

NOTICE OF SPECIAL MEETING
OF THE
CHICKASHA CITY COUNCIL

In compliance with Title 25, Oklahoma Statutes, Section 301-314, the Oklahoma Open Meeting Act, including the posting of notice and agenda, be advised that the Chickasha City Council, Chickasha Municipal Authority, and Chickasha Municipal Airport Authority of the City of Chickasha, Oklahoma, will conduct a **SPECIAL MEETING ON MONDAY, OCTOBER 28, 2024, AT 6:00 PM.** Said meeting will be held in the Council Chambers, City Hall, 117 North 4th Street, Chickasha, Oklahoma.

The City of Chickasha encourages participation from all its citizens. If participation is not possible due to a disability, notification to the City Clerk at least 48 hours prior to the scheduled meeting is encouraged to make the necessary accommodations. The City may waive the 48-hour rule if signing is not the necessary accommodation.

All items on this agenda, including but not limited to any agenda item concerning the adoption of any ordinance, resolution, contract, agreement, or any other item of business, are subject to amendment, including additions and/or deletions. This rule will apply to every individual agenda item without exception, and without providing this same amendment language with respect to each individual agenda item. Such amendments should be rationally related to the topic of the agenda item, or the governing body will be advised to continue the item.

The governing body may adopt, approve, ratify, deny, defer, recommend, amend, strike, or continue any agenda item. When more information is needed to act on an item, the governing body may refer the matter to its City/Trust Manager, staff, attorney or to the recommending board, commission or committee.

Agenda items are attached.

I, Susan M. McDaniel, City Clerk, posted this **AMENDED** Special Agenda on the official City of Chickasha bulletin board in the Municipal Building, 117 North 4th Street Chickasha, OK, 73018, which is accessible to the public twenty-four hours each day at 2:00 p.m. on FRIDAY, October 25, 2024.



Susan McDaniel, CMC - City Clerk

Sworn to and subscribed before me on this 25th day of October 2024.

My Commission Expires: __10-1-2026__





Notary Public, State of Oklahoma

CHICKASHA CITY COUNCIL

AGENDA

LOCATION OF MEETING

CITY HALL COUNCIL CHAMBERS

117 NORTH FOURTH STREET

CHICKASHA, OKLAHOMA 73018

TIME OF MEETING

6:00 PM

DATE OF MEETING

OCTOBER 28, 2024

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1. Call to Order / Roll Call.

2. Work Session:

- a. Discussion on Airport projects and future plans

3. Discussion and Consideration:

- a. Discussion, consideration, and possible action to waive the competitive bidding requirements and authorize staff to solicit bids for CMA-2407 - Emergency Waterline Repair/Replacement - Stillwater Central Railroad at Chickasha Water Treatment Plant based on the City Council's determination that an emergency exists which is critical to life, health, or destruction of property causing economic loss to the City or its inhabitants.

4. Executive Session:

- a. Discussion, consideration, and possible action to enter into Executive Session pursuant to 25 O.S. Section 307(B)(1) to discuss the hiring of a City Manager (Interview of candidate Jim Crosby).
- b. Discussion, consideration, and possible action to reconvene open session and take action on any matter discussed in the Executive Session.

5. Motion to Adjourn.

CHICKASHA



**Meeting Type: Special Council Meeting and Work
Session 10-28-2024**

Meeting Date: 10/28/2024

Department: City Clerk

Agenda Item No. 2.a.

AGENDA ITEM: Discussion on Airport projects and future plans

I. BACKGROUND/DESCRIPTION:

II. RECOMMENDED ACTION:

III. FISCAL INFORMATION -

IV. FUND INFORMATION:

Dept. Director: NAME, TITLE	Fund	Account	Amount
	(To)		
	FUND	ACCOUNT	AMOUNT
Meeting Date: October 28, 2024	(From)		

V. ATTACHMENTS:



**RFP CMA-2407
EMERGENCY WATERLINE REPAIR/REPLACEMENT
STILLWATER CENTRAL RAILROAD
AT CHICKASHA WATER TREATMENT PLANT**

CHICKASHA MUNICIPAL AUTHORITY

CHICKASHA, OKLAHOMA

SPECIFICATIONS & CONTRACT DOCUMENTS

Prepared by:



CHISHOLM TRAIL CONSULTING, LLC

CA 7771
2124 Scott Lane
Duncan, Ok 73533
580-467-8130
rscottv11@gmail.com



Randall Scott Vaughn, OK P.E., 15194

October 25, 2024
Date

**RFP CMA-2407
EMERGENCY WATERLINE REPAIR/REPLACEMENT
STILLWATER CENTRAL RAILROAD AT CHICKASHA WATER
TREATMENT PLANT**

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<u>WATER MAIN CONSTRUCTON SUPPLEMENT</u>	8 PAGES
 <u>DRAWINGS</u>	 SEPARATE



117 North 4th Street
Chickasha, Ok 73018

BID PROPOSAL
EMERGENCY WATERLINE
REPAIR/REPLACEMENT
STILLWATER CENTRAL RAILROAD AT
CHICKASHA WATER TREATMENT PLANT

RFP-2407

Proposal of _____
(hereinafter called "Bidder"), organized and existing under the laws of the
State of _____, doing business as _____
to the Chickasha Municipal Authority (hereinafter call "Owner").

In compliance with your Advertisement for Bids, Bidder hereby proposes to perform all
work for the construction of RFP CMA-2407 Emergency Waterline Repair/Replacement
Project, Stillwater Central Railroad at Chickasha Water Treatment Plant, in
Chickasha, Ok in strict accordance with the contract documents within the time set
forth therein and at the prices stated on the Bid Schedule.

TOTAL BID (WORDS) _____

Bidder: _____ By: _____
Name of Company *Signature & Title*

Mailing Address: _____

Phone No

Fax No

Email

SUBSCRIBED AND SWORN TO BEFORE ME THIS ____ DAY OF _____ 20____.

MY COMMISSION EXPIRES:

NOTARY PUBLIC

BID SCHEDULE

EMERGENCY WATERLINE REPAIR/REPLACEMENT					
PAY ITEM	PAY ITEM DESCRIPTION	UNITS	EST QTY	UNIT PRICE	TOTAL PRICE
1	18" DIP WATER MAIN, TRENCHED UNCASSED	LF	190	\$	\$
2	18" DIP WATER MAIN, INSTALLED IN CASING	LF	70	\$	\$
3	28" DIA. 7/16" WALL THICKNESS CASING INSTALLED	LF	70	\$	\$
4	18" MJ SLEEVES, INSTALLED	EA	2	\$	\$
5	18" X 45° MJ BEND, INSTALLED	EA	3	\$	\$
6	18" X 22.5° MJ BEND, INSTALLED	EA	2	\$	\$
7	18" MJ GATE VALVE W/ BOX, INSTALLED	EA	1	\$	\$
8	18" REPAIR CLAMP, INSTALLED	EA	1	\$	\$
9	DEWTERING	LSUM	1	\$	\$
10	DISINFECTION	LSUM	1	\$	\$
11	HYDROSTATIC PRESSURE TESTING	LSUM	1	\$	\$
12	FENCE REMOVAL AND REPLACEMENT	LF	200	\$	\$
13	RAILROAD FLAGGING	LSUM	1	\$	\$
14	RAILROAD CONSTRUCTION OBSERVATION	LSUM	1	\$	\$
15	RAILROAD SAFETY	LSUM	1	\$	\$
16	INSURANCE	LSUM	1	\$	\$

TOTAL BID (NUMBERS) \$ _____

TOTAL BID (WORDS) _____

AGREEMENT
(CONTRACT)

Chickasha Municipal Authority
RFP CMA-2407
EMERGENCY WATERLINE REPAIR/REPLACEMENT
STILLWATER CENTRAL RAILROAD AT CHICKASHA WATER TREATMENT PLANT

THIS AGREEMENT is dated as of the ____ day of _____, in the year of 20__, by and between the CHICKASHA MUNICIPAL AUTHORITY, hereinafter referred to as OWNER, and _____ hereinafter referred to as the CONTRACTOR.

OWNER and CONTRACTOR, in consideration of the mutual covenants hereinafter set forth, agree as follows:

ARTICLE 1. WORK

CONTRACTOR shall complete all work as specified or indicated in the contract documents. The work is generally described as follows:

RFP CMA-2407 EMERGENCY WATERLINE REPAIR/REPLACEMENT, STILLWATER CENTRAL RAILROAD AT CHICKASHA WATER TREATMENT PLANT

ARTICLE 2. CONTRACT TIME

2.1 The work will be completed in immediately.

2.2 Liquidated Damages. OWNER and CONTRACTOR recognize that time is of the essence of this agreement and that OWNER will suffer financial loss if the work is not substantially complete within the time specified in 2.1 above, plus any extensions thereof allowed. They also recognize the delays, expense and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by OWNER if the work is not substantially completed on time. Accordingly, instead of requiring any such proof, OWNER and CONTRACTOR agree that as liquidated damages for delay (but not as a penalty) CONTRACTOR shall pay OWNER Five Hundred Dollars (\$500.00) for each day that expires after the time specified in paragraph 2.1 for substantial completion until the work is substantially complete.

ARTICLE 3. CONTRACT PRICE

3.1 OWNER shall pay CONTRACTOR for performance of the work in accordance with the contract documents in current funds as follows:

_____ Dollars.
(\$ _____)

ARTICLE 4. PAYMENT PROCEDURES

4.1 CONTRACTOR may submit an invoice or application for payment on a monthly basis at any time prior to completion of the work. All payments made by the Owner are subject to procedures established by the Owner to authorize payment at its regularly scheduled meetings. The Owner regularly scheduled meetings are held on the 1st and 3rd Monday of each month.

Invoice or application for payment must be received in the Public Works Department office no less than fifteen (15) business days prior to the regular meeting at which authorization for payment is to be requested.

4.2 Final Payment. Upon final completion and acceptance of the work, including all submittals, OWNER shall pay the remainder of the contract price, subject to the procedures noted in paragraph 4.1 above.

ARTICLE 5. CONTRACTOR'S REPRESENTATIONS

In order to induce OWNER to enter into this agreement, CONTRACTOR makes the following representations:

5.1 CONTRACTOR has familiarized himself with the nature and extent of the contract documents, and the written resolution thereof by the Owner is acceptable to CONTRACTOR.

5.2 CONTRACTOR has given the Owner written notice of all conflicts, errors, discrepancies or omissions that he has discovered in the contract documents, and the written resolution thereof by the Owner is acceptable to CONTRACTOR.

ARTICLE 6. CONTRACT DOCUMENTS

The contract documents which comprise the entire agreement between OWNER and CONTRACTOR are attached to this agreement, made a part hereof, and consists of the following:

- 6.1 This agreement (pages 1 to 3 inclusive).
- 6.2 Exhibits to this agreement (pages ____to____inclusive).
- 6.3 Performance and other bonds, consisting of _____pages.
- 6.4 Notice of Award.
- 6.5 Specifications bearing the title: **RFP CMA-2407 EMERGENCY WATERLINE REPAIR/REPLACEMENT, STILLWATER CENTRAL RAILROAD AT CHICKASHA WATER TREATMENT PLANT.**
- 6.6 Addenda numbers____to____, inclusive.
- 6.7 CONTRACTOR'S bid (pages _____to _____, inclusive).
- 6.8 Documentation submitted by CONTRACTOR prior to Notice of Award (pages 1to____ inclusive).
- 6.9 Any modification, including change orders, duly delivered after execution of agreement.

There are no contract documents other than those listed above in Article 6.

The contract documents may only be altered, amended, or repealed by written and approved change order.

ARTICLE 7. MISCELLANEOUS

7.1 No assignment by a party hereto of any rights under or interests in the contract documents will be binding on another party hereto without written consent of the party sought to be bound; and specifically but without limitations, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment. No assignment will release or discharge the assignor from any duty or responsibility under the contract documents.

7.2 OWNER and CONTRACTOR each binds himself, his partners, successors, assigns, and legal representatives to the other party hereto, his partners, successors, assigns, and legal representatives in respect to all covenants, agreements and obligations contained in the contract documents.

IN WITNESS WHEREOF, the parties hereto have signed this agreement in duplicate. One counterpart has been delivered to OWNER and CONTRACTOR. All portions of the contract documents have been signed or identified by OWNER and CONTRACTOR.

This agreement will be effective the _____ day of _____ 20__.

OWNER:
CHICKASHA MUNICIPAL AUTHORITY

CONTRACTOR:

By: _____
Chairman

By: _____
Signature & Title

CORPORATE SEAL
Attest:

CORPORATE SEAL
Attest:

By: _____

By: _____

ADDRESS FOR GIVING NOTICES:

ADDRESS FOR GIVING NOTICES:

Chickasha Municipal Authority

ATTN: General Manager

117 North 4th Street

Chickasha, OK 73018

Phone: 405-222-6086

Phone: _____

Fax: 405-222-6084

Fax: _____

keith.johnson@chickasha.org

Email: _____

STATUTORY BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____, as Principal, and
_____, as Surety, are
held firmly bound unto the Chickasha Municipal Authority in the sum of

DOLLARS (\$ _____), for the payment of which, well and truly to be made, we, and each
of us, bind ourselves, our heirs, executors and assigns, themselves, and its successors and assigns, jointly
and severally, firmly by these presents.

Dated this _____ day of _____, 20__.

The conditions of this obligation are such, that whereas, the above Bonded Principal _____
_____ is the lowest and best bidder for the making of the following work and improvements, viz:

RFP CMA-2407 Emergency Waterline Repair/Replacement Project, Stillwater Central Railroad at
Chickasha Water Treatment Plant in Chickasha, Oklahoma (Project)

and has entered into a certain written contract with the Chickasha Municipal Authority on the _____
day of _____ 20__, for the construction of said work and improvement, in exact accordance with
the bid of said Principal, and according to certain specifications heretofore made, adopted and placed on
file in the office of the City Clerk of the City of Chickasha.

