITE AND ALL CONSTRUCTION ACTIVITIES COVERED UNDER THESE PLANS SO AS TO PREVENT DISPERSAL OF CONSTRUCTION MATERIALS, EQUIPMENT FLUIDS OR CONTAMINATES. FURTHERMORE, THE CONTRACTOR SHALL CONDUCT HIS/HER OPERATIONS OF EQUIPMENT MAINTENANCE ACTIVITIES SUCH THAT THEY WILL NOT RESULT IN THE SPILL OF OILY OR GREASY SUBSTANCES ON THE SITE OR INTO DRAINAGE DITCHES, SEWERS OR STORM DRAINS.

25. THE CONTRACTING PARTY IS NOT LIABLE FOR ANY DELAYS DUE TO DAMAGE TO UTILITIES CAUSED BY CONTRACTOR'S CONSTRUCTION ACTIVITIES.

26. PRIOR TO BIDDING THE WORK, THE CONTRACTOR SHALL THOROUGHLY SATISFY HIMSELF AS TO THE ACTUAL CONDITIONS, REQUIREMENTS OF THE WORK AND EXCESS OR DEFICIENCY IN QUANTITIES. NO CLAIMS SHALL BE MADE AGAINST THE OWNER/DEVELOPER OR ENGINEER FOR ANY EXCESS OR DEFICIENCY THEREIN, ACTUAL OR RELATIVE.

NO.	DESCRIPTION	DATE

3205 W. Ray Road
Chandler, AZ 85226
Phone: 480.705.5372
Fax: 480.705.5376
www.unitedeng.com

POTABLE WATER
PHASE 5A WEST
MIDLAND COUNTY, TEXAS

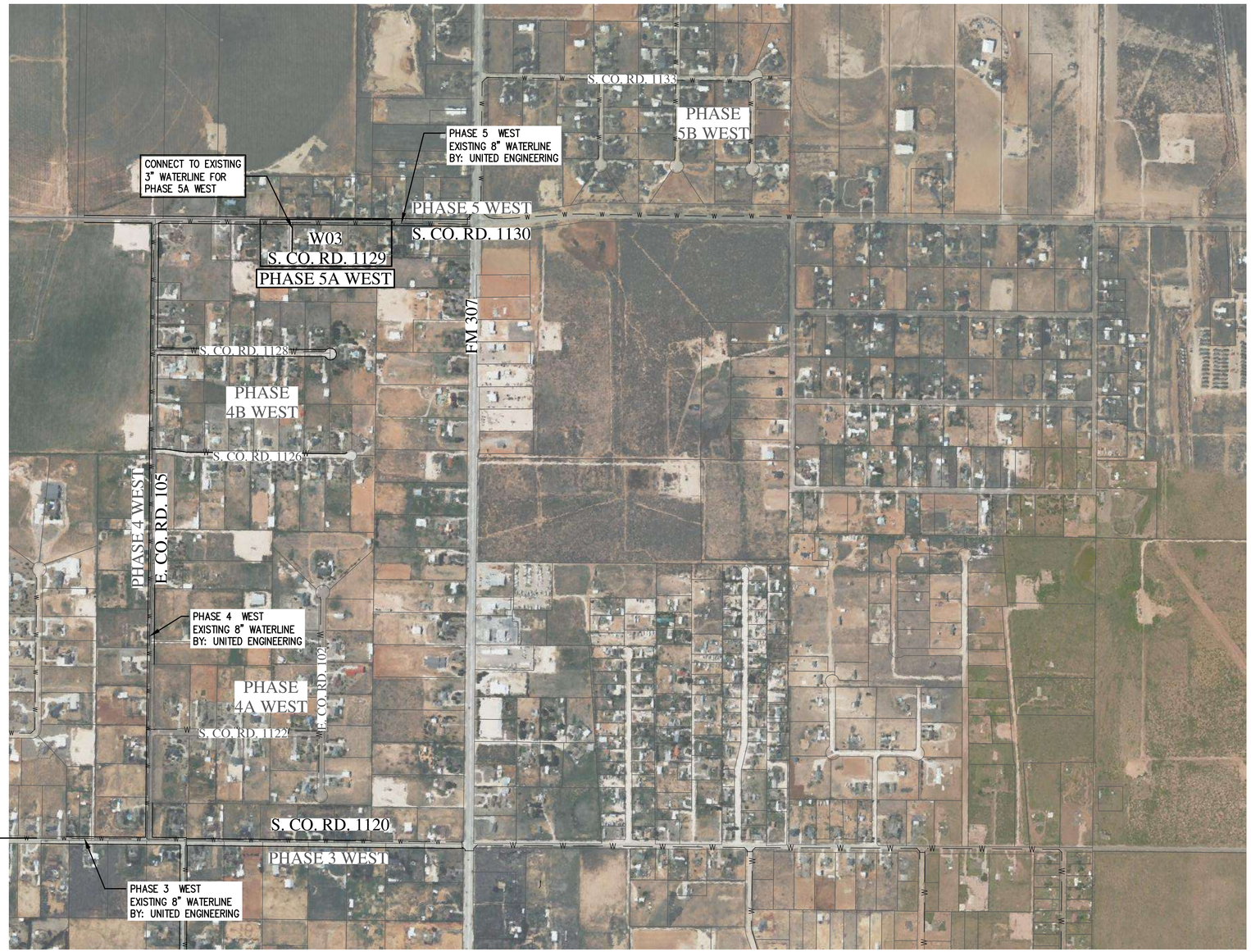
STATE OF TEXAS
CHRISTOPHER F. LENZ
97947
LICENSED
PROFESSIONAL ENGINEER
02/18/21

DESIGNED BY:	JBR
DRAWN BY:	JBR
CHECKED BY:	CFL

W01

SHEET 1 OF 4

PROJECT NUMBER
20425 - 1



TO
PARK WATER
COMPANY CAMPUS
@
E. CO. RD. 120

KEY MAP
1"=500'

Texas 811

NO.	DESCRIPTION	DATE

ueg
united engineering group
3205 W. Ray Road
Chandler, AZ 85226
Phone: 480.705.5372
Fax: 480.705.5376
www.unitedeng.com

POTABLE WATER

PHASE 5A WEST
MIDLAND COUNTY, TEXAS

CHRISTOPHER F. LENZ
97947
LICENSED
PROFESSIONAL ENGINEER
02/18/21

DESIGNED BY:	JBR
DRAWN BY:	JBR
CHECKED BY:	CFL

W02

SHEET 2 OF 4

PROJECT NUMBER
20425 - 1

CONSTRUCTION NOTES:

6 REMOVE EXISTING 2" TAPPED CAP WITH 2" CORP STOP & CONNECT TO EXISTING 3" WATER

8 METHOD OF WATERLINE INSTALLATION ACROSS EXISTING PAVEMENT/DRIVEWAYS WILL BE DETERMINED BY CONTRACTOR AT THE TIME OF CONSTRUCTION. IF DIRECTIONAL BORING IS USED CONTRACTOR TO PROTECT EXISTING PAVEMENT & IF OPEN TRENCHING IS USED CONTRACTOR TO REPLACE EXISTING PAVEMENT IN KIND.

12 INSTALL 3" WATERLINE. MINIMUM 4' OF COVER. TRENCH & BACKFILL PER MIDLAND STD DTLS 310(A) & 310(B).

14 INSTALL 2" TAPPED CAP WITH 2" CORP STOP OR APPROVED EQUAL. SEE DETAIL ON SHEET W06

15 INSTALL 45° BEND PER PLAN WITH BLOCKING PER MIDLAND STD DTL 616. SEE DETAIL SHEET W06

NOTE:
THE DETAILS SPECIFIED ON THESE PLANS CAN BE SUBSTITUTED WITH AN APPROVED EQUAL AND IS AT THE DISCRETION OF THE CONTRACTOR. ALL MATERIALS SUBSTITUTED SHALL MEET THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE APPROPRIATE LOCAL, STATE AND FEDERAL AGENCIES.