NOW, THEREFORE, if said principal shall fail or neglect to pay all indebtedness incurred by said
Principal or subcontractor of said Principal who perform work in the performance of such, for labor and
materials furnished by any supplier and consumed in the performance of said contract, and such repairs to
and rental of machinery and equipment as may be furnished by a subcontractor to the person or persons
contracting with this Owner within thirty (30) days after the same becomes due and payable, the person,
firm or corporation entitled thereto may sue and recover on this bond, the amount so due and unpaid.

It is further expressly agreed and understood by the parties hereto that no changes or alterations in said
Contract and no deviations from the plan or mode of procedure herein fixed shall have the effect of
releasing the sureties, or any of them, for the obligations of this Bond.

IN WITNESS WHEREOF, the said Principal has caused these presents to be executed in its name and its
corporate seal to be hereunto affixed by its duly authorized officers, and the said Surety has caused these
presents to be executed in its name and its corporate seal to be hereunto affixed by its attorney—in—fact,
duly authorized so to do, the day and year first above written.

ATTEST:

_____	Principal
Secretary	By: _____

	Surety
	By: _____

ATTEST:

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS THAT:

_____, as Principal,
and _____, a corporation
organized under the laws of the State of _____, as Surety, are held and firmly bound unto
the Chickasha Municipal Authority, in the penal sum of
Dollars (\$_____) in lawful money of the United States of America, for the payment
of which, well and truly to be made, we bind ourselves and each of us, our heirs, executors,
administrators, trustees, successors, and assigns, jointly and severally, firmly by these presents.

The condition of this obligation is such that WHEREAS, said Principal entered into a written contract
with the Chickasha Municipal Authority, dated _____, 20__, for the RFP CMA-2407
Emergency Waterline Repair/Replacement Project, Stillwater Central Railroad at Chickasha Water
Treatment Plant in Chickasha, Oklahoma (PROJECT) all incompliance with the specifications therefore,
made a part of said Contract and on file in the office of the City Clerk, City of Chickasha, Oklahoma.

NOW THEREFORE, if said Principal shall, in all particulars, well, truly and faithfully perform and abide
by said Contract and each and every covenant, condition, and part thereof, and shall fulfill all obligations
resting upon said Principal by the terms of said Contract and said specifications, and if said Principal shall
protect and save harmless said Chickasha Municipal Authority from any pecuniary loss resulting from
the reach of any of the items, covenants and conditions of said Contract resting upon said Principal, then
this obligation shall be null and void, otherwise to be and retain in full force and effect.

It is further expressly agreed and understood by the parties hereto that no changes or alternations in said
Contract and no deviations from the plan or mode of procedure herein fixed shall have the effect of
releasing the Sureties, or any of them, from the obligations of this Bond.

IN WITNESS WHEREOF, the said Principal has caused these presents to be executed in its name and its
corporate seal to be hereunto affixed by its duly authorized officers, and the said Surety has caused these
presents to be executed in its name and its corporate seal to be hereunto affixed by its attorney-in-fact,
duly authorized so to do, the day and year set forth below.

Dated this _____ day of _____, 20__.

Principal

ATTEST:

Secretary

By: _____

Surety

ATTEST:

By: _____

MAINTENANCE BOND

KNOW ALL MEN BY THESE PRESENTS:

That we, _____ as Principal,
and _____, as Surety, are
held and firmly bound into the CHICKASHA MUNICIPAL AUTHORITY, a Municipal Trust in
the State of Oklahoma, in the full and just sum of

_____ DOLLARS
(\$ _____) such sum being equal to the contract price for the payment of
which, well and truly to be made, we, and each of us, bind ourselves, our heirs, executors, and
assigns, themselves, and its successors and assigns, jointly and severally, firmly by these
presents.

The conditions of this obligation are such, that whereas, said Principal, has by certain contract
between _____ and the CHICKASHA
MUNICIPAL AUTHORITY dated this _____ day of _____ 20____, agreed
to perform for the Chickasha Municipal Authority, RFP CMA-2407 Emergency Waterline
Repair/Replacement Project, Stillwater Central Railroad at Chickasha Water Treatment Plant in
compliance with the specifications therefore, made part of said contract and on file in the office
of the City Clerk of the City of Chickasha; and to maintain the said improvement in the amounts
set forth above against any failure due to workmanship or material for a period of ONE year
from the date of acceptance of the work by the Chickasha Municipal Authority.

NOW THEREFORE, if said Principal shall pay or cause to be paid to the Chickasha Municipal
Authority all damages, loss and expense, which may result by reason of defective materials
and/or workmanship in connection with said work, occurring within a period of ONE year from
and after acceptance of said project by the OWNER; and if Principal shall save and hold
harmless the OWNER from all damages, loss and expense occasioned by or resulting from any
failure whatsoever of said Principal, then this obligation shall be null and void, otherwise to be
and remain in full force and effect.

It is further agreed that if the said Principal or Surety herein shall fail to maintain said
improvements against any failure due to defective workmanship and/or material for a period of
ONE year and at any time repairs shall be necessary, that the cost of making said repairs shall be
determined by the Chickasha Municipal Authority or some person(s) designated by them to
ascertain the same; and if, upon thirty (30) days' notice, the said amount ascertained shall not be
paid by the Principal or Surety herein, or if the necessary repairs are not made, that said amount
shall become due upon the expiration of thirty (30) days and suit may be maintained to recover
the amount so determined in any court of competent jurisdiction; and that the amount so
determined shall be conclusive upon the parties as to the amount due on this bond for the
repair(s) included therein, and that the cost of all repairs shall be so determined from time-to-
time during the life of this bond as the conditions of the improvements may require.

It is further expressly agreed and understood by the parties hereto that no changes or alterations
in said contract and no deviations from the plan or mode of procedure herein fixed shall have the
effect of releasing the sureties, or any of them, from the obligations of this bond.

IN WITNESS WHEREOF, the said Principal has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its duly authorized officers; and the said Surety has caused these presents to be executed in its name and its corporate seal to be hereunto affixed by its attorney-in-fact, duly authorized so to do, the day and year first above written.

ATTEST:

Principal

Secretary

By: _____

Surety

ATTEST:

By: _____

Chickasha Municipal Authority
RFP CMA-2407
EMERGENCY WATERLINE REPAIR/REPLACEMENT
STILLWATER CENTRAL RAILROAD AT CHICKASHA WATER TREATMENT
PLANT

INSTRUCTIONS TO BIDDERS

1. Bidders assume full responsibility for ensuring they have obtained all contract documents, including but not limited to: Bid Proposal forms, affidavits, Specifications, Drawings and Addenda. By submitting a bid for this project, Bidder thereby agrees that he/she has obtained all required documents prior to submitting said bid.
2. Hard copy bidding documents may be obtained from the Engineer for a non-refundable fee of \$100 per set.
3. A cashier's check or a certified check on a solvent bank in Oklahoma or a bid bond in the amount of five percent (5%) of the bid shall accompany the proposal of each bidder. The check or bond shall be made payable to the Owner. All checks or bonds will be returned to unsuccessful bidders. This check or bond shall be as a guarantee of contractor's ability to perform the contract bid upon, and that he will enter into a written contract with the Owner to perform said work and/or furnish said materials in accordance with said specifications and furnish the required bonds within ten (10) business days after the acceptance of his bid. No bidder may withdraw his bid for a period of sixty (60) days after the closing date for the receipt of bids.
4. In accordance with Oklahoma statutes, any bid must be accompanied by a Non-Collusion Affidavit and a Business Relations Affidavit. All bidders shall use the enclosed forms to satisfy this requirement.
5. Any bids received after the closing time will be returned unopened. Minority and small business owners are encouraged to submit proposals.
6. A Maintenance Bond guaranteeing the repair of all damage due to improper materials or workmanship for a period of one (1) year after the acceptance of the work by the Owner will be required.
7. A Performance Bond and a Statutory Payment Bond in the amount of 100% of the contract price each with a Corporate Surety licensed in Oklahoma and approved by the Owner will be required for the faithful performance of the contract, and the bidder shall state in the proposal the name and address of the Surety or Sureties who will sign this bond in case the contract is awarded to him. Copies of required bond forms are included in the bid packet.

RFP CMA-2407
EMERGENCY WATERLINE REPAIR/REPLACEMENT
STILLWATER CENTRAL RAILROAD
AT CHICKASHA WATER TREATMENT PLANT

PROJECT REQUIREMENTS

1. GENERAL CONDITIONS

- 1.1. Proposal is to perform construction of Water Mains as described below and elsewhere herein on Stillwater Central Railroad at Chickasha Water Treatment Plant in Chickasha, Oklahoma.
- 1.2. Quoted prices shall remain valid for not less than 60-days.
- 1.3. The prices bid shall be for completed work as specified herein. Details necessary for completed work not listed herein shall be considered incidental to the work and will not be paid for separately.
- 1.4. The Chickasha Municipal Authority reserves the right to reject any and all bids.
- 1.5. Oklahoma Department of Environmental Quality rules and regulations, City of Chickasha/ Chickasha Municipal Authority standards and specifications and Stillwater Central Railroad requirements shall govern the work.
- 1.6. The Owner reserves the right to consider alternative proposals submitted in writing by Bidders or by the Contractor.
- 1.7. Refer to the Drawings for additional information.
- 1.8. Contractor shall be responsible for Quality Control of all products and the work.
- 1.9. The work shall proceed continuously from Notice to Proceed until Final Completion.
- 1.10. Contractor shall perform all work consistent with Stillwater Central Railroad, MUTCD and OSHA regulations and requirements.
- 1.11. Dimensions and distances provided are approximate. Contractor shall verify dimensions in the field before ordering materials.
- 1.12. All materials shall be new and shall be of standard production as offered by the manufacturer, unless otherwise approved by the Owner.
- 1.13. All work shall comply with the applicable Rules, Codes and Standards listed in these Specifications, and all Federal, State and Local codes and ordinances, as well as any other authorities that may have lawful jurisdiction pertaining to the work specified. None of the terms or provisions of this specification shall be construed as waiving any of the rules, regulations or requirements of these authorities. The contractor shall procure all necessary permits or licenses to carry out his work.
- 1.14. In any instance where these specifications call for materials for construction of a better quality or larger capacity than required by the codes, the provisions of these specifications shall take precedence. The codes shall govern in other cases of direct conflict between the codes and the specifications.
- 1.15. Purchases of materials for this project shall not be exempt from Sales taxes and use taxes.



Chickasha Municipal Authority, Oklahoma

RFP CMA-2401 GENERAL PROVISIONS

SECTION 101 DEFINITION OF TERMS

Wherever the words, forms or phrases herein defined, or pronouns used in their stead occur in these specifications, in the contract or in the advertisement or any document or instrument herein contemplated or to which these specifications apply, the intent and meaning shall be interpreted as follows:

ADVERTISEMENT - All of the legal publications pertaining to the work contemplated or under contract.

ATTORNEY - The Attorney of the City of Chickasha/Chickasha Municipal Authority or the duly authorized assistants or agents of the Attorney.

AWARD - The decision of the Owner to accept the proposal of the lowest and best bidder for the work, subject to the execution and approval of a satisfactory contract and the required bonds therefor, and to such other conditions as may be specified or otherwise required by law.

AUTHORITY - Chickasha Municipal Authority, acting through its duly authorized representatives or agents.

AUDITOR - The Auditor of the City of Chickasha/Chickasha Municipal Authority of Chickasha, Oklahoma or the duly authorized assistants or agents of the Auditor.

BIDDER - Any person or persons, partnership, company, firm or corporation acting directly or through a duly authorized representative, submitting a proposal for the work contemplated.

CHANGE ORDER - A written order issued by the Owner to the Contractor providing for additions, deletions or revisions to the Work, or for an adjustment in the Contract Price or the Contract Time.

CITY - City of Chickasha, a Municipal Corporation in the State of Oklahoma.

CLERK/TREASURER - The Clerk/Treasurer of the City of Chickasha or the duly authorized assistants or agents of the Clerk/Treasurer.

CONTRACT - The written agreement covering the performance of the work. The contract includes the Advertisement and Notice to Contractors, Proposal, Bonds, Specifications, including special Provisions, Plans, or working drawings and any supplemental agreement pertaining to the work or materials therefore.

CONTRACTOR - The person or persons, partnership, company, firm or corporation entering into contract for the execution of the work, acting directly or through a duly authorized representative.

CONTRACT TIME - The number of calendar days stated in the Agreement to achieve completion of the Contract so that it is ready for final acceptance and final payment. When a calendar date of completion is shown in a proposal, the Contract Time shall be the number of days between the effective date of the Notice to Proceed and the specified Completion Date.

ENGINEER - City Engineer, City of Chickasha/Chickasha Municipal Authority, Oklahoma or the duly authorized agents, engineers, assistants, inspectors or superintendents, acting singularly or severally within the scope of the particular duties entrusted to them.

EXTRA WORK - Any work performed by the Contractor not provided for by the plans, specifications or special provisions.

FURNISH - To supply.

CITY MANAGER/GENERAL MANAGER - The Manager of the City of Chickasha/Chickasha Municipal Authority of Chickasha, Oklahoma.

DIRECTOR OF PUBLIC WORKS - Director of Public Works of the City of Chickasha/Chickasha Municipal Authority, Oklahoma or the duly authorized agents, engineers, assistants, inspectors or superintendents, acting singularly or severally within the scope of the particular duties entrusted to them.

MAINTENANCE BOND - The approved form of security furnished by the Contractor and his Surety as a guarantee that he will maintain the work constructed by him in good condition for the period of time required.

OWNER - The City of Chickasha or Chickasha Municipal Authority, as listed in the Solicitation for Bids or Advertisement for Bids.

OWNER'S REPRESENTATIVE – The individual or company designated by the Owner to represent the Owner during the execution of the work with a duty to protect the Owner's interests in the work.

PERFORMANCE BOND - The approved form of security furnished by the Contractor and his Surety as a guarantee of good faith on the part of the Contractor to execute the work in accordance with the plans, specifications and terms of the contract.

PLAN OR PLANS - All of the drawings pertaining to the contract and made a part thereof, including such supplemental drawings as the Owner may issue from time to time, in order to clarify or explain other drawings or for the purpose of showing changes in the work as authorized under the Section, "Changes and Alterations", or for showing details not shown thereon.

PROPOSAL – The written statement or statements duly filed with the Clerk/Treasure of the person or persons, partnership, company, firm or corporation proposing to do the work contemplated.

PROPOSAL FORM - The approved form on which the formal bids for the work are to be prepared and submitted.

PROPOSAL GUARANTY - The security, designated in the “proposal form” and in the Advertisement, to be furnished by the bidder as a guarantee of good faith to enter into a contract with the Owner and to execute the required bonds for the work contemplated after the work is awarded to him and as liquidated damages in event of failure to do so.

PROVIDE - To furnish and construct, erect or install.

SPECIAL PROVISIONS - The special clauses setting forth conditions or requirements peculiar to the specific project involved, supplementing the Standard Specifications and taking precedent over any conditions or requirements of the Standard Specifications with which they are in conflict.

SPECIFICATIONS - The directions, provisions, and requirements contained herein, together with the “Special Provisions” supplemental hereto, pertaining to the method and manner of performing the work or to the kinds, quantities or qualities of materials to be furnished under the contract, and methods of measurement and basis of payment.

The Standard Specifications, referred to hereinafter, are the editions in effect on the date of the invitation for bids.

STATUTORY BOND - The approved form of Surety furnished by the Contractor and his Surety as a guarantee that he will pay, in full, all bills and accounts for material and labor used in the construction of the work, as provided by law.

SURETY OR SURETIES - The Corporate body which is bound by such bonds as are required with and for the Contractor, and engages to be responsible for the entire and satisfactory fulfillment of the contract and for any and all requirements as set out in the specifications, contract or plans.

THE WORK - All design and construction activities included within the scope of the plans and specifications, including the furnishing of labor, materials, tools, equipment and incidentals, to be performed by the Contractor and Consultant under the terms of the contract.

TREASURER – The Treasurer of the City of Chickasha/Chickasha Municipal Authority of Chickasha, Oklahoma, or the duly authorized assistants or agents of the Treasurer.

TRUSTEES - The Trustees of the Chickasha Municipal Authority.

A.A.N.	American Association of Nurserymen
A.A.R.	Association of American Railroads
A.A.S.H.T.O.	American Association of State Highway and Transportation Officials
A.G.C	Associated General Contractors of America
A.I.A.	American Institute of Architects
A.I.S.C.	American Institute of Steel Construction
A.N.S.I.	American National Standards Institute (United States of American Standards Institute)
A.R.A.	American Railway Association
A.R.E.A.	American Railway Engineering Association
A.S.A.	American Standards Association
A.S.C.E.	American Society of Civil Engineers
A.S.L.A.	American Society of Landscape Architects
A.S.T.M.	American Society for Testing Materials
A.W.P.A.	American Wood Preservers Association
A.W.S.	American Welding Society
A.W.W.A.	American Water Works Association
F.A.A.	Federal Aviation Agency of the U.S. Department of Transportation
F.H.W.A.	Federal Highway Association
F.R.A.	Federal Rail Administration
F.S.S.	Federal Specifications and Standards (General Services Administration)
FM	Factory Mutual
I.E.S.	Illuminating Engineering Society
I.M.S.A.	International Municipal Signal Association
I.T.E.	Institute of Traffic Engineers
M.U.T.C.D.	Manual on Uniform Traffic Control Devices
N.E.C.	National Electrical Code
N.E.M.A.	National Electrical Manufacturers Association
N.S.F.	National Sanitary Foundation
O.A.C.	Oklahoma Aeronautics Commission
O.D.E.Q.	Oklahoma Department of Environmental Quality
O.D.O.T.	Oklahoma Department of Transportation
O.S.D.H.	Oklahoma State Department of Health
O.S.H.A	Occupational Safety and Health Association
O.W.R.B.	Oklahoma Water Resources Board
S.A.E.	Society of Automotive Engineers
S.S.P.C.	Steel Structures Paint Council
U.L.	Underwriter's Laboratory

SECTION 102 PROPOSAL REQUIREMENTS AND CONDITIONS

102.01 CONTENTS OF PROPOSAL FORM. The Owner will furnish bidders with proposal forms which will state the general location and description of the contemplated work and which will contain a list of the items of work to be completed or materials to be furnished and upon which bid prices are requested. The proposal form will state the time limits for commencing and for completing the work and will provide for entering the amount of the proposal guaranty. The proposal form will contain a non-collusion affidavit.

102.02 INTERPRETATION OF PLANS AND SPECIFICATIONS. If any person contemplating submitting a bid for the proposed contract is in doubt as to the true meaning of any part of the plans, specifications or other proposed contract documents, he shall submit to the Owner a written request for an interpretation thereof. The person submitting such request will be responsible for its prompt delivery. An interpretation of the proposed documents will be made only by Addendum duly issued and a copy of such Addendum will be mailed or delivered to each person receiving a set of such documents. The Owner will not be responsible for any other explanations or interpretations of the proposed documents.

102.03 EXAMINATION OF DOCUMENTS AND SITE OF THE WORK. Bidders are advised that the plans and specifications on file with the Clerk/Treasurer shall constitute all the information which the Owner will furnish. No other information given by the Owner or any official thereof prior to the execution of the contract shall ever become a part of or change the contract, plans or specifications or be binding on the Owner. Bidders are required, prior to submitting any proposal, to read carefully the specifications, the proposal, contract and bond forms; to examine carefully all plans on file with the Clerk/Treasurer; to visit the site of the work; to examine carefully local conditions; to inform themselves by their independent research of the difficulties to be encountered and judge for themselves of the accessibility of the work and all attending circumstances affecting the cost of doing the work or the time required for its completion and obtain all information required to make an intelligent proposal. Bidders shall rely exclusively upon their own estimates, investigations and other data, which are necessary for full information upon which the proposal may be based. It is mutually agreed that submission of a proposal will be evidence that the bidder has made the examination and investigations required herein.

102.04 PREPARATION OF PROPOSAL. The bidder shall submit his proposal in single copy on the forms furnished by the Owner. All blank spaces in the proposal forms shall be correctly filled in and the bidder shall state the prices, written in ink, both in words and numerals, for which he proposes to do the work contemplated or furnish the materials required.

Such prices shall be written distinctly legible, in case of conflict between words and

numerals, the words will govern. If an individual submits the proposal, he must sign his name or his duly authorized agent and list his mailing address. If the proposal is submitted by a firm or partnership, the name and mailing address of the firm or partnership must be listed and the proposal signed by a member of the firm or partnership as a person duly authorized. If the proposal is made by a company or corporation, the company or corporate name and the state under the laws of which said company, or corporation is chartered and the business address must be listed and the proposal signed by an official or agent duly authorized. Powers of Attorney, authorizing agents or others to sign proposals must be properly certified and must be in writing on file with the Clerk/Treasurer.

102.05 NON-COLLUSION AFFIDAVIT. Each proposal or copy thereof shall be accompanied by a sworn statement in writing that the person signing the proposal executed said proposal on behalf of the bidder therein named and that he had lawful authority to do so and that said bidder has not directly or indirectly entered into any agreement, expressed or implied, with any other bidder or bidders having for its object the controlling of the amount of such bid or any bids, the limiting of the bid or bidders, the parceling or farming out to any bidder or bidders or other persons of any part of the contract or any bid or the subject matter of the bid or of the profits thereof, and that he had not and will not divulge said sealed bid to any person whatever except those having a partnership or other financial interest with him in said bid, until after the said sealed bids are opened.

102.06 PROPOSAL GUARANTY. Proposals will not be considered unless the original filed with the Clerk/Treasurer is accompanied by a certified or cashier's check, bank money order, or bidder's bond, in the required amount, made payable to the Owner. The proposal guaranty shall be in an amount of not less than five percent (5%) of the total amount of the bid unless otherwise provided in the Advertisement or Special Provisions. The proposal guaranty is required as evidence of good faith and as a guarantee that if awarded the contract, the bidder will execute the contract and furnish the required bonds within the required time and as liquidated damages in event of failure to do so.

102.07 FILING OF PROPOSALS. No proposals will be considered by the Owner unless they are filed in sealed envelopes with the Clerk/Treasurer in his office in the City Hall, Chickasha, Oklahoma, within the time limit for receiving proposals, as stated in the advertisement. Each proposal shall be plainly marked on the envelope with the word "Proposal", the name of the project, and the date and hour of opening.

102.08 WITHDRAWAL OF PROPOSALS. Permission will not be granted to withdraw or modify any proposal after it has been filed.

102.09 OPENING OF PROPOSALS. The proposals filed with the Clerk/Treasurer will be opened in public at the time and place stated in the advertisement.

Bidders are invited to attend the bid opening at the time and place set forth in the advertisement.

102.10 IRREGULAR PROPOSALS. Proposals may be considered irregular if they show any omissions, alterations of forms, additions or conditions not requested unauthorized alternate bids or irregularities of any kind. However, the Owner reserves the right to waive technicalities as to changes, alterations or reservations and make the award in the best interest of the Owner.

102.11 REJECTION OF PROPOSALS. The Owner reserves the right to reject any or all proposals, and all proposals submitted are subject to this reservation. Proposals may be rejected for any of the following specific reasons:

- (a) Proposal received after the time limit for receiving proposals as stated in the advertisement;
- (b) Proposal prices obviously unbalanced;
- (c) Summation of proposal prices on any one project above the Engineers estimate of cost for such project;
- (d) Proposal containing any irregularities.

102.12 DISQUALIFICATION OF BIDDERS. Bidders may be disqualified and their proposals not considered for any of the following specific reasons:

- (a) Where more than one proposal for an individual, firm, partnership or corporation is filed under the same or different names and where such proposals are not identical in every respect;
- (b) Reasonable grounds for believing that any bidder is interested in more than one proposal for the work contemplated or materials to be furnished;
- (c) Reason for believing that collusion exists among bidders;
- (d) The bidder being in arrears on any existing contracts, interested in any litigation against the Owner or having defaulted on a previous contract;
- (e) Incomplete work which, in the judgment of the Owner, will hinder or prevent the prompt completion of additional work, if awarded.

SECTION 103

AWARD AND EXECUTION OF CONTRACT

103.01 CONSIDERATION OF PROPOSALS. After the proposals are opened, those proposals containing unit prices will be tabulated for comparison on the basis of the quantities shown in the approximate estimate. Until the final award of the contract, the Owner reserves the right to reject any or all proposals, to waive technicalities and to advertise for new proposals or proceed to do the work otherwise when the best interests of the Owner will be promoted thereby.

Projects advertised as all parts tied: Bidder shall submit a bid for each part. Tied bid projects will be considered on the basis of the total dollar amount bid for all tied parts.

Projects advertised as parts not tied: Bidder may submit a bid for an individual part, or multiple parts, as either tied or separate. Bidder shall clearly indicate the intent of his bids. Bids submitted as tied bids will be considered on the basis of the total dollar amount bid for all tied parts. Bids submitted as separate parts may be considered on the basis of the dollar amount for each part, or the total dollar amount of any combination of parts, when it appears to be in the best interest of the Owner.

103.02 AWARD OF CONTRACT. The Owner reserves the right to withhold the award of the contract for a reasonable period of time from the date of opening the proposals and no award will be made until the necessary investigations are made as to the responsibility of the low bidder. The awarding of the contract shall give the bidder no right of action or claim against the Owner upon such contract until the execution of the contract shall have been completed and the contract delivered to the Contractor. The Owner reserves the right to award all or any portion or portions of the work.

103.03 RETURN OF PROPOSAL GUARANTY. As soon as the proposal prices have been compared, the Owner may, at its discretion, return the proposal guaranties accompanying proposals which in its judgment would not be considered in making the award.

103.04 SURETY BONDS. With the execution and delivery of the contract, the Contractor shall furnish and file with the Owner in the amounts herein required, the following surety bonds:

- (a) A good and sufficient Performance Bond in an amount equal to one hundred percent (100%) of the approximate total amount of the contract, guaranteeing the full and faithful execution of the work and performance of the contract and for the protection of the Owner and all property owners interested against any damage by reason of the negligence of the Contractor, or the improper execution of the work or the use of inferior materials;

- (b) A good and sufficient Statutory Payment Bond in an amount equal to one hundred percent (100%) of the approximate total amount of the contract, guaranteeing payment for all labor, materials and equipment used in the construction of the improvement.
- (c) A good and sufficient Maintenance Bond in an amount equal to one hundred percent (100%) of the contract price, conditioned for the maintenance in good condition of the improvement for a period of one (1) year from the time of acceptance by the Owner, or as otherwise specified in the Advertisement and Proposal.
- (d) No surety will be accepted who is now in default or delinquent on any bond or who is interested in any litigation against the Owner. AD bonds shall be made on forms acceptable to the Owner and shall be executed by surety companies licensed to do business in the State of Oklahoma and acceptable to the Owner. Each bond shall be executed by the Contractor and the Surety.

Should any surety on the contract be determined unsatisfactory at any time by the Owner, notice will be given to the Contractor to that effect and the Contractor shall forthwith substitute a new Surety or Sureties satisfactory to the Owner. No payment will be made under the contract until the new surety or sureties, as required, have qualified and been accepted by the Owner. The contract shall not be operative nor shall any payments be due until approval of the bonds has been made by the Owner.

103.05 EXECUTION OF CONTRACT. The person(s), partnership, company, firm or corporation to whom a contract is awarded shall within ten (10) business days after such award sign the necessary agreements entering into the required contract with the Owner and execute and deliver the required bonds.