Texas 811

NO.	DESCRIPTION	DATE

united engineering group
3205 W. Ray Road
Chandler, AZ 85226
Phone: 480.705.5372
Fax: 480.705.5376
www.unitedeng.com

POTABLE WATER

PHASE 5A WEST
MIDLAND COUNTY, TEXAS

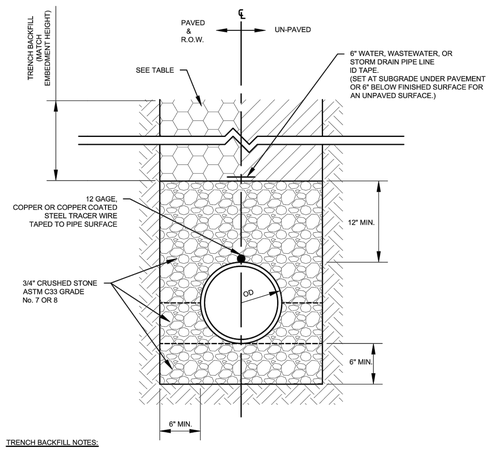
STATE OF TEXAS
CHRISTOPHER F. LENZ
97947
LICENSED PROFESSIONAL ENGINEER
02/18/21

DESIGNED BY:	JBR
DRAWN BY:	JBR
CHECKED BY:	CFL

W03

SHEET 3 OF 4

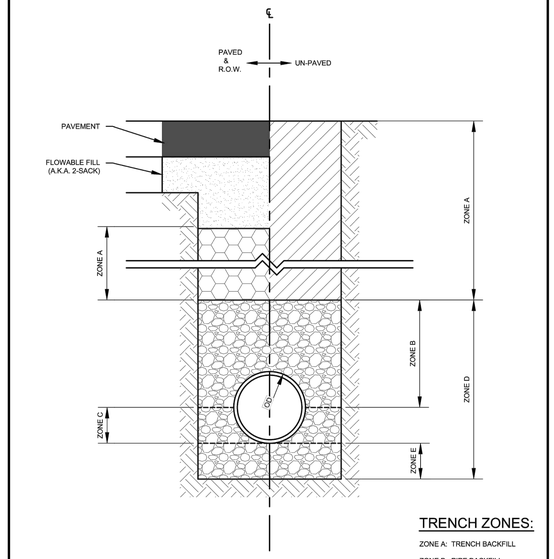
PROJECT NUMBER
20425 - 1



TRENCH BACKFILL NOTES:

1. APPLIES TO ALL PIPE TYPES. (DUCTILE IRON, PVC, ETC.)
2. UTILIZE SELECT FILL BACKFILL BENEATH ALL PAVED SURFACES. NATIVE MATERIAL BACKFILL CAN ONLY BE USER FOR UNPAVED TRENCH CONDITIONS IF BACKFILL MATERIAL IS ≤ 30LL AND ≤ 15 PI.
3. NATIVE MATERIAL TO BE EXISTING EXCAVATED SOIL FROM TRENCH WITH ALL MATERIAL BROKEN DOWN ≤ 2".
4. MOISTURE CONDITION ALL BACKFILL MATERIAL PRIOR TO PLACING IN TRENCH.
5. PLACE TRENCH BACKFILL MATERIAL IN MAXIMUM 12" LOOSE LIFTS AND COMPACT TO MAXIMUM 8" COMPACTED LIFTS.
6. REFER TO CITY DETAILS 311 AND 312 FOR TRENCH PAVEMENT REPLACEMENT REQUIREMENTS.
7. PLACE LAYERS B, C, AND E FOUND ON CITY DETAIL 310(B) AS SEPARATE LAYERS.
8. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
9. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

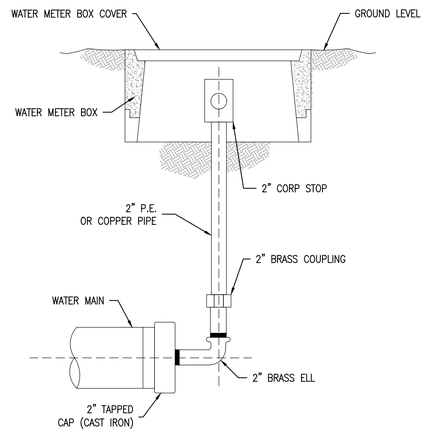
DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services	TRENCHING AND BEDDING		310(A)



TRENCH ZONES:

ZONE A: TRENCH BACKFILL
ZONE B: PIPE BACKFILL
ZONE C: HAUNCHING
ZONE D: PIPE EMBEDMENT
ZONE E: BEDDING

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
MIDLAND Engineering Services	TRENCHING AND BEDDING		310(B)



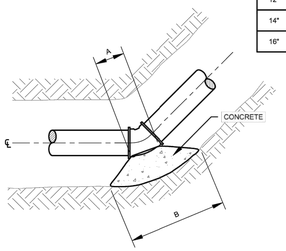
2" TAPPED CAP WITH 2" CORP STOP

(OR APPROVED EQUAL)
N.T.S.

BLOCKING FOR HORIZONTAL BENDS
DESIGN 180 PSI LINE PRESSURE
SOIL BEARING CAP 2KSF

DIA. OF PIPE	DEGREE OF BEND											
	11 1/4°			22 1/2°			45°			90°		
	A	B	*C	A	B	*C	A	B	*C	A	B	*C
4"	0'-4"	1'-0"	1'-0"	0'-5"	1'-0"	1'-0"	0'-6"	1'-0"	1'-0"	0'-11"	1'-3"	1'-3"
6"	0'-7"	1'-0"	1'-0"	0'-7"	1'-0"	1'-0"	0'-8"	1'-5"	1'-5"	1'-3"	1'-11"	1'-11"
8"	0'-8"	0'-10"	1'-2"	0'-9"	1'-4"	1'-4"	0'-10"	1'-10"	1'-10"	1'-6"	2'-6"	2'-6"
10"	0'-10"	1'-0"	1'-5"	0'-11"	1'-8"	1'-8"	1'-1"	2'-4"	2'-4"	1'-11"	3'-2"	3'-2"
12"	1'-0"	1'-3"	1'-8"	1'-1"	2'-0"	2'-0"	1'-3"	2'-10"	2'-10"	2'-2"	3'-10"	3'-10"
14"	0'-11"	1'-5"	1'-11"	1'-1"	2'-4"	2'-4"	1'-3"	3'-3"	3'-3"			
16"	1'-1"	1'-8"	2'-2"	1'-2"	2'-8"	2'-8"	1'-5"	3'-9"	3'-9"			

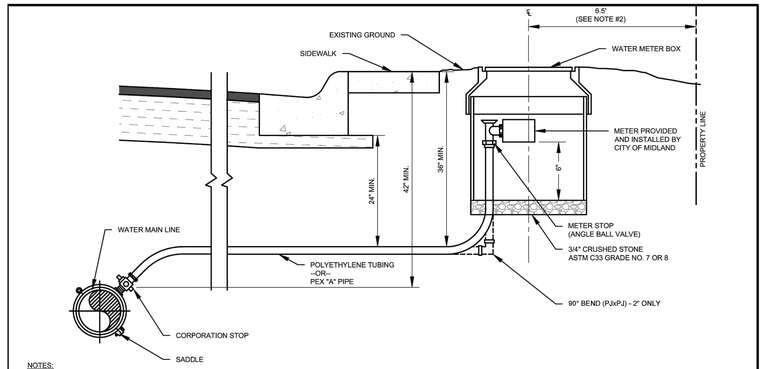
*C - VERTICAL DEPTH OF CONCRETE BEARING ON UNDISTURBED EARTH



NOTES:

1. FORM ALL CONCRETE THRUST BLOCKING. DO NOT PLACE UN-FORMED THRUST BLOCKING.
2. ALL THRUST BLOCKING TO BE CLASS "A" CONCRETE, 3000 PSI, AND TO BE PLACED AGAINST UNDISTURBED EARTH. USE FIBER REINFORCEMENT THROUGHOUT.
3. FITTING TO BE POLY WRAPPED BEFORE BLOCKING IS PLACED.
4. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
5. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	BLOCKING FOR HORIZONTAL BENDS		616
APPROVED: MCC			