No contract shall be binding on the Owner until it has been approved by the Attorney, executed by the Owner and delivered to the Contractor.

103.06 FAILURE TO EXECUTE CONTRACT. Upon failure of the bidder to execute the required bonds or to sign the required contract within ten (10) business days after the contract is awarded, he will be considered to have abandoned his proposal and the Owner may annul the award. By reason of the uncertainty of market prices of the materials and labor and it being impracticable and extremely difficult to fix the amount of damages to which the Owner would be put by reason of said bidder's failure to execute said bonds and contract within ten (10) business days, the proposal guaranty accompanying the proposal shall be the agreed amount of damages which the Owner will suffer by reason of such failure on the part of the bidder and shall thereupon be retained by the Owner as liquidated damages. The filing of a proposal will be considered as an acceptance of this provision.

103.07 PRE-WORK CONFERENCE. The Contractor and Consultant shall attend a Pre-Work Conference, scheduled by the Owner, to clarify the intent of the work and to present the Contractor's work plan, including progress schedule as provided by Section 107.04, prior to starting work on the project.

SECTION 104 SCOPE OF WORK

104.01 INTENT OF PLANS AND SPECIFICATIONS. The intent of the plans and specifications is to prescribe a complete work or improvement which the Contractor undertakes to provide, in full compliance with the plans, specifications, special provisions, proposal and contract. The Contractor shall provide all work as specified in the plans, special provisions, specifications, proposal and contract, except that specifically shown to be provided by the Owner or others, and shall provide such additional extra and incidental work as may be considered necessary to complete the work in a satisfactory and acceptable manner. He shall furnish all labor, materials, tools, equipment and incidentals necessary to the prosecution of the work.

104.02 SPECIAL PROVISIONS. Should any work or any conditions which are not thoroughly or satisfactorily stipulated or covered by the general or standard specifications be anticipated on any proposed work "Special Provisions" for such work may be prepared and shall be considered as a part of the specifications and contract.

104.03 INCREASED OR DECREASED QUANTITIES OF WORK. The Owner reserves the right to alter the quantities of the work to be performed or to extend or shorten the improvement any time when and as found necessary, by means of change orders, and the Contractor shall perform the work as altered, increased or decreased. No allowance will be made for any change in anticipated profits nor shall such changes be considered as waiving or invalidating any condition or provision of the contract.

104.04 ALTERATIONS OF PLANS AND SPECIFICATIONS. The Owner reserves the right to make such changes in the plans and in the character of the work as may be necessary or desirable to insure completion of the work in the most satisfactory manner, provided such changes do not materially alter the original plans and specifications or change the general nature of the work as a whole. Such changes shall not be considered as waiving or invalidating any condition or provision of the contract.

104.05 EXTRA WORK. When any work is necessary to the proper completion of the project for which no prices are provided in the proposal or contract, the Contractor shall do such work, but only when and as ordered in writing by the Owner and with the prior approval of the Owner.

Payment for extra work will be made as hereinafter provided.

104.06 FINAL CLEANUP. Upon completion of the work and before acceptance and final payment will be made, the Contractor shall clean and remove from the site of the work surplus and discarded materials, temporary structures, stumps or portions of trees and debris of any kind. He shall leave the site of the work in as good or better than condition as prior to work.

SECTION 105 CONTROL OF THE WORK AND MATERIALS

105.01 AUTHORITY OF OWNER'S REPRESENTATIVE. All work shall be provided to the satisfaction of the Owner's Representative. He shall decide all questions which arise as to the quality and acceptability of materials furnished, work performed, manner of performance, rate of progress of the work, interpretation of the plans and specifications, acceptable fulfillment of the contract, compensation, mutual rights between contractors under these specifications and suspension of work. He shall determine the amount and quality of work performed and materials furnished and his decisions and estimates shall be final. His estimate in such event shall be a condition precedent to the right of the Contractor to receive money due him under the contract.

The authority of the Owner's Representative shall not be construed to include the authority to waive, revise or modify specifications as herein set forth either as to kind, type or quality of materials or manner or quality of construction, unless an appropriate Change Order is executed.

Neither the Owner's Representative, nor his designated representatives, shall act as supervisor of the work, nor shall the Contractor rely on any such supervision.

105.02 DETAIL SHOP AND WORKING DRAWINGS FURNISHED BY CONTRACTOR. The Contractor shall submit to the Owner's Representative for approval, such additional shop and working drawings of structures or equipment as may be required, and, prior to the approval of such drawings by the Owner's Representative, any work done or materials ordered shall be at the Contractor's risk. The contract price shall include the cost of furnishing such drawings.

105.03 CONFORMITY WITH PLANS. ALLOWABLE DEVIATIONS. All work shall conform to the lines, grades, cross-sections and dimensions shown on the plans. All deviations from the plans will be accomplished by Change Orders prepared by the Engineer. All Change Orders shall be in writing, and shall, except in case of emergency, be approved by the governing body of the Owner before the work is commenced. Where an actual emergency exists, wherein the delay caused by submitting the Change Order to the governing body of the Owner for approval would jeopardize the interest of the Owner or the public, the Owner's Representative may approve the change in writing. However, Change Orders approved by the Owner's Representative under the circumstances outlined above shall be submitted to the governing body of the Owner for consideration at the next regular meeting. Two (2) copies shall be furnished to the Owner and two (2) copies shall be furnished to the Contractor of all Change Orders approved by the Owner's Representative. Change Orders submitted to the governing body of the Owner for approval shall bear the approval of the Owner's Representative and shall be prepared in four (4) copies, distribution as follows: 2 copies to the Contractor; and 2 copies to the Owner's Representative.

Change Orders shall include the following:

- (a) Complete detail of the work contemplated.
- (b) Estimated cost of the work as originally planned and as contemplated by the Change Order.
- (c) Complete justification.
- (d) Statement as to whether the prices shown are contract bid prices or agreed prices.
- (e) Statement by the Contractor that he agrees to perform the work at the prices shown.

105.04 EXISTING STRUCTURES NOT SHOWN ON PLANS. The plans show the location of certain existing surface and subsurface structures. The Owner assumes no responsibility for failure to show any or all structures on the plans or to show them in their exact location. It is mutually agreed such failure will not be considered sufficient basis for claims for extra work or for increasing the pay quantities in any manner whatsoever, unless the obstruction encountered is such as to necessitate substantial changes in the lines or grades or requires the building of a special structure, provision for which is not made in the plans, in which case the provisions in these specifications for "Extra Work" will apply.

105.05 COORDINATION OF PLANS, SPECIFICATIONS, PROPOSAL AND SPECIAL PROVISIONS. The plans, these specifications, the proposal, Special Provisions and all supplementary documents are intended to describe a complete work and are essential parts of the contract. A requirement occurring in any of them is binding. In case of discrepancies, figured dimensions shall govern over scaled dimensions; plans shall govern over specifications; Special Provisions shall govern over the plans and over both General and Standard Specifications, and the quantities shown on the plans shall govern over those shown in the proposal. The Contractor shall take no advantage of any apparent error or omission in the plans and specifications, and the Owner's Representative shall be permitted to make such corrections or interpretations as may be deemed necessary for the fulfillment of the plans and specifications. In the event the Contractor discovers any apparent error or discrepancy, he shall immediately call such error or discrepancy to the attention of the Owner's Representative.

105.06 COOPERATION OF CONTRACTOR. Three sets of plans and specifications will be furnished the Contractor as follows: One office copy, one for the Field Superintendent, and one copy for job use. The Contractor, however, shall have a set of plans and specifications available at all points where a separate construction crew is working.

The Contractor shall give the work the consistent attention necessary to facilitate the progress thereof, and he shall cooperate with the Owner's Representative and any inspectors and with other contractors in every way possible. The Contractor shall provide a competent Superintendent on the work at all times who is fully authorized as his agent on the work. Such Superintendent shall be capable of reading and thoroughly understanding the plans and specifications and shall receive and fulfill instructions from the Owner's Representative or his representative.

The Contractor and his Superintendent shall provide all reasonable facilities to enable the Owner's Representative and any inspectors to inspect the workmanship and materials entering the work.

105.07 CONSTRUCTION STAKING. The Contractor shall furnish, place and maintain construction layout stakes necessary for the proper prosecution and inspection of the work under the contract in accordance with these Specifications.

The Owner will locate and reference the centerline of construction and will establish bench marks and set sufficient right-of-way stakes to define right-of-way limits. The Owner will set stakes to mark centerline and establish bench marks for bridges and special structures as may be considered necessary. The Owner's stakes and benchmarks shall constitute field control staking.

The Contractor shall exercise care in the preservation of stakes and bench marks and shall have them reset at his expense when any are damaged, lost, displaced or removed. The Contractor shall use competent personnel and suitable equipment for the layout of the work required. The Contractor shall not engage the services of any person or persons in the employment of the Owner or its equipment for the performance of any of this work.

The Contractor shall provide field forces and shall set all additional stakes needed, such as offset stakes, reference point stakes, slope stakes, pavement and curb line and grade stakes, stakes for bridges, sewers, roadway drainage, pipe underdrains, paved gutter, fence, culverts or other structures, and any other horizontal or vertical controls necessary to secure a correct layout of the work. Stakes for line and grade shall be adequate to maintain the specified tolerances for the operation being performed. The station number and the distance from the centerline of construction shall be marked on all grade stakes.

The Contractor shall furnish the original of his survey records to the Owner for the Owner's permanent file. These records shall be furnished as they are completed during the progress of the work. These records shall be in permanently bound field books and/or level books and formatted in a manner commonly accepted by the surveying profession. The Owner's Representative may at any time check the correctness of the Contractor's staking work by using spot check method. When significant errors occur, the Contractor shall resurvey to the satisfaction of the Owner's Representative. The Contractor shall furnish, at his expense, platforms and equipment necessary for proper and safe access for checking his staking. Any inspection or checking of the Contractor's layout by the Owner's Representative and the acceptance of all or any part of it shall not relieve the Contractor of his responsibility to secure the proper dimensions, grades, and elevation of the several parts of the work. Deviations resulting from plan errors will be resolved by the Owner.

Contractor construction staking will not be paid as a separate item, but all associated costs shall be included in the price bid for other items of work.

105.08 MEASUREMENTS. Before ordering any material or doing any work, the Contractor shall verify all measurements involved and shall be responsible for the correctness of same. No extra charge or compensation will be allowed on account of difference between actual dimensions and the measurements indicated on the drawings, and any difference which may be found shall be submitted to the Owner's Representative for consideration before proceeding with the work.

105.09 SOURCE OF SUPPLY AND QUALITY OF MATERIALS. The Contractor shall not start delivery of materials until the Owner's Representative has approved the source of supply. Only materials conforming to the requirements of these specifications shall be used in the work and such materials shall be used only after written the Owner's Representative has given approval and only so long as the quality of said material remains equal to the requirements of the specifications. The Contractor shall furnish approved materials from other sources, if, for any reason, the product from any source at any time before commencing or during the prosecution of the work proves unacceptable. After approval, any material which has become mixed with or coated by dirt or any other foreign substances during its delivery and handling shall not be used in the work.

105.10 MATERIALS AND WORKMANSHIP. The Contractor shall submit samples of materials, finish, appliances, etc., when required by the Owner's Representative, and all such samples must be approved by the Owner's Representative in writing before the work is executed and all work shall conform in all respects to the approved samples. Any work which does not conform to the approved samples will be rejected, and shall be removed and replaced by work that does so conform.

105.11 SAMPLES AND TESTS OF MATERIALS. Where, in the opinion of the Owner's Representative or called for in the specifications, tests of materials are necessary, such tests shall be made by, and at the expense of the Contractor, unless otherwise provided. Tests, unless otherwise specified, are to be made in accordance with the latest standard methods of the American Society for Testing Materials. The Contractor shall provide such facilities as the Owner's Representative may require for collecting and forwarding samples and shall not use the materials represented by the samples until test results have been approved by the Owner's Representative.

The Contractor in all cases shall furnish the required samples without charge.

105.12 CONTRACTOR'S QUALITY CONTROL

- (a) Contractor shall be responsible for all Quality Control necessary to ensure compliance with these specifications and any manufacturer's requirements. Contractor's Quality Control shall include testing, documentation, and daily diaries, with copies to the Owner's Representative. All associated costs for Contractor's Quality Control shall be included in the price bid for other items.
- (b) The Contractor must show proof that all employees associated with this project shall have been employed by the Contractor for a period not less than six (6) months, unless waived by the Owner's Representative.

105.13 STORAGE OF MATERIALS. Materials shall be stored so as to insure the preservation of their quality and fitness for the work. They shall be placed on wooden platforms or other hard, clean surfaces and not on the ground, and shall be placed under cover when directed. Stored materials shall be located so as to facilitate prompt inspection.

105.14 INSPECTION. The Contractor shall furnish the Owner's Representative with every reasonable facility for ascertaining whether or not the work as performed is in accordance with the requirements and intent of the plans and specifications. If the Owner's Representative requires, the Contractor shall at any time before acceptance of the work, remove and uncover

such portions of the finished work as may be directed, for inspection. After inspection, the Contractor shall restore said portions of the work to the condition required by the specifications.

Should the work thus exposed on examination prove acceptable the cost of uncovering or removing and the replacing of the covering or making good the parts removed will be paid for as "Extra Work". Should the work so exposed or examined prove unacceptable, the cost of covering or removing and the replacing of the covering or making good of the parts removed shall be at the Contractor's expense. When ample notice of the intention to complete or cover up the work was not given by the Contractor to the Owner's Representative, then the cost of the uncovering or removing and the replacing of the covering or making good of the parts removed shall be borne by the Contractor regardless of whether or not the work examined proved acceptable or unacceptable. Any work provided or materials used without suitable supervision or inspection by the Owner's Representative may be ordered removed and replaced at the Contractor's expense.

105.15 REMOVAL OF DEFECTIVE AND UNAUTHORIZED WORK All work which has been rejected or condemned shall be repaired, or, if it cannot be satisfactorily repaired, it shall be removed and replaced at the Contractor's expense. Defective materials shall be removed immediately from the site of the work.

Work provided without lines and grades having been given, work provided beyond the lines or not in conformity with the grades shown on the plans or as given, save as herein provided; work provided without written authority and prior agreement in writing as to prices, will be provided at the Contractor's risk and will be considered unauthorized, and, at the option of the Owner's Representative may not be measured and paid for and may be ordered removed at the Contractor's expense.

Upon the failure of the Contractor to satisfactorily repair or to remove and replace, if so directed, any rejected, unauthorized or condemned work or materials immediately after receiving notice from the Owner's Representative, the Owner's Representative shall, after giving written notice to the Contractor, have the authority to cause unauthorized work to be removed and to deduct the cost thereof from any compensation to become due to the Contractor. If the Owner's Representative and Owner deem it inexpedient to correct work injured or done not in accordance with the contract, an equitable deduction from the contract price may be made therefor.

105.16 CORRECTION OF WORK AFTER FINAL PAYMENT. Neither the final certificate nor payment nor any provision in the Contract Documents shall relieve the Contractor of responsibility for faulty materials or workmanship and, unless otherwise specified, he shall remedy any defects due thereto and pay for any damage to other work resulting therefrom, which shall appear within a period of one year from the date of substantial completion. The Owner shall give notice of observed defects with reasonable promptness.

105.17 FINAL INSPECTION. The Owner's Representative shall make final inspection of all work included in the contract or any portion thereof as soon as practicable after the work is completed and ready for acceptance. If the work is not acceptable to the Owner's Representative at the time of such inspection, he shall inform the Contractor as to the particular defects to be remedied before the final acceptance can be made.

SECTION 106
LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

106.01 **LAWS TO BE OBSERVED.** The Contractor shall, at all times, observe and comply with all Federal and State laws and City ordinances and regulations which in any manner affect the conduct of the work and shall observe and comply with all orders and decrees which exist at the present or which may be enacted later, of bodies or tribunals having jurisdiction or authority over the work, and no plea of misunderstanding or ignorance thereof will be considered. The Contractor and his surety shall defend, indemnify and save harmless the City and all its officers, agents, employees and servants against any claims or liability arising from or based on the violation of any such law, ordinance, regulation, order or decree, whether by himself or his employees.

106.02 **PERMITS AND LICENSES.** The Contractor shall procure all permits and licenses, pay all charges or fees, and give all notices necessary and incidental to the due and lawful prosecution of the work.

106.03 **PATENTED DEVICES, MATERIALS AND PROCESSES.** If the Contractor is required or desires to use any design, device, material or process covered by letters patent or copyright, he shall provide for such use by suitable legal agreement with the patentee or owner. It is mutually understood and agreed that without exception the contract prices shall include all royalties or costs arising from patents, trademarks and rights in any way involved in the work. The Contractor and Surety shall defend, indemnify and save harmless the Owner and all its officers, agents and employees from all suits, actions or claims of any character, name and description brought for or on account of infringement or alleged infringement by reason of the use of any such patented design, device, material or process or any trademark or copyright used in connection with the work agreed to be performed under this contract, and shall indemnify the Owner for any cost, expense or damage which it may be obliged to pay by reason of any action or actions, suit or suits which may be commenced against the Owner for any such infringement or alleged infringement at any time during the execution or after the completion of the work contracted for herein, It is mutually agreed that the Owner may give written notice of any such suit to the Contractor, and thereafter the Contractor shall attend to the defense of the same and save and keep harmless the Owner from all expense, counsel fees, cost liabilities, disbursements, recoveries, judgments and executions in any manner growing out of, pertaining to or connected therewith.

106.04 **SANITARY PROVISIONS.** The Contractor shall establish and enforce among his employees such regulations in regard to cleanliness and disposal of garbage and waste as will tend to prevent the inception and spread of contagious or infectious diseases and to effectively prevent the creation of a nuisance about the work or any property, either public or private and such regulations as are required by the Owner's Representative shall be put into effect immediately by the Contractor. Contractor shall strictly comply with all sanitary laws and regulations of the Owner and the State of Oklahoma.

106.05 **PUBLIC CONVENIENCE AND SAFETY.** Materials stored about the work shall be so placed and the work shall at all times be so conducted as to cause no greater obstruction of the traveling public than is considered necessary by the Owner's Representative. The Contractor shall make arrangements satisfactory to the Owner's Representative for handling traffic. Sidewalks must not be obstructed unless by special permission of the Owner's Representative. Neither the materials excavated nor the construction materials or plant used in the construction

of the work shall be placed so as to endanger the work or prevent free access to all fire hydrants, water valves, gas valves, manholes for electric, telephone, telegraph or traffic signal conduits, sewers or fire alarm or police call boxes in the vicinity. The Owner reserves the right to remedy any neglect on the part of the Contractor as regards the public convenience and safety which may come to its attention, after twenty-four (24) hours notice in writing to the Contractor, save in cases of emergency when it shall have the right to remedy any neglect without notice and, in either case, the cost of such work done by the Owner shall be deducted from monies due or to become due the Contractor. The Contractor shall notify the Public Works Director a minimum of 24 hours before any street is closed or obstructed and shall keep any street or streets in condition for unobstructed use by fire and other emergency apparatus, as much as is practical.

Where the Contractor is required to construct temporary culverts or bridges or make other arrangements for crossings over ditches or streams, his responsibility for accidents shall include the roadway approaches as well as the structures of such crossings.

Contractor shall give written notice to all residents/occupants/businesses that may be affected by the work (e.g. water disruption, street closure, sewer jet cleaning). Said written notice shall be delivered no less than 48 hours, nor more than 2 weeks prior to the start time of the disruption.

The written form may be "door hangars", but in any event shall be submitted to and approved by the Owner's Representative prior to use. At a minimum the form shall contain:

- Project Identification
- Contractor Name, address, Telephone Number
- Type of Construction
- Reason for affecting or disrupting service and duration of such

106.06 PRIVILEGES OF CONTRACTOR IN STREETS, ALLEYS, OR RIGHTS-OF-WAY.

For the performance of the contract, the Contractor will be permitted to occupy such portions of streets or alleys, other public places or other rights-of-way as provided for in the ordinances of the City, as shown on the plans or as permitted by the Owner's Representative. A reasonable amount of tools, materials and equipment for construction may be stored in such space but not more than is necessary to avoid delay in the construction. Excavated and waste materials shall be piled or stacked in such a way as not to interfere with spaces that may be designated to be left free and unobstructed, nor inconvenience occupants of adjoining property. Other contractors of the Owner may, for all purposes required by their contracts, enter upon the work and premises used by the Contractor, and the Contractor shall give to other contractors of the Owner, all reasonable facilities and assistance for the completion of the adjoining work. Any additional grounds desired by the Contractor for his use shall be provided by him at his own expense.

106.07 RAILWAY CROSSINGS. When the work encroaches upon the right-of-way of any railway, the Owner will secure for the Contractor, all the necessary contracts, easements or authority to enter upon such right-of-way for the prosecution and completion of the work. Where railway tracks are to be crossed, the railway company, if it elects to do so, may construct the necessary bridges, trestles, cribs or other structures for the safe operation of trains or cars across any excavation during the time of construction of the work, and the cost of construction of such bridges, trestles, cribs or other structures shall be paid to the railway company by the Contractor together with the necessary cost of any supervision or other incidental expenses which may be required by the railway company while the work is in progress on the right-of-way of the railway company, and all such costs shall be taken into consideration by the Contractor in submitting proposals. The Contractor shall take such special precautions for the safety of the

work and the traveling public as may be necessary by sheeting, bracing and thoroughly supporting the sides of any excavation and supporting and protecting any adjacent structures.

106.08 BARRICADES AND WARNING SIGNS. Where work is carried on, in or adjacent to any street, alley, or public place, the Contractor shall furnish and erect such barricades, fences, lights, signs and other appurtenances in accordance with the MUTCD and OSHA requirements. The Contractor shall take such precautionary measures for the protection of persons or property and of the work as are necessary. Failure to comply with this requirement may result in the Owner's Representative discontinuing or suspending the work until the Contractor shall have provided the necessary protection.

The Contractor's responsibility for the maintenance of barricades, signs and lights and protection of the work shall not cease until the project shall have been accepted by the Owner.

106.09 USE OF EXPLOSIVES. Should the Contractor elect to use explosives to loosen rock or for any other purpose in the prosecution of the work, he shall obtain the required permits and the written permission of the Owner's Representative before any blasting is done, but neither the issuance of said permits, the granting of said permission nor any other act, requirement or condition contained in the specifications, nor any order, direction or approval given by the Owner's Representative or any other official or employee of the Owner shall be construed as requiring or directing the use of any explosives or as accepting any liability for any injury or damage to persons or property resulting from such usage. No blasting shall be done unless an Inspector is present and the Contractor shall notify the City Code Enforcement Division when he is ready to begin any blasting work. All necessary precautions shall be taken by the Contractor as required by the ordinances of the City or the laws of the State of Oklahoma relative to blasting and the necessary provisions shall be made for the protection of the new work and all blasting shall be so conducted as not to endanger persons or property. Only sufficient quantity of explosives necessary for the immediate day's work shall be kept on hand by the Contractor. Storage of caps, exploders and explosives shall be done strictly in compliance with the orders of the Owner's Representative and the ordinances of the City. The Contractor shall be responsible for and shall make good any damage caused by blasting or accidental explosions.

The Contractor shall notify the proper representatives of any public service corporation, any company or individual, not less than forty-eight (48) hours in advance of any blasting which might cause damage to their or his property along or adjacent to the work. Wherever explosives are stored, they shall be kept in a safe, secure manner and all storage places shall be plainly marked "Dangerous Explosives", and shall be under the care of a competent watchman at all times.

106.10 PROTECTION AND RESTORATION OF PROPERTY. The Contractor shall not enter upon private property for any purpose without first obtaining permission and he shall be responsible for the preservation of and shall use every precaution necessary to prevent damage to all trees, fences, culverts, bridges, pavements, driveways, sidewalks, etc., to all water, sewer, gas or electric lines or appurtenances thereof and to all other public or private property along or adjacent to the work. The Contractor shall notify the proper representatives of any public service corporation, and company or any individual, not less than twenty-four (24) hours in advance of any work which might damage or interfere with the operation of their or his property, along or adjacent to the work. He shall be responsible for all damage or injury to property of any character resulting from any act, omission, neglect, or misconduct in the manner or method of executing the work or due to his non-execution of the work, or at any time due to defective work or materials, and said responsibility shall not be released until the work shall have been completed and accepted. When any direct or indirect damage or injury is done to public or private property

on account of any act, omission, neglect or misconduct in the execution of the work or in consequence of the non-execution thereof on the part of the Contractor, he shall restore at his expense such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding or otherwise restoring, or he shall make good such damage for injury in an acceptable manner.

In case of the failure on the part of the Contractor to restore such property or make good such damage or injury, the Owner may, upon forty-eight (48) hours written notice, under ordinary circumstances, and without notice when a nuisance or hazardous condition results, proceed to repair, rebuild or otherwise restore such property as may be determined necessary and the cost thereof will be deducted from any monies due or to become due the Contractor under his contract.

106.11 PROTECTION AND PRESERVATION OF LAND MONUMENTS AND PROPERTY-LINE MARKS. The Contractor shall protect carefully from disturbance or damage all land monuments and iron pins or other markers which establish property lines, provided that where such monuments or markers must, of necessity, be disturbed or removed in the performance of the contract, the Contractor shall first give ample notice to the Owner's Representative, so that he may witness or reference in such monuments or markers. Should the Contractor disturb, remove or damage any established land monument or property line mark without first giving the Owner's Representative ample notice, the Owner's Representative may, at his option deduct the cost of re-establishing such monuments or markers from any monies due to become due the Contractor.

106.12 RESPONSIBILITY FOR DAMAGE CLAIMS. The Contractor and his surety shall defend, indemnify and save harmless the Owner and all its officers, agents and employees from all suits, actions or claims of any character, name and description brought for or on account of any injuries or damages received or sustained by any person or persons or property by or from the said Contractor or his employees or by or in consequence of any negligence in safeguarding the work or through the use of unacceptable materials in constructing the work or by or on account of any act or omission, neglect or misconduct of said Contractor or by or on account of any claim or amounts arising or recovered under the Workmen's Compensation Law or any other law, ordinance, order or decree, and so much of the money due the said Contractor under and by virtue of his contract as shall be considered necessary by the Owner may be retained for the use of the Owner, or in case no money is due, his surety shall be held until such suit or suits, action or actions, claim or claims for injury or damages as aforesaid shall have been settled and satisfactory evidence to the effect furnished to the Owner.

106.13 CONTRACTOR'S CLAIM FOR DAMAGES. Should the Contractor claim compensation for any alleged damage by reason of the acts or omissions of the Owner, he shall within ten (10) days after the sustaining of such damage, make a written statement to the Owner's Representative, setting out in detail the nature of the alleged damage. On or before the 25th day of the month succeeding that in which any such damage is claimed to have been sustained, the Contractor shall file with the Owner's Representative an itemized statement of the details and amount of such damage, and upon request shall give the Owner's Representative access to all books of accounts, receipts, vouchers, bills of lading and other books or papers containing any evidence as to the amount of such damage. Unless such statement shall be filed as thus required, the Contractor's claim for compensation shall be waived and he shall not be entitled to payment on account of any such damage.

106.14 PUBLIC UTILITIES AND PUBLIC PROPERTY. In the event it is necessary to change or move the property of any owner of a public utility, such owner will, upon proper application by the Contractor, be notified by the Owner's Representative to change or move such property within a specified time, and the Contractor shall not interfere with such property until ordered to do so by the Owner's Representative. The right is reserved to the owner of public utilities to enter upon the limits of the contract for the purpose of making such repairs or changes of their property that may be necessary by performance of the contract. The Owner shall have the privilege of entering upon the limits of the contract for the purpose of repairing or relaying sewer and water lines and appurtenances, repairing culverts or storm drains, and for making other repairs, changes or extensions to any utilities.