NOTES:

1. ALL WATER SERVICES TO BE 1" OR 2" DIAMETER.
2. THE DISTANCE FROM PROPERTY LINE SHOWN IS FOR 5' SIDEWALK AT THE PROPERTY LINE. WHEN 5' SIDEWALK IS PLACED AT THE BACK OF CURB, PLACE METER BOXES A MINIMUM OF 6.5' FROM THE BACK OF CURB.
3. TWO ADJACENT SERVICE LATERALS MAY BE PLACED IN THE SAME TRENCH. EACH TAP MUST BE SEPARATE AND HAVE BOTH A CORPORATION STOP AND A METER STOP. ("BULLHEAD TAPS ARE NOT PERMITTED".)
4. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
5. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	1" AND 2" WATER METER AND SERVICE CONNECTION		604(A)
APPROVED: MCC			

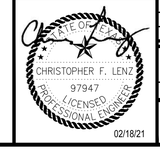
Texas 811

NO.	DESCRIPTION	DATE

ueg
united engineering group
3205 W. Ray Road
Chandler, AZ 85226
Phone: 480.705.5372
Fax: 480.705.5376
www.unitedeng.com

POTABLE WATER

PHASE 5A WEST
MIDLAND COUNTY, TEXAS



02/18/21

DESIGNED BY:	JBR
DRAWN BY:	JBR
CHECKED BY:	CFL

W04

SHEET 4 OF 4

PROJECT NUMBER
20425 - 1

Water Distribution Construction Checklist

Texas Commission on Environmental Quality Public Water System I.D. No. PWS 1650167
Water Supply Division TCEQ Log No. P-_____
Plan Review Team MC-159
P.O. Box 13 087, Austin, Texas 78711-3087

The following list is a brief outline of the "Rules for Public Water Systems", 30 TAC Chapter 290 regarding proposed water distribution system improvements. Sealed plans and specifications meeting, but not limited to, the minimum requirements cited here shall be prepared under the supervision of a Texas licensed professional engineer and submitted to TCEQ for approval. This list is not a substitute for the rules and this checklist cannot be accepted in lieu of the required engineering submittals. Failure to submit the following items may delay project approval. Copies of the rules may be obtained from **Texas Register, 1019 Brazos St, Austin, TX, 78701-2413, Phone: (512) 463-5561** or downloaded from the website:
http://www.tceq.texas.gov/rules/indxpdf.html

Please address the following in your submittal:

1. ☐ Conforms to American Water Works Association (AWWA) standards. In the absence of AWWA standards, the standards for the American Society for Testing and Materials (ASTM), commercial, and other recognized standards; [§290.44(a)]
Yes, the waterline distribution conforms with the American Water Works Association (AWWA) standards.

2. ☐ Conforms to ANSI/NSF Standard 61 and is certified; [§290.44(a)(1)]
Yes, the waterline distribution conforms with ANSI/NSF Standard 61 and is certified.

3. ☐ Plastic pipe bears NSF-pw seal; ASTM class 150 psi minimum or SDR-26 or less; [§290.44(a)(2)]
Yes, plastic pipe bears NSF-pw seal; ASTM class 150 psi minimum or SDR-26 or less will be used.

4. Not previously used for any purpose other than drinking water; [§290.44(a)(3)]
The water distribution line is new and not used for any purpose other than drinking water.

5. Installed by manufacturer's instructions; [§290.44(a)(4)]
Yes, the water distribution line will be installed by manufacturer's instructions.

6. Depth of cover is at least 24 inches; [§290.44(a)(4)]
Yes, the depth of cover is at least 24 inches

7. Hydrostatic leakage testing conforms to AWWA method and leakage rate conforms to AWWA formulas; [§290.44(a)(5)]
Yes, the Hydrostatic leakage testing will conform to AWWA method and leakage rate conforms to AWWA formulas

8. Pipes and fittings contain no more than 0.25% lead; [§290.44(b)(1)]
Yes, Pipes and fittings will not contain no more than 0.25% lead

9. Minimum water line sizes; [§290.44(c)]

CONNECTIONS	MINIMUM DIAMETER
10	2 inches
25	2.5

50	3
100	4
150	5
250	6
>250	8 and larger

The water line is the correct minimum diameter for the number of connections that are stated to be created.

10. ☐ Air release devices where air locks may occur in the lines. 16-mesh or finer screen on vent; [§290.44(d)(1)]
Yes, air release devices will be installed in areas where air locks may occur in the lines. A 16-mesh or finer screen on vent.

11. ☐ When service is to be provided to more than one pressure plane or when distribution system conditions and demands are such that low pressures develop, the method of providing increased pressure shall be by means of booster pumps taking suction from storage tanks. Otherwise, an exception is required; [§290.44(d)(2)]
Service provided to more than one pressure plane or when distribution system conditions
Booster pumps will be used to providing increased pressure for the service that is provided to more than one pressure plane or when distribution system conditions and demands are such that low pressure develop.

12. ☐ Sufficient valves so that necessary repairs can be made without undue interruption of service over any considerable area; [§290.44(d)(5)]
Yes, Sufficient valves will be installed for any necessary repairs

13. ☐ Blow-offs at all dead-end mains for flushing the system; [§290.44(d)(5)]
Yes, Blow-offs will be installed at all dead-end mains

WATER DISTRIBUTION CONSTRUCTION CHECKLIST

14. ☐ Designed to afford effective circulation of water with a minimum of dead ends; [§290.44(d)(6)]

Yes, the water distribution has been designed to afford effective circulation of water with minimum of dead ends

15. ☐ When new potable water distribution lines are constructed, they shall be installed no closer than nine feet in all directions to wastewater collection facilities. All separation distances shall be measured from the outside surface of each of the respective pieces; [§290.44(e)(1)]
Acknowledged. The water distribution lines are not constructed near a wastewater collection facility.

16. ☐ Potable water distribution lines and wastewater mains or laterals that form parallel utility lines shall be installed in separate trenches; [§290.44(e)(2)]
Yes, potable water distribution lines and wastewater mains or laterals are installed in separate trenches

17. ☐ No physical connection shall be made between a drinking water supply and a sewer line. Any appurtenance shall be designed and constructed so as to prevent any possibility of sewage entering the drinking water system; [§290.44(e)(3)]
Correct, no physical connection is made between a drinking water supply and a sewer line.

18. ☐ Where the nine-foot separation distance cannot be achieved between parallel water and wastewater lines, the following criteria shall apply: [§290.44(e)(4)(A)]
Not applicable. There is no wastewater line near the water distribution line.

    ☐ (i) Where a new potable waterline parallels an existing, non-pressure or pressure rated wastewater main or lateral and the licensed professional engineer licensed in the State of Texas is able to determine that the existing wastewater main or lateral is not leaking, the new potable waterline shall be located at least two feet above the existing wastewater main or lateral, measured vertically, and at least four feet away, measured horizontally, from the existing wastewater main or lateral. Every effort shall be exerted not to disturb the bedding and backfill of the existing wastewater main or lateral;

    ☐ (ii) Where a new potable waterline parallels an existing pressure-rated wastewater main or lateral and it cannot be determined by the licensed professional engineer if the existing line is leaking, the existing wastewater main or lateral shall be replaced with at least 150 psi pressure-rated pipe. The new potable waterline shall be located at least two feet above the new wastewater line, measured vertically, and at least four feet away, measured horizontally, from the replaced wastewater main or lateral; and

    ☐ (iii) Where a new potable waterline parallels a new wastewater main, the wastewater main or lateral shall be constructed of at least 150 psi pressure-rated pipe. The new potable waterline shall be located at least two feet above the wastewater main or lateral, measured vertically, and at least four feet away, measured horizontally, from the wastewater main or lateral.

19. ☐ Where the nine-foot separation distance cannot be achieved between crossing water and wastewater lines, make note of each crossing, and provide sufficient detail in the engineering plans and specifications. Show the crossing in the profile view of the engineering plans so the separation distance between the two lines is shown. Call out all pipe materials and pressure ratings of wastewater lines at each crossing, and make note of the minimum separation distance: [§290.44(e)(4)(B)]
Not applicable. There is no wastewater line near the water distribution line.

    ☐ (i) For a new waterline that crosses over an existing and non-pressure rated wastewater line, the minimum separation distance is 2 feet. The wastewater line must be perpendicular and constructed in compliance with §290.44(e)(4)(B)(i)(I);

    ☐ For a new waterline that crosses over an existing and pressure rated wastewater line, the minimum separation distance is 6 inches. The wastewater line must perpendicular and be constructed in compliance with §290.44(e)(4)(B)(i)(II)

WATER DISTRIBUTION CONSTRUCTION CHECKLIST

☐ For a new waterline that crosses over a new and non-pressure rated wastewater line, the minimum separation distance is 2 feet. The wastewater line must be perpendicular and constructed in compliance with §290.44(e)(4)(B)(ii);

☐ (ii) For a new waterline that crosses under a wastewater line, the minimum separation distance is 1 foot with an encasement pipe around the waterline The waterline and wastewater line must be constructed in compliance with §290.44(e)(4)(B)(iii); and

☐ (iii) For a new waterline that crosses over a new and pressure rated wastewater line, the minimum separation distance is 6 inches. The wastewater line must be perpendicular and constructed in compliance with §290.44(e)(4)(B)(iv).

20. ☐ The separation distance from a potable waterline to a wastewater main manhole or lateral manhole or cleanout shall be a minimum of nine feet. Where the nine-foot separation distance cannot be achieved, the potable waterline shall be encased in a joint of at least 150 psi pressure class pipe at least 18 feet long and two nominal sizes larger than the new conveyance. The space around the carrier pipe shall be supported at five-foot intervals with spacers or be filled to the springline with washed sand. The encasement pipe shall be centered on the crossing and both ends sealed with cement grout or manufactured sealant; [§290.44(e)(5)]
Not applicable. There are no wastewater lines near the water distribution line.

21. ☐ Fire hydrants shall not be installed within nine feet vertically or horizontally of any wastewater main, wastewater lateral, or wastewater service line regardless of construction; [§290.44(e)(6)]
Not applicable. There are no fire hydrants installed around the distribution line.

22. ☐ Suction mains to pumping equipment shall not cross wastewater mains, wastewater laterals, or wastewater service lines. Raw water supply lines shall not be installed within five feet of any tile or concrete wastewater main, wastewater lateral, or wastewater service line; [§290.44(e)(7)]
Not applicable. Please see response above.

23. ☐ Waterlines shall not be installed closer than ten feet to septic tank drainfields; [§290.44(e)(8)]
True. There are no septic tank drainfields closer than 10 feet to the distribution line.

24. ☐ Pipe shall not be laid in water or placed where it can be flooded with water or sewage during its storage or installation; [§290.44(f)(1)]
Acknowledged. Pipe will not be laid in water or placed near a flooded area during its storage or installation.

25. ☐ Special precautions must be taken when waterlines are laid under any flowing or intermittent stream or semipermanent body of water such as marsh, bay, or estuary. In these cases, the water main shall be installed in a separate watertight pipe encasement and valves must be provided on each side of the crossing with facilities to allow the underwater portion of the system to be isolated and tested to determine that there are no leaks in the underwater line. Alternately, and with the permission of the executive director, the watertight pipe encasement may be omitted; [§290.44(f)(2)]
Acknowledged. The water main will be installed in a separate watertight pipe encasement and valves were installed on each side of the crossing with the facility. No such crossing exist on this alignment.

26. ☐ Disinfected in accordance with Chapter 290 and AWWA Standard C651. Samples collected for microbiological analysis for every 1,000 feet of completed waterline; and [§290.44(f)(3)]
The Water distribution line will be disinfected in accordance with chapter 290 and AWWA standard C651 and samples were collected for microbiological analysis every 1,000 feet

27. ☐ Submit all necessary information to demonstrate the minimum capacity requirements specified in §290.46(x) and (y) have been met, if applicable [§290.45(f)(7)] such as:
Not applicable. No fire hydrants are installed near the water distribution line.

WATER DISTRIBUTION CONSTRUCTION CHECKLIST

- ☐ a. Fire hydrants placed as required by city ordinance and TCEQ rules 290.44(e)(6).
- ☐ b. GST capacity sufficient for water supply and fire flow (i.e. 250 gpm for 120 minutes or ordinance requirements, whichever greater).
- ☐ c. Service pumps sufficient for water supply and fire flow (250 gpm or ordinance whichever greater).
- ☐ d. Distribution piping sized at least 6-inches or distribution model to demonstrate sufficient capacity (250 gpm or ordinance requirement, whichever greater).

WATER DISTRIBUTION CONSTRUCTION CHECKLIST

Fire Flow Requirements Breakdown

§290.46(x) Public safety standards.

This subsection only applies to a municipality with a population of 1,000,000 or more, with a public utility within its corporate limits; a municipality with a population of more than 36,000 and less than 41,000 located in two counties, one of which is a county with a population of more than 1.8 million; a municipality, including any industrial district within the municipality or its extraterritorial jurisdiction (ETJ), with a population of more than 7,000 and less than 30,000 located in a county with a population of more than 155,000 and less than 180,000; or a municipality, including any industrial district within the municipality or its ETJ, with a population of more than 11,000 and less than 18,000 located in a county with a population of more than 125,000 and less than 230,000.

Fire Flow Requirements at a Glance as of February 2019: (subject to change with each subsequent census)

30 TAC 290.46(x) Flow requirements are applicable only to investor owned utilities within municipal jurisdiction.

Municipalities >1,000,000 population:

- City of Dallas
- City of Houston
- City of San Antonio

Municipalities >36,000 <41,000 population located in two counties. One of which is greater than a population of 1.8 million:

- City of Burleson Population: 36,690 (Counties: Johnson and Tarrant)
- City of Coppell Population: 38,659 (Counties: Dallas and Denton)

30 TAC 290.46(x) Flow requirements are applicable only to investor owned utilities within municipal jurisdiction including ETJ and Industrial district)

Municipalities >7,000 <30,000 pop., in one county >155,000 <180,000 population:

- City of Buda: Population 7,295 (County: Hays)
- City of Kyle: Population 28,016 (County: Hays)

Municipalities >11,000 <18,000 pop., in one county >125,000 <230,000 population:

- City of Crowley: Population 12,838 (County: Johnson)
- City of Glenn Heights: Population 11,278 (County: Ellis county)

§290.46(y)(2) The governing body of a municipality by ordinance may adopt standards set by the executive director requiring a utility to maintain a minimum sufficient water flow and pressure to fire hydrants in a residential area located in the municipality or the municipality's ETJ. The municipality must submit a signed copy of the ordinance to the executive director within 60 days of the adoption of an ordinance by its governing body.

The engineer shall check municipal requirements and ensure the design is adequate to meet specific municipal requirements.

TCEQ WATER DISTRIBUTION SYSTEM GENERAL CONSTRUCTION NOTES

1. This water distribution system must be constructed in accordance with the current Texas Commission on Environmental Quality (TCEQ) Rules and Regulations for Public Water Systems 30 Texas Administrative Code (TAC) Chapter 290 Subchapter D. When conflicts are noted with local standards, the more stringent requirement shall be applied. At a minimum, construction for public water systems must always meet TCEQ's "Rules and Regulations for Public Water Systems."

2. All newly installed pipes and related products must conform to American National Standards Institute (ANSI)/NSF International Standard 61 and must be certified by an organization accredited by ANSI [§290.44(a)(1)].

3. Plastic pipe for use in public water systems must bear the NSF International Seal of Approval (NSF-pw) and have an ASTM design pressure rating of at least 150 psi or a standard dimension ratio of 26 or less [§290.44(a)(2)].

4. No pipe which has been used for any purpose other than the conveyance of drinking water shall be accepted or relocated for use in any public drinking water supply [§290.44(a)(3)].