The Contractor shall provide all notices to the ONE-OKIE system prior to excavating, in accordance with State law.

106.15 TEMPORARY SEWER AND DRAIN CONNECTIONS. When existing sewers have to be taken up or removed, the Contractor at his own expense shall provide and maintain temporary outlets and connections for all private or public drains, sewers or sewer, inlets. He shall also take care of all sewage and drainage which will be received from these drains, sewers and sewer inlets, and for this purpose he shall provide and maintain at his own expense adequate pumping facilities and temporary outlets or diversions. He shall construct such troughs, pipes or other structures necessary and be prepared at all times to dispose of drainage and sewage received from these temporary connections until such time as the permanent connections are built and in service. The existing sewers and connections shall be kept in service and maintained under the contract, save where specified or ordered to be abandoned by the Owner's Representative. All water or sewage shall be disposed of in a satisfactory manner so that no nuisance is created and that the work under construction will be adequately protected.

106.16 ARRANGEMENT AND CHARGE FOR POTABLE WATER FURNISHED BY THE OWNER. If the Contractor desires to use Owner water he shall pay the rate established by City ordinances for such service and he shall make complete and satisfactory arrangements with the Water Department for so doing. Meters will be used and the Contractor shall deposit the cost of the water meter with the Water Department and will pay for all repairs and maintenance of the meter for the period which he has the meter in use or in his possession.

106.17 USE OF FIRE HYDRANTS. The Contractor or his employees shall not open, turn off, interfere with, attach pipe or hose to or connect anything with any fire hydrant, stop valve or stop cock or tap any water main belonging to the Owner, unless duly authorized to do so by the Water Department.

106.18 USE OF A SECTION OR PORTION OF THE WORK. Whenever in the opinion of the Owner's Representative any portion of the work or any structure is in suitable condition it may be put into use by the written order of the Owner's Representative and such usage shall not be held to be in any way acceptance of said work or structure or any part thereof or as a waiver of any of the provisions of these specifications or contract. Pending final completion and acceptance of the work, all necessary repairs and renewals on any section of the work so put into use, due to defective material or workmanship, to natural causes other than ordinary wear and tear or to the operations of the Contractor shall be performed by and at the expense of the Contractor.

106.19 CONTRACTOR'S RESPONSIBILITY FOR THE WORK. Until issuance of written acceptance by the Owner's Representative as provided for in these specifications, the work shall

be under the charge and care of the Contractor, and he shall take every necessary precaution to prevent injury or damage to the work or any part thereof by the action of the elements or from any other cause whatsoever, whether arising from the execution or from the non-execution of the work. The Contractor shall rebuild, repair, restore, and make good, at his own expense, all injuries or damage to any portion of the work occasioned by any of the above causes before acceptance.

106.20 PERSONAL RESPONSIBILITY OF PUBLIC OFFICIALS. In carrying out any of the provisions contained herein or in exercising any power or authority granted to him by the contract, there shall be no liability upon the Owner's Representative or his authorized assistants, either personal or as officials of the Owner, it being understood that in such matters he acts as the agent and representative of the Owner.

106.21 WAIVER OF LEGAL RIGHTS. Inspection by the Owner's Representative or by any of the duly authorized representatives of the Owner's Representative, any order, measurement, or certificate by the Owner's Representative, any order by the Owner for the payment of money, any payment for or acceptance of any work or any extension of time or any possession taken by the Owner, shall not operate as a waiver of any provision of the contract or any power therein provided. Any waiver of any breach of contract shall not be held to be a waiver of any other or subsequent breach. The Owner reserves the right to correct any error that may be discovered in any estimate that may have been paid and to adjust the same to meet the requirements of the contract and specifications. The Owner reserves the right to claim and recover by process of law sums as may be sufficient to correct any error or errors or make good any deficiency in the work resulting from such error or deficiency, dishonesty or collusion discovered in the work after the final payment has been made.

106.22 CONTRACTOR'S INSURANCE. The Contractor shall not commence work under this contract until he has obtained all insurance required under this specification and such insurance has been approved by the Owner, nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance required for the subcontractor has been so obtained and approved.

- (a) WORKMEN'S COMPENSATION AND DEATH LIABILITY INSURANCE. The Contractor shall secure and maintain during the life of this contract Workmen's Compensation Insurance as prescribed by the laws of the State of Oklahoma for all his employees employed at the site of the project. The Contractor shall require any subcontractor similarly to provide Workmen's Compensation and Employer's Death Liability insurance for all the latter's employees, unless such employees are covered by the protection afforded by the Contractor.
- (b) PUBLIC LIABILITY AND PROPERTY DAMAGE INSURANCE. The Contractor shall secure and maintain during the life of this contract such Public Liability and Property Damage Insurance as will protect the Owner, himself, and any subcontractor performing work covered by this contract, from claims for damages for personal injury, including accidental death, as well as from claims for property damages, which may arise from operations under this contract, whether such operations be by himself or by any subcontractor or by anyone directly or indirectly employed by either of them.
- (c) Contractor shall provide to the City a certificate of public liability insurance, a certificate of worker's compensation insurance, and automobile public liability insurance as follows:

Comprehensive Public Liability and Property Damage

Bodily Injury	\$ 125,000 per individual
	\$1,250,000 in the aggregate per occurrence;
Property Damage	\$ 25,000 per occurrence
	\$ 125,000 in the aggregate

Worker's Compensation Insurance. Statutory limits as required by the laws of the State of Oklahoma, including employer's liability insurance with \$500,000 limit.

Automobile Public Liability Insurance

Bodily Injury	\$ 125,000 per individual
	\$1,000,000 in the aggregate per occurrence

Public Liability Insurance in the amount of not less than fifty thousand dollars(\$50.000) for injuries, including accidental death, or one hundred thousand dollars(\$100.000) for one accident.

106.23 LIENS. Neither the final payment nor any part of the retained percentage shall become due until the Contractor, if required, shall deliver to the Owner a complete release of all liens arising out of this Contract, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as he has knowledge or information the releases and receipts include all the labor and material for which a lien could be filed; but the Contractor may, if any subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the Owner, to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

SECTION 107 PROSECUTION AND PROGRESS

107.01 SUBLETTING OF WORK. If the Contractor sublets the whole or any part of the work to be done under this contract, he will not under any circumstances be relieved of his responsibility and obligations. All transactions of the Owner's Representative shall be with the Contractor. Subcontractors will be considered only in the capacity of employees or workmen and shall be subject to the same requirements as to character and competency. The Contractor shall at all times when work is in operation, be represented either in person or by a qualified superintendent or qualified designated representative.

The Contractor shall submit the name and address of any proposed subcontractor to the Owner's Representative in writing prior to said subcontractor performing any of the work. The Contractor shall clearly list the types and amounts of work of the subcontractor.

107.02 ASSIGNMENT OF CONTRACT. The Contractor shall not assign, transfer, convey or otherwise dispose of the contract or his right, title, or interest in or to the same or any part thereof without the previous consent of the Owner's Representative in writing, approved by the governing body of the Owner and concurred in by the Surety. If the Contractor does, without such previous consent, assign, transfer, convey, or otherwise dispose of the contract or of his right, title or interest therein or any part thereof to any person or persons, partnership, company, firm or corporation or by bankruptcy, voluntary or involuntary, or by assignment under the insolvency laws of any state, attempt to dispose of the contract or make default in or abandon said contract, then the contract may, at the option of the Owner, be revoked and annulled unless the Surety shall successfully complete said contract and any monies due or to become due under said contract shall be retained by the Owner as liquidated damages for the reason that it would be impractical and extremely difficult to determine the actual damages.

107.03 PROSECUTION OF WORK. The Contractor shall begin the work to be performed under the contract within the time limit stated in the advertisement, proposal and contract, and shall conduct the work in such a manner and with sufficient equipment, materials and labor as is necessary to insure its completion within the time limit set forth in the proposal and contract. Should the prosecution of the work for any reason be discontinued by the Contractor for an extended period of time, he shall notify the Owner's Representative at least twenty-four (24) hours in advance of resuming operations.

107.04 PROJECT SCHEDULES. Within ten days after the effective date of the agreement, the Contractor shall submit to the Owner's Representative for review a progress schedule indicating the times (number of days or dates) for starting and completing the various stages of the Work, including any milestones specified in the contract documents.

No progress payment shall be made to the Contractor until the schedules are submitted to and acceptable to the Owner's Representative as provided below. The progress schedule will be acceptable to the Owner's Representative as providing an orderly progression of the work to completion within any specified milestones and the contract times, but such acceptance will neither impose on the Owner's Representative responsibility for the sequencing, scheduling or progress of the work nor interfere with or relive the Contractor from the Contractor's full responsibility therefor. The Contractor's schedule of Shop Drawing(s) and Sample submissions will be acceptable to the Owner's Representative as providing a workable arrangement for reviewing and processing the required submittals.

107.05 LIMITATION OF OPERATIONS. The Contractor shall conduct his work so as to create a minimum amount of inconvenience to the public. At any time when in the judgment of the Owner's Representative the Contractor has obstructed or closed or is carrying on operations on a greater portion of the site or public way than is necessary for the proper execution of the work, the Owner's Representative may require the Contractor to finish sections on which work is in progress before work is started on any additional section.

107.06 CHARACTER OF WORKMEN AND EQUIPMENT. The Contractor shall employ such superintendents, foremen and workmen as are careful and competent, and the Owner's Representative may require removal from the project of any person or persons employed by the Contractor, in, about or on the work who shall misconduct himself or be incompetent or negligent in the proper performance of his or their duties or neglect or refuse to comply with the directions of the Owner's Representative, and such person or persons shall not be employed again thereon without the written consent of the Owner's Representative. The Owner's Representative may withhold all payments which are or may become due or may suspend the work until such orders are fulfilled.

All workmen shall have sufficient skill and experience to properly perform the work assigned them. All workmen engaged on special work or skilled work or in any trade shall have sufficient experience in such work to properly and satisfactorily perform it and operate the equipment involved, and shall make due and proper effort to execute the work in the manner prescribed in these specifications.

In the employment of labor, preference shall be given, other conditions being equal, to bona fide residents of the Owner or the area, but no other preference or discrimination among citizens of the United States shall be made.

The Contractor shall furnish such equipment as is considered necessary for the prosecution of the work in an acceptable manner and at a satisfactory rate of progress. All equipment, tools and machinery used for handling materials and executing any part of the work shall be operated and maintained in a satisfactory working condition in accordance with the equipment manufacturers' recommendations. Equipment on any portion of the work shall be such that no injury to the work or adjacent property will result from its use.

107.07 DAYS WORK WORKING HOURS. Work shall be performed only during regular and commonly accepted and prescribed working hours. No work shall be performed nights, Sundays or during City holidays unless authorized in writing.

107.08 TIME OF COMMENCEMENT AND COMPLETION. The Contractor shall commence work within the time specified in the advertisement, proposal and contract and the rate of progress shall be such that the whole work will be performed and the premises cleaned up in accordance with the contract, plans and specifications within the time limit, as stated in the contract, unless an extension of time is granted in the manner hereinafter specified.

107.09 EXTENSION OF TIME OF COMPLETION. If the Contractor finds it impossible, for reasons beyond his control, to complete the work within the Contract time as specified or as extended in accordance with the provisions of this Subsection, he may, at any time prior to the expiration of the Contract time as extended, make a written request to the Owner's Representative for an extension of time setting forth therein the reasons which he believes will justify the granting of his request. The Contractor's plea that insufficient time was specified in

the Proposal and the Contract or that previously unprotested time charges were incorrect shall not be grounds for an extension of time. If the Owner's Representative finds that the work was delayed because of conditions beyond the control and without the fault of the Contractor, the Owner's Representative may extend the time for completion in such amounts as the conditions justify. The extended time for completion shall be in full force and effect the same as though it were the original time for completion. Daily time charges will cease when the project is completed.

In adjusting the contract time for the completion of the project, all strikes, lockouts, unusual delays in transportation or any condition over which the Contractor has no control and also any suspensions ordered by the Owner's Representative for causes not the fault of the Contractor shall be excluded from the computation of the contract time for completion of the work. If the satisfactory execution and completion of the contract should require work or materials in greater amounts or quantities than those set forth in the contract, then the contract time shall be increased in the same proportion as the cost of the original work. No allowance shall be made for delays or suspension of the prosecution of the work due to the fault of the Contractor.

107.10 FAILURE TO COMPLETE WORK ON TIME. It is mutually agreed by Owner and Contractor that time is of the essence of this Contract and that Owner will suffer financial loss if the Work is not substantially complete within the time specified in the Contract, plus any extensions thereof allowed in accordance with Section 107.09 of these General Conditions. They also recognize the delays, expense and difficulties involved in proving, in a legal or arbitration proceeding, the actual loss suffered by Owner if the Work is not substantially complete on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner the amount set forth in the Special Provisions, until the work is substantially complete.

107.11 TEMPORARY SUSPENSIONS. The Owner's Representative shall have the authority to suspend the work wholly or in part for such period or periods, as he may deem necessary, due to unsuitable weather or such other conditions as are considered favorable for the suitable prosecution of the work.

If it should be necessary to stop work for an indefinite period, the Contractor shall store all materials in such manner that they will not obstruct or impede the traveling public unnecessarily nor become damaged in any way, and he shall take every precaution to prevent damage or deterioration of the work performed, and shall provide suitable drainage of the work.