5. All water line crossings of wastewater mains shall be perpendicular [§290.44(e)(4)(B)].

6. Water transmission and distribution lines shall be installed in accordance with the manufacturer's instructions. However, the top of the water line must be located below the frost line and in no case shall the top of the water line be less than 24 inches below ground surface [§290.44(a)(4)].

7. The maximum allowable lead content of pipes, pipe fittings, plumbing fittings, and fixtures is 0.25 percent [§290.44(b)].

8. The contractor shall install appropriate air release devices with vent openings to the atmosphere covered with 16-mesh or finer, corrosion resistant screening material or an acceptable equivalent [§290.44(d)(1)].

9. The contractor shall not place the pipe in water or where it can be flooded with water or sewage during its storage or installation [§290.44(f)(1)].

10. When waterlines are laid under any flowing or intermittent stream or semi-permanent body of water the waterline shall be installed in a separate watertight pipe encasement. Valves must be provided on each side of the crossing with facilities to allow the underwater portion of the system to be isolated and tested [§290.44(f)(2)].

11. Pursuant to 30 TAC §290.44(a)(5), the hydrostatic leakage rate shall not exceed the amount allowed or recommended by the most current AWWA formulas for PVC pipe, cast iron and ductile iron pipe. Include the formulas in the notes on the plans.

- The hydrostatic leakage rate for polyvinyl chloride (PVC) pipe and appurtenances shall not exceed the amount allowed or recommended by formulas in America Water Works Association (AWWA) C-605 as required in 30 TAC §290.44(a)(5). Please ensure that the formula for this calculation is correct and most current formula is in use;

$$Q = \frac{LD\sqrt{P}}{148{,}000}$$

  Where:

  - Q = the quantity of makeup water in gallons per hour,
  - L = the length of the pipe section being tested, in feet,
  - D = the nominal diameter of the pipe in inches, and
  - P = the average test pressure during the hydrostatic test in pounds per square inch (psi).

- The hydrostatic leakage rate for ductile iron (DI) pipe and appurtenances shall not exceed the amount allowed or recommended by formulas in America Water Works Association (AWWA) C-600 as required in 30 TAC §290.44(a)(5). Please ensure that the formula for this calculation is correct and most current formula is in use;

$$L = \frac{SD\sqrt{P}}{148{,}000}$$

  Where:

  - L = the quantity of makeup water in gallons per hour,
  - S = the length of the pipe section being tested, in feet,
  - D = the nominal diameter of the pipe in inches, and
  - P = the average test pressure during the hydrostatic test in pounds per square inch (psi).

12. The contractor shall maintain a minimum separation distance in all directions of nine feet between the proposed waterline and wastewater collection facilities including manholes. If this distance cannot be maintained, the contractor must immediately notify the project engineer for further direction. Separation distances, installation methods, and materials utilized must meet §290.44(e)(1)-(4).

13. The separation distance from a potable waterline to a wastewater main or lateral manhole or cleanout shall be a minimum of nine feet. Where the nine-foot separation distance cannot be achieved, the potable waterline shall be encased in a joint of at least 150 psi pressure class pipe at least 18 feet long and two nominal sizes larger than the new conveyance. The space around the carrier pipe shall be supported at five-foot intervals with spacers or be filled to the springline with washed sand. The encasement pipe shall be centered on the crossing and both ends sealed with cement grout or manufactured sealant [§290.44(e)(5)].

14. Fire hydrants shall not be installed within nine feet vertically or horizontally of any wastewater line, wastewater lateral, or wastewater service line regardless of construction [§290.44(e)(6)].

15. Suction mains to pumping equipment shall not cross wastewater mains, wastewater laterals, or wastewater service lines. Raw water supply lines shall not be installed within five feet of any tile or concrete wastewater main, wastewater lateral, or wastewater service line [§290.44(e)(7)].

16. Waterlines shall not be installed closer than ten feet to septic tank drainfields [§290.44(e)(8)].

17. The contractor shall disinfect the new waterlines in accordance with AWWA Standard C-651-14 or most recent, then flush and sample the lines before being placed into service. Samples shall be collected for microbiological analysis to check the effectiveness of the disinfection procedure which shall be repeated if contamination persists. A minimum of one sample for each 1,000 feet of completed waterline will be required or at the next available sampling point beyond 1,000 feet as designated by the design engineer [§290.44(f)(3)].

18. Dechlorination of disinfecting water shall be in strict accordance with current AWWA Standard C655-09 or most recent.

PART 1 GENERAL

1.1 General

This section of the specifications covers all piping, valves and fittings required for the project. The term "piping" as used herein shall include all piping, valves, fittings, and accessories as shown on the plans and as specified herein.

The types of pipe approved for use in the pipelines are as follows, unless otherwise scheduled on the drawings:

Distribution Piping 6 to 12-inch Polyvinyl Chloride Pipe, Class 150, AWWA C900 with an SDR-26 or less

HDPE DR 13.5 (160 psi min.) AWWA C906 NSF Standard 61

All material shall not have been previously used for any purpose other than drinking water and shall be installed per the manufacturer's instructions.

Pipes and fittings shall contain no more than 0.25% lead

Construction of the water distribution system shall be accomplished in accordance with all TCEQ requirements.

1.2 Measurements and Payment

The unit price or lump sum price bid on each item, as stated in the Proposal, shall include furnishing all labor, superintendence, machinery, equipment, and materials necessary or incidental to complete the various items of work in accordance with the plans and specifications. The cost of work or materials shown on the plans or called for in the specifications and for which no separate payment is made shall be included in the bid prices on the various items.

PART 2 PRODUCTS

2.1 Polyvinyl Chloride (PVC) Pipe

A. PVC pipe shall conform to the requirements of AWWA C900 and NSF 61. Pipe shall bear NSF-pw seal and meet ASTM class 150 psi minimum or SDR-26 or less. PVC pipe shall have cast-iron-pipe-equivalent outside diameters. The pipe shall be plain end using

elastomeric-gasket couplings or shall have elastomeric-gasket bell ends.

B. An affidavit of compliance covering all PVC pipe furnished under these specifications shall be provided. The affidavit shall state that all materials comply with the testing, marking and all other requirements of AWWA C900.

2.2 HDPE (High Density Polyethylene) Pipe

HDPE pipe, 6" to 12” in diameter, shall be High Density Polyethylene Pipe and shall conform to the requirements of AWWA C906. HDPE pipe shall have ductile-iron-pipe-equivalent outside diameters (DIPS). The pipe shall be plain end using electrofusion butt-weld assembly method. The PE 3408 shall conform to ASTM D3350 with a cell classification of 345464C/E and is listed with Plastic Pipe Institute’s (PPI) TR4. It shall be formulated with carbon black and/or ultraviolet stabilizer for maximum protection against UV rays for added protection.

An affidavit of compliance covering all HDPE pipe furnished under these specifications shall be provided. The affidavit shall state that all materials comply with the testing, marking and all other requirements of AWWA C906 and ASTM F714.

2.3 Ductile Iron Pipe

Ductile iron pipe shall conform to the requirements of AWWA C110. An affidavit of compliance covering all ductile iron pipe furnished under these specifications shall be provided. The affidavit shall state that all materials comply with the testing, marking, and all other requirements of AWWA C110.

2.4 Pipe Fittings

A. General

Pipe fittings shall be of a type and design especially suitable for use with the type of piping with which they are installed. Pressure rating of fittings shall not be less than that of the pipe. HDPE joints shall be welded joints and shall be tested and inspected prior to bury for consistent weld penetrations. Fittings shall conform to HDPE pipe and shall also be welded in-place.

All flanged fittings shall be faced and drilled in accordance with the standard drilling for ANSI B16.1 Class 125 flanges. Bolts for flanged joints shall be of the length and diameter required by the ANSI

Specification. Bolts and nuts shall be of best quality mild steel and shall be provided with hexagonal heads. Suitable gaskets shall be provided for all flanged joints.

B. PVC Pipe Fittings

Fittings for PVC pipe shall, in general, shall be bell-and-spigot type epoxy coated cast iron. Flanged fittings shall be used on exposed piping unless otherwise shown. Mechanical joint fittings shall be used where shown on the drawings and may be used at other locations except where flanged fittings are required. Epoxy coated cast iron fittings shall conform to the dimension requirements of AWWA C110.

C. HDPE fittings shall meet ASTM F2206 for manufacturing requirements and and AWWA C906 for water line use. All fittings shall be butt-fusion type. All fittings shall match the HDPE pipe used. Stiffeners shall be used on all mechanical fittings to assure proper seating and connections to valves, tees or other fittings as required. Stiffeners shall be as manufactured by the HDPE pipe manufacturer or as approved by the Engineer.

2.5 Pipe Joints

A. Mechanical Joints

Mechanical Joints shall be as specified in AWWA Standard C110. All mechanical joints shall use MegaLug glands on PVC pipe. MegaLug glands shall conform to ASTM A536 ductile iron construction. The glands shall be as manufactured by MegaLug series 2024PV. All MegaLug glands shall meet AWWA C600 and ASTM D2774. Or Equal

B. Flanged Joints

Flanged joints for PVC pipe shall meet the requirements of ANSI Specification B16.1 (Class 125). Bolts shall be of the length and diameter required by the ASA Specification for Class 125 flanges. Bolts and nuts shall be of best quality mild steel and shall be provided with hexagonal heads, except where other types of bolts are specified. Suitable gaskets shall be used in all flanged joints.

C. Miscellaneous Joints

Miscellaneous types of joints shall be made as specified in other paragraphs or as recommended by the manufacturer. All joints shall

be made using materials and methods as required to produce joints that will function satisfactorily under the various conditions encountered.

2.6 Pipe Hangers and Pipe Supports

All exposed piping shall be suitably supported by pipe hangers or pipe supports. Supports and hangers shall be of the types specified herein or shown on the drawings with the spans between adjacent supports or hangers being as shown on the drawings. Supports or hangers for small piping shall be spaced so that no deflection of the piping will occur between adjacent supports.

All supports and hangers shall be installed and adjusted so that the loads are equally distributed throughout any one run of piping.

Small piping shall be supported from continuous concrete inserts and trapeze hangers, wall brackets, or other accessories as required by the particular installation. Small piping supports shall be Unistrut or approved equal.

2.7 Valves and Valve Boxes

A. Gate Valves and Resilient Gate Valves

All valves smaller than 2” gate valves shall be double disc, parallel seat, iron body, bronze mounted throughout, and all valves 2" and larger shall be resilient seat gate valves. Valve ends shall be flanged, bell, or mechanical joint as required by each valve installation. Valves shall have non-rising stems and shall open by turning to the left. The valves shall comply in all respects with AWWA C 500. All valves shall be equipped with 2" operating nuts unless noted otherwise on the Plans. O-ring stem seals shall be provided on all gate valves. Valves shall be Mueller, M&H, or approved equal.

B. Check Valves

Unless otherwise specified, all check valves shall be cushioned, cast iron fully bronze mounted, non-slamming check valves. Hinge pin shall be stainless steel. Check valves shall be designed for not less than 150 psi working pressure. Buried check valves shall have mechanical joint ends. Check valves installed in boxes or above ground shall have flanged ends and shall be provided with side levers and weights. Valves shall be Mueller, M&H, or approved equal.

C. Air/Vacuum Valves

All air/vacuum valves shall be as manufactured by Cla-Val or approved equal. The air/vacuum valves shall be 2” threaded on inlet and discharge in standard U.S. pipe thread. The air/vacuum valves shall extend vertically off of the 24-inch line from a corporation saddle clamped around the pipe and pointed vertically starlight up. 3’ schedule 80 PVC threaded on both ends shall extend up 2 feet from the corporation saddle. A ¼ turn plug valve shall be placed between the 3’ pipe extension and the air vacuum valve. The discharge of the air vacuum valve shall be extended to the outside of the manhole and exhaust to the atmosphere. Stainless steel screen (16-mesh or finer)shall be secured over the discharge pipe to prevent insects from entering the pipe.

D. Valve Boxes

All valves to be buried shall be equipped with 2" operating nuts and shall be installed in cast iron valve boxes as specified below.

Valve boxes shall be of cast iron. The boxes shall be designed to fit over a section of 6" C900 pipe which will be used as an extension from the top of the valve to within 8" of the ground surface. The box shall have a heavy cast iron cover. The box shall have a flange-type base, the base being approximately 4" larger in diameter than the outside diameter of the barrel of the box. The necessary length of 6" C900 pipe required for the extension shall be considered as a part of the valve box. Valve box shall be centered vertically over the operating nut of the valve.

Extension stems shall be furnished for all buried valves where the top of the operating nut is 48” or more below finished grade. Top of the extension stem shall not be more than 9" below the top of the valve box.

E. Manholes

4’ foot diameter fiberglass or concrete manholes shall be placed over all air/vacuum valves with 30” diameter manway openings. All manholes shall include an iron frame and cover.

Fiberglass manholes shall be set in concrete to secure the manhole in the location as shown on the plans. The pipe structure shall be sealed to prevent intrusion of soil, water and debris into the inside of the manhole.

2.8 Tracer Tape/Wire

Any wire or tape that is specified by the Manufacturer as for use as tracer tape/wire may be submitted for approval. All buried PVC or HDPE pipe shall be installed with a tracer wire or tape and shall be tied to all bends, fittings and valves. Tape shall be installed over the pipe after the initial backfill has been placed

PART 3 EXECUTIONS

3.1 General

This section shall govern the excavation, trenching, and backfilling for water, sanitary sewer, and recycled water construction, unless otherwise noted in the contract documents. The work shall include all necessary drainage, dewatering, pumping, bailing, sheeting, shoring and incidental construction. All existing utilities shall be protected from damage during the excavation and backfilling of trenches and, if damaged, shall be replaced by the Contractor at his expense. Unless otherwise shown in the contract documents, all excavation shall be unclassified and shall include all materials encountered regardless of their nature or the manner in which they are removed, to include but not limited to rock, stone, sand, organic material, or whatever material is encountered. The Contractor shall at all times conform to the latest applicable provision of subpart “P” entitled “Excavation, Trenching, and Shoring of OSHA Safety and Health Regulations for Construction”, or most applicable approved equal provision. An excavation plan submittal signed and sealed by a Texas licensed professional engineer shall be submitted for review and acceptance by the Owner or Engineer, if applicable, one week prior to start of actual construction activities where the planned excavation is 20 feet or greater.

All pipe and accessories required for the work specified herein shall be unloaded, handled, laid, jointed and tested for defects and for leakage in the manner herein specified.

3.2 Inspection

The pipe, fittings, valves and accessories shall be inspected upon delivery and during the progress of the work. Any material found to be defective will be rejected by the Engineer, and the Contractor shall remove such defective material from the site of the work.

3.3 Responsibility for Materials

The Contractor shall be responsible for all materials furnished by him and he shall replace at his own expense all such material that is found to be defective in manufacture or has become damaged in handling after delivery.

3.4 Handling Pipe and Accessories

All pipe, fittings, valves, and other accessories shall, unless otherwise directed, be unloaded at the site of the work by the Contractor. In loading and unloading, they shall be lifted by hoists or slid, or rolled on skidways in such a manner as to avoid shock or damage to the materials. Under no circumstances shall they be dropped. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground.

The pipe, fittings and accessories shall be stored at the site in such a manner as to be kept as free as possible from dirt, sand, mud or foreign matter.

3.5 Excavations and Trenching

The trench shall be excavated to the lines and grades as required by the drawings or these specifications. The minimum depth of cover for all pipe lines for which grades are not shown shall be 48”.

The minimum width of the trench shall be the outside diameter of the pipe plus 12" and the maximum width shall be the outside diameter of the pipe plus 18". The trenching equipment shall be maintained on a sufficiently level roadbed to provide substantially vertical trench walls. The maximum horizontal offset of the trench wall from bottom of trench to the top of the trench (undercutting) shall be 4".