107.12 SUSPENSION OF WORK AND ANNULMENT OF CONTRACT. The work or any portion of the work under contract may be suspended on written order of the Owner's Representative or the Owner, with copy of such notice to be served upon the Contractor's Surety, or the contract may be annulled by the Owner, for any good cause or causes, said causes including but not limited to the following:

- (a) Failure of the Contractor to start the work within the time limit specified;
- (b) Substantial evidence that the progress being made by the Contractor is insufficient to complete the work within the specified time;
- (c) Failure of the Contractor to provide sufficient and proper equipment for properly executing the work;

- (d) Deliberate failure on the part of the Contractor to observe any requirements of these specifications or to comply with any orders given by the Owner's Representative, as provided for in these specifications;
- (e) Failure of the Contractor to promptly make good any defects in materials or workmanship or any defects of any other nature, the correction of which had been directed in writing by the Owner's Representative.
- (f) Substantial evidence of collusion for the purpose of illegally procuring a contract or perpetrating fraud on the Owner in the construction of work under contract.

When work is suspended for any one of the causes itemized above, or for any other cause or causes, the Contractor shall discontinue the work or such part thereof as the Owner shall designate, whereupon the Surety may, at its option, assume the contract or that portion thereof which the Owner has ordered the Contractor to discontinue and may perform the same or may, with the written consent of the Owner's Representative, approved by the Owner, sublet the work or portion of the work so assumed; provided, however, that the Surety shall exercise its option, if at all, within two (2) weeks after the written notice to discontinue work has been served upon the Contractor and upon the Surety or its authorized agent. The Surety, in such event shall assume the Contractor's place in all respects and shall be paid by the Owner for all work performed by it in accordance with the terms of the contract and, if the Surety, under the provisions hereof, shall assume said entitled contract, all monies remaining due the Contractor at the time of his default shall thereupon become due and payable to the Surety as the work progresses, subject to all the terms of the contract.

In the event that the Surety does not within the time hereinbefore specified, exercise its right and option to assume the contract, or that portion thereof which the Owner has ordered the Contractor to discontinue, then the Owner shall have the power to complete, by contract or otherwise as it may determine, the work herein described, or such part thereof as it may deem necessary, and the Contractor hereby agrees that the Owner shall have the right to take possession of and use any of the materials, tools, equipment, supplies and property of every kind provided by the Contractor for the purpose of his work and to procure other tools, equipment and materials for the completion of the same, and to charge to the account of the Contractor the expense of said contract for labor, materials, tools, equipment and expenses incident thereto. The expense so charged shall be deducted by the Owner out of such monies as may be due or may at any time thereafter become due to the Contractor under and by virtue of the contract or any part thereof. The Owner shall not be required to obtain the lowest bid for the work of completing the contract but the expense to be deducted shall be the actual cost of such work. In case such expense is less than the same which would have been payable under the contract, if the same had been completed by the Contractor, the balance shall operate as liquidated damages, as herein above set forth. In case such expense shall exceed the amount which would, have been payable under the contract, if the same had been completed by the Contractor, then the Contractor and his Surety shall pay the excess as due and payable. When, any particular part of the work is being carried out by the Owner by contract or otherwise under the provisions of this Section, the Contractor shall continue the remainder of the work in conformity with the terms of the contract and in such manner as not to hinder or interfere with the performance of workmen employed as above provided by the Owner.

107.13 TERMINATION OF CONTRACT. The Contract will be considered fulfilled save as provided in any bond or bonds or by law, when all the work has been completed, the final inspection made by the Owner's Representative, and final acceptance and final payment made by the Owner.

SECTION 108 MEASUREMENT AND PAYMENT

108.01 MEASUREMENT OF QUANTITIES. The determination of quantities of work accepted and completed under the terms of the contract or as directed by the Owner's Representative, in writing, will be made by the Owner's Representative, based on measurements taken by him or his assistants, or at the sole discretion of the Owner's Representative determination of quantities may be based on measurements taken by the Contractor. These measurements will be taken according to the United States Standard Measurements. When materials are measured in the vehicle, the measurement will be taken at the point of delivery. The capacity of all vehicles shall be plainly marked on each vehicle and the capacity or markings shall not be changed without permission of the Owner's Representative.

108.02 SCHEDULE OF VALUES. (For Lump Sum Items or Contracts Only) Prior to work commencing, Owner's Representative and Contractor shall determine and agree to payments based on a percentage of the Lump Sum amount, to correlate to completion of respective phases of the work.

108.03 SCOPE OF PAYMENT. The Contractor shall receive and accept the compensation as herein provided as full payment for furnishing all labor, materials, tools, equipment and incidentals; for performing all work contemplated and embraced under the contract; for all loss or damage arising out of the nature of the work or from the action of the elements; for any unforeseen defects or obstructions which may arise or be encountered during the prosecution of the work and before its final acceptance by the Owner's Representative; for all risks of every description connected with the prosecution of the work; for all expenses incurred by or in consequence of suspension or discontinuance of such prosecution of the work as herein specified; for any infringement of patents, trademarks or copyrights and for completing the work in an acceptable manner according to the plans and specifications.

The payment of any current or partial estimate prior to final acceptance of the work by the Owner shall in no way constitute an acknowledgment of the acceptance of the work nor in any way prejudice or affect the obligation of the Contractor to repair, correct, renew, or replace at his expense any defects or imperfections in the construction or in the strength or quality of the materials used in or about the construction of the work under the contract and its appurtenances nor any damage due to or attributable to such defects, which defects, imperfections or damage shall have been discovered on or before the final inspection and acceptance of the work. The Owner's Representative shall be the sole judge of such defects, imperfections or damage and the Contractor shall be liable to the Owner for failure to correct the same as provided herein.

108.04 PAYMENT FOR EXTRA WORK. Extra work provided by the Contractor, as authorized and approved by the Owner's Representative and the Owner, will be paid for in the manner hereinafter described and the compensation thus provided shall be accepted by the Contractor as payment in full for all labor, materials, tools, equipment and incidentals, and all superintendents' and timekeepers' services, all insurance and all other overhead expense incurred in the prosecution of the extra work. Payment for extra work will be made by one or more of the following methods:

- (a) Unit prices agreed upon by the Owner's Representative and the Contractor and approved by the governing body of the Owner in writing, before said work is commenced, subject to all other conditions of the contract;

- (b) A lump sum price agreed upon by the Owner's Representative and the Contractor and approved in writing by the governing body of the Owner before said work is commenced, subject to all other conditions of the contract;
- (c) The actual cost including labor, materials, tools, equipment and field supervision of such extra work plus fifteen percent (15%); said 15% understood and agreed to be full compensation for all overhead expenses and profits, when agreed upon by the Owner's Representative and the Contractor, and approved in writing by the governing body of the Owner before said work is commenced; subject to all other conditions of the contract.

The Contractor shall, on or before the 10th day of the month succeeding that in which any extra work shall have been performed, file with the Owner's Representative his claim and an account giving the itemized cost of such work and shall give the Owner's Representative access to all accounts, bills and vouchers relating thereto.

108.05 PAYMENT PROCEDURES. The Contractor shall submit an Invoice or Application for Payment for work completed as of the date of the Invoice or Application. All payments made by the Owner are subject to procedures established for the governing body of the Owner to authorize payment at its regularly scheduled meetings.

Invoice or Application for Payment must be received in the Public Works Director's Office no less than ten (10) business days prior to the regular meeting at which authorization for payment is to be requested.

Retainage shall be withheld from all progressive payments in accordance with Oklahoma Statutes.

Upon final completion and acceptance of the work, including all submittals, the Owner shall pay the remainder of the Contract price, subject to the procedures as noted in this section.

It is understood that payments will be subject to correction in the payment rendered following discovery of an error in any previous payment and such payment shall not in any respect, be taken as an admission by the Owner of the amount of work done or of its quality or sufficiency nor as an acceptance of the work or the release of the Contractor of any of his responsibility under the contract.

108.06 PAYMENTS WITHHELD. The Owner's Representative may withhold or, on account of subsequently discovered evidence, nullify the whole or a part of any payment to such extent as may be necessary to protect the Owner from loss on account of:

- (a) Defective work not remedied;
- (b) Claims filed or reasonable evidence indicating probable filing of claims;
- (c) Failure of the Contractor to make payments properly to subcontractors or for materials or labor;
- (d) A reasonable doubt that the contract can be completed for the balance then paid;
- (e) Damage to another Contractor.

When the above conditions are remedied, payment shall be made for amounts withheld as a result of such condition.

108.07 STATE SALES AND USE TAX. Under the terms of contracts established between the City of Chickasha and the Contractor, the Contractor will be appointed agent for the City of Chickasha, Oklahoma, for the purpose of the tangible personal property purchased or rented for the project. Legal title to all tangible personal property purchased, and the right to direct the use of all tangible personal property rented by Contractor shall pass directly from the vendor to the City of Chickasha. Upon passage of title, all of such property will be included in the project owned by the City of Chickasha. Title to all such property shall pass to the City of Chickasha from the vendor. All such property procured under the terms of contracts established between the City of Chickasha and the Contractor is exempt from Oklahoma sales and use taxes and/or City sales taxes. Contracts established between the Chickasha Municipal Authority and the Contractor shall not provide for sales and/or use tax exemption.

108.08 ACCEPTANCE AND FINAL PAYMENT. Whenever the improvement provided for by the contract shall have been completely performed on the part of the Contractor, and all parts of the work have been approved by the Owner's Representative and accepted by the Owner a final pay request showing the value of the work will be prepared by the Contractor as soon as the necessary measurements and computations can be made. All prior pay requests, upon which payments have been made, are subject to necessary corrections or revisions in the final payment. The amount of this pay request, less any sums that have been deducted or retained under the provisions of the contract, will be paid to the Contractor as soon as practicable after the final acceptance, provided the Contractor has furnished to the Owner satisfactory evidence that all sums of money due for any labor, materials, apparatus, fixtures or machinery furnished for the purpose of such improvement have been paid or that the person or persons to whom the same may respectively be due have consented to such final payment.

The acceptance by the Contractor of the last payment, as aforesaid, shall operate as and shall be a release to the Owner from all claims of liability under the contract for anything performed or furnished or relating to the work under the contract or for any act or neglect of Owner relating to the contract.

108.09 FINAL MEASUREMENT AND FINAL PAY REQUESTS. Final measurement will be taken and final pay requests compiled as soon as work has progressed to a point where the final measurements may be taken accurately.

108.10 This contract, and all documents incorporated herein by reference or executed in connection herewith, are intended solely to govern the relationship between the Contractor and the Owner and their mutual obligations in respect to the subject of the contract. To that end, no provision of this contract, or of any document mentioned above, shall be interpreted or given legal effect to create an obligation on the part of the Owner to third persons, including by way of illustration but not of exclusion, sureties upon performance bonds, payment bonds, or other bonds; assignees of the contractor; subcontractors; and persons performing labor, furnishing material, or in any other way contributing to or assisting in the performance of the obligations of the Contractor; nor shall any such provisions be interpreted or given legal effect to afford a defense against any obligation owed or assumed by such third person to the Owner or in any way to restrict the freedom of the Owner to exercise full discretion in its dealing with the Contractor.

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SECTION 500 – WATER MAINS

SECTION 500 – CONSTRUCTION REQUIREMENTS

500.01 – DESCRIPTION

This section covers general requirements for construction of water lines and appurtenances as described herein. The intent of these specifications is to provide for complete installation including materials, labor and equipment necessary to complete the work. These specifications shall apply to water mains with nominal diameter of 6" through 12" only.

All design, materials, construction, sampling and testing shall comply with ODEQ rules and regulations and AWWA Standards. ODEQ rules and regulations found at OAC 252:626, latest addition, shall govern. Construction compliance shall specifically include, but not will not be limited to, compliance with paragraphs 252:626-19-2 (h) (1) and (2) regarding horizontal and vertical separation between water mains and contamination sources. That is, maintain 1) at least 10 feet horizontally between the water main and any existing or proposed sanitary sewer mains and 2) at least two (2) feet vertically between the water main and any existing or proposed sanitary sewer mains. In the event these separation distances cannot be maintained, refer to the plans for details regarding installation.

The work to be done under this contract consists in general of the installation of pipe, fittings, specials, valves, and other pipe line appurtenances, shall include unloading such material at the point of delivery, hauling, distribution and installation thereof; the furnishing and installation of all jointing materials, gate valves, air valves and appurtenances, structures, concrete and all other materials required by the plans and specifications; making all specified and necessary connections with existing mains; making all required tests; restoration of all roadways, streets, driveways, sidewalks, crosswalks, and street crossing surfaces, and replacement or repair of all drains, sewers, conduits, water, oil and gas lines, fences, culverts, bridges and other structures which may be damaged in the prosecution of the work; maintenance of traffic across sites of the work where required, with all necessary barricades, lights and other safety provisions; making of all repairs to coatings and linings of pipe under the supervision of a representative of the pipe manufacturer; and the performance of all other work required by the plans and as specified herein.

500-02 - EXCAVATION AND BACKFILLING

- A.) DEFINITION – The terms “excavation” and “trenching”, as used herein or in any other reference to the work under contract shall refer to and mean any and all material excavated, for whatever purpose, in accordance with the terms of the specifications, plans, proposal and contract, and shall include all subsequent handling, backfilling, compacting, disposal of excess excavation materials, and the preparation of all sub-grades, etc., necessary for a first-class job.
- B.) EXCAVATION WORK – Excavation work shall include clearing and preparation of the trench or excavation size, including the removal of all surface vegetation, stumps and debris; all sheeting, shoring, bracing, protection of adjacent property, preparation of all sub-grades, storage of excavated materials off of the excavation site where necessary, backfilling, tamping and otherwise compacting of backfill and specified embankments, grading and surfacing; moving, hauling or otherwise transporting excavated materials from whatever source, where materials are to be returned to the excavation site for backfill purposes, as directed by the Engineer; and all other excavation stipulated in this specification.

C.) CLASSIFICATION OF EXCAVATION – There shall be no classification of excavated materials (except as otherwise provided for in the proposal) and the term “excavation” shall include all materials excavated or removed on the several sites of the work regardless of the type, character, composition or condition of the materials so excavated; and shall further include all debris, junk, broken concrete and all other materials within the excavation limits.