The trench shall be excavated to an even grade so that the bottom of the pipe will rest on the bottom of the trench throughout the entire length of the pipe. In order to obtain a true, even grade, the trench shall be fine graded by hand. On lines that are to be laid to established grades, the trench graded to the established grade.

Any part of the trench excavated below grade shall be corrected by filling with approved material and thoroughly compacting.

If ledge rock, rock fragments or other unyielding material is encountered in the bottom of the trench, it shall be removed to a depth of 3" below grade, refilled with selected material, and thoroughly compacted.

For PVC pipe, the trench shall be undercut a minimum of 4" id unsuitable materials are encountered, refilled with selected well-graded material, and thoroughly compacted to provide uniform and adequate longitudinal support

under the entire length of pipe. The preferred backfill material shall be sandor select fill.

Bell holes of ample dimensions shall be dug at each joint to permit the jointing of pipe to be made properly, and of sufficient depth to prevent the bell of the pipe from resting on undistributed materials.

Whenever necessary to prevent caving, the trench shall be adequately braced and sheeted. Trench protection is required in cuts greater than 5'. Ladders shall be provided within 25' of workers in cuts over 4' in depth, and trench material shall be stockpiled a minimum of 2' from the edge of the trench. The Contractor shall comply with all applicable regulations of OSHA-2202 regarding these requirements.

Trench digging machinery may be used to make trench excavation except in places where operation of same would cause damage to existing structures either above or below ground. In such instances, hand methods shall be employed. The Contractor shall locate all existing underground lines, of which he has been advised whether or not they are shown on the drawings, sufficiently in advance of the trenching to make whatever provisions necessary to prevent damage thereto. Extreme care shall be used to prevent such damage, and the Contractor shall be fully responsible for damage to any such lines.

There will be no classification of or extra payment for excavated materials, and all materials encountered shall be excavated as required. Adjacent structures shall be protected from damage by construction equipment. All excavated material shall be piled in a manner which will not endanger the work or existing structures and which will cause the least obstruction to roadways.

The Contractor will be required to locate all known utility lines far enough in advance of the trenching to make proper provisions for protecting the lines and to allow for any deviations that may be required from the established lines and grades.

Excess trench excavation, not used for back filling, shall be disposed of by the Contractor, and at the Contractor's expense.

3.6 Pipe Laying

All pipes shall be laid and maintained to the lines and grades shown on the plans or as required by these specifications. All piping under structures shall be ductile pipe as shown on the plans. Ductile pipe shall extend a minimum 36 inches beyond edges of all structural footings.

Wherever it is necessary to deflect pipe from a straight line either in a vertical or horizontal plane to avoid obstructions or to plumb valves, or where vertical or horizontal curves are shown or permitted, the degree of deflection at each joint shall not exceed the maximum deflection recommended by the manufacturer of the particular kind of pipe being laid and the degree of deflection shall be approved by the Engineer.

After the trench grade has been completed, all bell holes dug and the grade inspected, the pipes and accessories may be placed in the trench. All pipe, fittings, and valves shall be carefully lowered into the trench piece by piece by means of derricks, ropes, or other suitable tools or equipment, in such a manner as to prevent damage to the material in any way. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

Before lowering into the trench, the pipe shall be again inspected for defects. Any defective, damaged or unsound pipe and materials shall be rejected.

All foreign matter or dirt shall be removed from the inside of the pipe and from all bells, spigots or parts of the pipe used in forming the joint, before the pipe is lowered into the trench, and it shall be kept clean by approved means during and after laying.

3.7 Laying and Jointing Pipe

A. General

Unless otherwise directed, pipe shall be laid with bells facing in direction of laying; and for lines on appreciable slopes, bells shall, at the discretion of the Engineer, face up grade.

Cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe.

The jointing shall be completed for all pipe laid each day, in order not to leave open joints in the trench overnight. At times when pipe laying is not in progress, the open ends of pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe.

No pipe shall be laid in water, or when the trench conditions or weather is unsuitable for such work, except by permission of the Engineer.

Immediately after completion of the jointing, sufficient bedding and backfill material shall be placed around and over the pipe to hold the pipe to line.

Premolded joints shall be made in accordance with the recommendations of the manufacturer of the pipe. The surfaces of the jointing material on both the bell and the spigot at each joint shall be wiped with the solvent recommended by the pipe manufacturer. The spigot shall then be firmly forced into the bell using a bar or other similar lever and a block of wood to prevent damage to the pipe.

B. Mechanical Joint Piping

The last 8" outside of the spigot and inside of the bell of mechanical-joint pipe shall be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter from the joint, and then painted with a soap solution prepared specifically for this purpose. The cast iron gland shall then be slipped on the spigot end of the pipe with the lip extension of the gland toward the socket, or bell, end. The rubber gasket shall be painted with the soap solution and placed on the spigot end with a thick edge toward the gland.

The entire section of the pipe shall be pushed forward to seat the spigot end in the bell. The gasket shall then be pressed into place within the bell; care shall be taken to locate the gasket evenly around the entire joint. The cast iron gland shall be moved along the pipe into position for bolting, all of the bolts inserted, and the nuts screwed up tightly with the fingers. All nuts shall be tightened with a suitable torque-limiting wrench.

Nuts spaced 180^{o} apart shall be tightened alternately in order to produce an equal pressure on all parts of the gland.

C. Flanged Joints

Flanged joints, where used, shall be bolted with flange bolts of best quality mild steel and of the size and length required by AWWA C 115; bolts and nuts shall be provided with standard hexagonal heads. Gasket rings shall be used and shall be made of best quality rubber composition sheet packing 1/8" thick, of a brand and quality approved by the Engineer.

The pipe and fittings shall be properly aligned and free to move in any direction while bolting, and the bolts shall be gradually tightened at a uniform rate around the entire flange.

D. Push-On Joints

The inside of the bell and outside of the spigot end shall be thoroughly cleaned to remove oil, grit, excess coating, and other foreign matter. The circular rubber gasket shall be flexed inward and inserted in the gasket recess of the bell socket. “Rieber” gaskets are the only approved gasket.
A thin film of gasket lubricant shall be applied to either the inside surface of the gasket or the spigot end of the pipe or both. Gasket lubricant shall be as supplied by the pipe manufacturer.

The spigot end of the pipe shall be entered into the socket with care used to keep the joint from contacting the ground. The joint shall then be completed by forcing the plain end to the bottom of the socket with a forked tool or a jack-type tool or other device. Pipe that is not furnished with a depth mark shall be inserted to the full depth of the joint. Field-cut pipe lengths shall be filed or ground to resemble the spigot end of such pipe as manufactured. Complete assembly instructions are available from the pipe manufacturer.

E. Setting Valves, Valve Boxes and Fittings

Valves and fittings shall be set at the locations shown on the plans or at locations as established by the Engineer, and shall be jointed to the pipe in the manner heretofore specified for pipe installations. All valves shall be mechanical joint as required and all valves buried in the ground shall have a cast iron valve box set over the valve. All valves shall be set vertically, unless otherwise specified, and shall be thoroughly inspected and checked for operation before installation. After pressure has been applied to the line, stuffing boxes shall be checked and tightened if necessary.

Cast iron valve boxes shall be firmly supported and maintained centered and plumb over the wrench nut of the valve, with box cover flush with the surface of the ground or at such level as directed. Sections of 6" C900 PVC pipe shall be used for valve box extensions and shall be of sufficient length to extend from the top of the valve bonnet to within 8" of the ground surface.

3.8 Location of Mains

If during construction, sewer lines are encountered, the waterlines shall be installed no less than nine (9) feet from the sewer lines in all directions. If the nine (9) foot separation distance cannot be achieved, the waterlines shall be laid in accordance with Section 337.206(d) of the Texas

Department of Health's "Rules and Regulations for Public Water Systems," 1988.

3.9 Anchorage of Bends, Tees and Plugs

Reaction or thrust blocking shall be applied to all pipelines at all tees, plugs, caps, and at bends deflecting 11-1/4° or more. Concrete shall be used for backing the pipe and fittings and shall conform to the concrete specifications as set forth in the CONCRETE Section. The backing shall be placed between solid ground and the fitting to be anchored; the area of bearing on pipe and on the ground in each instance shall be that required by the Engineer. The backing shall be so placed that the pipe and fitting joints will be accessible for repair. The following tables are to be used to determine the size of the thrust backing.

Standard plugs shall be inserted into the bells of all dead end pipes, tees, or crosses, and spigot ends shall be capped. Plugs or caps shall be jointed to the pipe or fittings in the same manner used in jointing the pipe.

TABLE 1: THRUST DEVELOPED PER 100 LB/IN^2 PRESSURE

Pipe Size, in	Fitting 90° elbow, lbf	Fitting 45° elbow, lbf	Valve, Tees, Dead ends, lbf
4	2,560	1,390	1,810
6	5,290	2,860	3,740
8	9,100	4,920	6,430
10	13,680	7,410	9,680
12	19,350	10,470	13,690
14	26,010	14,090	18,390
16	33,640	18,230	23,780
18	42,250	22,890	29,860
20	51,840	28,090	36,640
24	73,950	40,070	52,280
30	113,770	61,640	80,420
36	162,970	88,310	115,210

TABLE 2: ESTIMATED BEARING LOAD

Soil Type	lb/ft^2
Muck, peat, etc.	0
Soft Clay	500
Sand	1,000
Sand and gravel	1,500
Sand and gravel with clay	2,000
Sand and Gravel cemented with clay	4,000
Hard Pan	5,000

3.10 Connecting to Existing Piping

All connections to existing piping shall be made in accordance with these specifications and as noted on the drawings. The Contractor shall be responsible for acquiring and installing proper gaskets, fittings, adapters, etc., to provide a complete and workable system when completed.

3.11 Disinfection of Pipe Lines

The disinfection of the pipe shall be in accordance with AWWA Standard C651-90A. All pipelines shall be disinfected before being placed in service. The lines shall be disinfected by the application of a chlorinating agent. The chlorinating agent may be liquid chlorine, liquid chlorine gas-water mixture, or a calcium hypochlorite solution, which shall be fed into the lines through a suitable solution-feed device, or other methods approved by the Engineer.

The chlorinating agent shall be applied at or near the point from which the line is being filled, and through a corporation stop or other approved connection inserted in the horizontal axis of the newly laid pipe. The water being used to fill the line shall be controlled to flow very slowly into the section to be disinfected. The rate of application of the chlorinating agent shall be in such proportion to the rate of water entering the pipe that the chlorine dose applied to the water entering the line shall be at least fifty (50) parts per million. The treated water shall be retained in the pipelines for a period of not less than twenty-four (24) hours. At the end of the retention period, all treated water shall be thoroughly flushed from the

lines until the replacement water in the lines shall have a chlorine residual of not more than 0.2 parts per million. Treated water used for disinfection shall be disposed of in such a manner as is satisfactory to the Engineer.

Samples shall be collected and tested for bacteriological quality and the absence of coliform organisms by the Owner. Should the sample indicate the existence of coliform organisms, the Contractor shall be required to repeat the disinfection and testing procedures until the satisfactory results are obtained. The line shall not be placed in service until the bacteriologic tests indicate the absence of coliform organisms.

Where a new water main is to cross an existing clay or concrete gravity sewer showing no evidence of leakage, the water line shall be installed at least twenty-four (24) inches above the existing sewer. A full joint of the water line shall be centered over the sewer crossing, so as to provide maximum protection against contamination.

Where a new water main is to cross an existing gravity sewer showing evidence of leakage, the Contractor shall notify the Owner and Engineer immediately to allow repair of the sewer line prior to continuing construction in the immediate vicinity.

Dechlorination of disinfecting water shall be in strict accordance with the current AWWA Standard C655.

The use of pipes and pipe fittings that contain more than 0.25% lead or solders and flux that contains more than 0.2% lead is prohibited for installation or repair of any public water supply (290.44(b)).

All plastic pipe for use in public water systems must bear the National Sanitation Foundation Seal of Approval (NSF-pw) as required in 30 TAC 290.44(a)(2).

New mains shall be thoroughly disinfected in accordance with AWWA Standard C651 and then flushed and sampled before being placed in service. Samples shall be collected for microbiological analysis to check the effectiveness of the disinfection procedure. Sampling shall be repeated if contamination persists. A minimum of one sample for each 1,000 feet of completed waterline will be required or at the next available sampling point beyond 1,000 feet as designated by the design engineer as required in 30 TAC 290.44 (f) (3).

3.12 Backfilling

A. Backfill Material

All initial backfill material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones, or other unsuitable material. Select fill or sand shall be used for the initial backfill. From 1 foot above the top of the pipe to the existing ground, however, material containing stones up to 4" in their greatest dimension may be used. Selected materials from trench excavations shall be used for backfilling.

B. Backfilling under Pipe (Haunching)

All pipe shall be backfilled using select backfill or sand. Backfill material shall be deposited in the trench for its full width on each side of the pipe, fitting, and appurtenances simultaneously.

C. Initial Backfill

Initial backfill shall be deposited and leveled to a minimum of 8” above the pipe and compacted using lightweight vibratory compaction equipment

D. Backfilling over Pipe

From 8” minimum above the top of the pipe (12" for PVC pipe) to finish grade shall be backfilled in loose lifts not to exceed 1’ and properly compacted using a vibratory type trench roller or by jetting. Jetting may be used, except for opencut trenches located on highway right-of-way or other areas designated on the plans as requiring compacted backfill.

Jetting shall be done by filling the trench with the backfill material and jetting the fill with hose and long pipe nozzles. The nozzles shall be forced down to the top of the pipe at sufficient intervals to thoroughly wet and settle all backfill material in the entire trench. Jetting shall be done using a tank truck equipped with a pump which will apply pressure to the jetting nozzle, or other method approved by the Engineer. Any settlement detected after drying of the jetted trench shall be corrected by further grading and compaction to the density specified for tamping.

Where mechanical compaction is required, the material shall be placed in 8" loose layers, moistened if necessary, and thoroughly compacted with mechanical tampers to a density of at least 95% of

maximum density at optimum moisture as determined by ASTM Designation D 698.

Prior to filling the trenches with backfill material where flooding or jetting is to be used, earth dams or waterstops shall be constructed across the trench at a maximum spacing of 500 feet. Where the slope of the original ground is greater than 1.7%, the dams shall be spaced so that the vertical rise of the ground between two successive dams does not exceed 4.0 feet.

3.13 Hydrostatic Tests

All piping shall be tested for leakage as soon as practical after laying. The test pressure shall be not less than 150 psi or twice the operating pressure, whichever is greater. The duration of the test shall be determined by the Engineer and shall be not less than 4 hours.

However, the pipes shall be tested so that the pressure is at least 100%, but not greater than 120% of the pipe pressure class of the pipe, and the minimum pressure is not less than 85% of the pipe pressure class of the pipe.

The maximum allowable leakage is the number of gallons per hour as determined by the following formula:

$$L=\frac{ND\cdot P^{0.5}}{7400}$$

where:

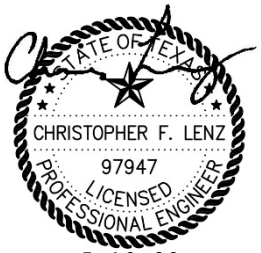
L = Allowable leakage in gallons/per hour
N = Number of joints in the length of pipe tested
D = Nominal diameter of the pipe in inches
P = Average of the max. and min. pressures within the test section in psi.

The hydrostatic leakage rate for PVC pipe and appurtenances shall not exceed the amount allowed or recommended by formulas in AWWA C605 as required in TAC 290.44(a)(5). Please ensure that the formula for this calculation is correct and most current formula is in use.

$$Q=\frac{LD\cdot P^{0.5}}{148{,}000}$$

where:

Q = the quantity of makeup water in gallons per hour,
L = the length of pipe section being tested, in feet,
D = the nominal diameter of the pipe in inches, and
P = the average test pressure during the hydrostatic test in pounds per square inch (psi).



END OF SECTION