D.) PIPE TRENCH EXCAVATION – Pipe lines shall be installed to the alignment, grades and elevations shown on the drawings. Grade and alignment of pipe and pipe sub-grades will ordinarily be obtained from offset (hub) stakes. Trenches shall be dug by means of a backhoe, trackhoe or trenching machine wherever practicable. The use of any other type of power excavating equipment such as drag line or power shovel will not be permitted except with special authorization by the Engineer and under such requirements relative to uniformity of trench width and vertical trench banks as they may require. Hand digging will be required where the operation of trench digging machinery will damage trees, buildings, surface or subsurface structures.

The minimum width of trench cut for each size of pipe shall be as follows:

<u>SIZE OF PIPE</u>	<u>WIDTH OF TRENCH</u>
6"	20"
8"	22"
10"	24"
12"	28"

The trenching machine shall be maintained on a sufficiently level roadbed to provide substantially vertical trench walls. The maximum horizontal offset of the trench bottom from the trench top (undercutting) shall be two inches.

E.) Where soft foundation is encountered in the trench bottom, the Contractor shall excavate below grade and provide either a gravel cushion or a concrete cradle for the purpose of supporting the pipe, as directed by the Engineer.

F.) All bell holes shall be of ample size

G.) All excavated materials shall be deposited on the sides of trenches at such a distance that no additional load due to surcharge is placed on the bank, and shall also be deposited or moved after original deposit in such a manner that the pipe laying crew and the public, when the trench is in highway or city streets, will be inconvenienced as little as possible.

H.) It will be the Contractor's responsibility to maintain the trench banks in a stable and vertical position by use of all necessary bracing or sheeting required for safety.

I.) The Contractor will be required to keep the pipe trenches free from water and shall keep the natural ground water table or surface not less than four (4) inches below the elevation of the finished sub-grade, from the time the sub-grade preparation is started until the pipe has been backfilled. No work shall be done in trenches after rough excavation is completed if the sub-grade is submerged or within four (4) inches of ground water. All water removed in the dewatering of trenches and other excavations shall be disposed of in a satisfactory manner.

The Contractor shall be liable for all damages to private property caused by such disposal of water.

- J.) **Rock Excavation** – In rock excavation, the Contractor shall over-excavate six (6) inches and place 6 inches of screenings in the trench upon which the pipe is laid. The Contractor shall further backfill over pipe with same or earth free from stone or rocks, to a depth of 6 inches.
- K.) **BACKFILLING TRENCHES.** Except where water mains lie under drives, streets, or alleys, backfill shall be brought up around the pipe in six inches (6") loose measurement layers from materials selected from the trench excavation, compacted by means of mechanical or hand tampers to twelve inches (12") above the top of the pipe, compaction shall be to ninety percent (90%) standard proctor density. Where water main crosses under drives, streets or alleys, the backfill shall be brought up from the point twelve inches (12") above the pipe as outlined above in six inch (6") layers compacted by mechanical or hand tampers to a minimum of ninety (90%) standard proctor density with the exception that the top twelve inches (12") the backfill under the drive shall be compacted to ninety-five percent (95%).

Where the main crosses or lies within the paved portion of a street or alley, special construction details as shown on the plans shall govern. In open areas the back fill from the point twelve inches above the top of the pipe shall be placed within the trench by either hand or machine method and the top of the trench shall be left slightly mounded to allow for future settlement. All tamping and backfill shall be to the approval of the Engineer. In compacted backfill driveways, streets, or alleys, the backfill shall extend three feet (3') on each side of the driveway, street or alley.

- L.) **DISPOSAL OF EXCESS EXCAVATION MATERIALS.** In general, excess excavated materials from trenches located in open fields and unimproved property will be distributed directly back over the pipe line and within the pipe line right-of-way, to a maximum depth above the original ground elevation at any point of six (6) inches, at and across the trench, and sloping uniformly each way therefrom. Materials so wasted shall be carefully finished with a drag or blade machine to have a neat and uniform appearance without obstructing drainage at any point.

Except as stated in the above paragraph, all excess excavated material remaining after final settlement of the trenches has occurred shall be removed and disposed of by and at the expense of the Contractor, and to the satisfaction of the Engineer.

- M.) **REPLACEMENT OF SOD.** Where shown on the plans, the Contractor shall replace sod removed or destroyed in the excavation of pipe trenches with new sod of a quality and condition and from a source approved by the Engineer. All such sod furnished shall be equal to or better than the original sod removed. Sod replaced shall be kept watered for a period of one month after installation.
- N.) **TREES AND SHRUBBERY.** The Contractor shall use every possible precaution to prevent injury to trees and shrubbery on and adjacent to the site of work. He shall replace, at his own expense, any such trees or shrubbery damaged or destroyed by him, unless the removal thereof is required by the plans or is authorized by the Engineer. When tree roots one and one-half inches (1 ½") or larger are encountered in making the excavation the roots are not to be cut. Hand excavation shall be used, and any damaged root or roots 1 ½" or larger shall be treated with a creosote paint as directed by the Engineer.

O.) LENGTH OF DITCH TO BE OPENED. In no case shall more than three hundred (300) feet of ditch be opened at one time in advance of the pipe laid, without consent of the Engineer.

P.) DRIVEWAYS. When the water main passes underneath any private driveway, tunneling shall not be used, unless special permission is given by the Engineer. Driveway pavement shall be saw cut to the pipe trench width to allow the main to be laid and for the proper backfilling of the ditch. After the main is laid and ditch is properly backfilled, the driveway shall be restored to as good a condition as found. See standard detail drawings.

Where driveways are cut to private residences, they shall be cut, the pipe installed, and trench properly backfilled all in the same day.

Where the water main passes underneath any private or public driveway, where the driveway is used for parking cars such as at shopping centers, large business buildings, stores, etc., the Contractor shall confer with the Engineer for an approved method of procedure in doing work in order to minimize the interference of traffic to and from the parking area.

Q.) PUBLIC STREETS AND ROADS. All public streets and roads which are closed to traffic, under authority of proper permit, shall be protected in accordance with the requirements of the authority having jurisdiction over the street or road by means of effective barricades on which shall be placed acceptable warning signs.

Materials stored upon or alongside public streets and highways shall be so placed and the work at all times shall be conducted so as to cause the minimum obstruction and inconvenience to the traveling public.

All barricades, signs, warning lights and other protective devices shall be installed and maintained in conformity with applicable statutory requirements.

500.03 – MATERIALS CERTIFICATIONS

The Contractor, in all cases, shall furnish required samples without charge. A laboratory approved by the City shall perform all tests. When the Standard Specifications require testing of prefabricated products or any other materials, the City Engineer may waive local testing requirements in lieu of a certification from the manufacturer that the material or product furnished conforms to the appropriate Specifications as called for in the Standard Specifications.

GENERAL REQUIREMENTS

The Contractor shall be responsible for obtaining all certifications and arranging for their delivery to the proper destinations as required by this specification. A responsible representative of the company that issues the certification shall sign materials certifications. The official company title of the signer must be clearly shown immediately beneath the Contractor's signature.

All certifications shall be furnished in duplicate and each copy shall show the following information:

- A) City's Project Name or Number
- B) Name of Contractor
- C) Identification Markings on Shipment
- D) Quantity of Material Represented by the Certification

When certified mill tests are submitted as a Type A certification the quantity information need not be

furnished provided that the identifying heat number is permanently rolled, stamped or otherwise permanently affixed to each individual piece of material in the shipment covered by the certification.

TYPES OF CERTIFICATIONS

Unless otherwise specified, a certification shall be one of the following types:

A) Type A certification shall be prepared by the manufacturer and shall consist of a certified copy of a report covering tests conducted by an approved laboratory. Such tests shall have been conducted on samples obtained from the lot or lots of material in the shipment.

B) Type B certification shall consist of a certification prepared by the manufacturer and shall show the limits of test values as determined by an approved manufacturer's laboratory, a qualified commercial laboratory or other approved laboratory.

C) Type C certification shall be prepared by the manufacturer and shall certify that the material in the shipment conforms to the same formula and/or is essentially the same as the material previously approved by the City Engineer.

D) Type D certification shall be prepared by the manufacturer and shall state that the materials meet the applicable Specifications. These Specifications shall be listed by number, section reference or other appropriate identification acceptable to the City Engineer.

DISTRIBUTION OF CERTIFICATIONS

Certifications shall be mailed in triplicate to the Public Works Director and the Engineer designated by the Public Works Director.

These certifications will be checked for conformance with the applicable Specifications.

BASIS OF ACCEPTANCE

Whenever a certification as defined above is required or requested by the City Engineer, such material may be accepted on the basis of certification provided that all applicable requirements are met. Visual inspection at delivery and installation will also be used to verify the Workmanship and condition of the material to be satisfactory.

All material furnished under certification shall be tagged, stenciled, stamped or otherwise marked with a lot number, heat number, order number, or other appropriate identification which can be readily recognized and checked against the certification. Material accepted on certification shall not be incorporated in the Work until the City Engineer has approved the certificates.

STORED MATERIALS

Stored materials shall be located and protected to preserve their quality and fitness for the Work. Materials shall be placed on wooden platforms or other hard, clean surfaces and not on the ground and shall be placed under cover as required. Stored materials shall be located to facilitate prompt inspection. The City assumes no responsibility for materials located on the site or off-site. The Contractor assumes full responsibility for any damage or loss to any stored materials. No stored material shall be located off-site unless approved by the City Engineer. Material shall be insured prior to payment for stored materials.

All aggregates shall be handled in such a manner as to preserve their quality, gradation and fitness for the work. The provisions for transporting aggregates shall be such to assure a continuous and adequate supply of material to the work. Aggregate stockpiles shall be built up in such a manner that acceptable materials will be delivered to the plant or the Project. Aggregates from different sources and different gradations shall not be stockpiled together. The gradation requirements for the individual

stockpiles and proportioning from the stockpiles, shall be the responsibility of the Contractor. Aggregates that have become segregated, or mixed with earth or other foreign material, shall be considered unacceptable, and will not be utilized in the work until Contractor causes aggregate piles to be integrated, and all foreign materials to be removed.

500.04 – MISCELLANEOUS REQUIREMENTS

- A) All salvageable water pipe and fittings removed from the existing water mains and not re-used during construction of the new water mains shall remain the property of the City of Chickasha.
- B) Contractor shall remove and reset existing mailboxes as necessary during construction to avoid damaging them during the work. Contractor shall relocate the mailboxes to maintain access by the mail carrier and residents at all times. Contractor shall relocate mailboxes to original location after water main construction is complete. Cost to be included in the price bid for other items of work.

Any excavation within street right-of-way shall be backfilled with soil, temporary construction entrance materials and/or permanent pavement within 72 hours of starting such excavation. The applicant shall ensure that any water that accumulates within any excavation within street right-of-way that has not been backfilled shall be removed by pumping or other approved means within 24 hours of the beginning of such accumulation.

- C) All concrete used in making pavement repairs shall be Class A (HES), meeting the requirements of 2009 ODOT Standard Specifications. All concrete used in making sidewalk repairs shall be Class C, meeting the requirements of 2009 ODOT Standard Specifications. All asphalt used in making pavement repairs shall be Type B Asphalt meeting the requirements of ODOT Standard Specifications. TBSC Type E meeting 2009 ODOT Standard Specifications shall be used to repair gravel driveways. All repairs shall be made in accordance with City of Chickasha standard detail drawings.
- D) When water main shut down is required, CONTRACTOR shall coordinate the shut-down with OWNER'S water department staff and shall give a minimum 72-hour notice to said staff and the Public Works Director. OWNER'S water department staff will be responsible for operation of all valves which require closing.

500.05 – PROGRESS OF CONSTRUCTION

The Contractor shall work at enough different locations to complete the entire contract within the time limit specified. Water Line appurtenances shall be constructed as soon as the Water Line that they serve is constructed. Postponing the construction of appurtenances until the Water Line has been completed, or the building of appurtenances in advance of the construction of the Water Line, will not be permitted.

- A) The construction of Water Lines for more than six hundred feet (600') in advance of appurtenances which are incomplete or the construction of which has not been started, will not be permitted.
- B) All water lines that are to be abandoned in place shall be cut to the nearest connections and either capped or plugged as required to provide a tight connection. The Contractor shall be responsible for providing the appropriate plug or cap for the job. The cost of this work is considered incidental.

500.06 – DELIVERY OF MATERIALS

Construction materials shall not be delivered to the site of the work more than three (3) days in advance of their anticipated use nor shall the quantity of pipe or other materials on hand at the site of the work at any time be in excess of the amount required to complete six hundred feet (600') of Water Line unless with special permission of the Engineer.

500.07 – SURFACE DRAINAGE STRUCTURES

Unless otherwise specified or called for on the plans, all surface drainage structures and appurtenances shall not be disturbed.

500.08 – CONCRETE

Unless otherwise approved by the Engineer, all concrete used in construction of waterlines and their appurtenances shall be High Early Strength Concrete and shall have a minimum three (3) day compressive strength of three thousand five hundred pounds per square inch (3,500 psi). It is recognized that some situations may occur in which different requirements may be more suitable for completion of the work. The contractor shall receive approval from the Engineer prior to proceeding with the work in such situations.

500.09 – DEPTH OF COVER

Where not otherwise indicated on plans, the pipe shall be laid at an elevation that will provide after completion, a minimum depth of cover over the top of pipe of forty-eight (48) inches below the surface.

500.10 – STANDARD DESIGN CONDITIONS

A) **Standard Design Pressures** - Unless otherwise specified, all pipes and fittings shall be designed for the following minimum pressure conditions:

Minimum Internal Pressure (psi)		
Working	Surge	Design
150	100	250

B) **Live Loading** - Unless otherwise specified or called for on the plans, minimum pipe design corresponding to the specified design pressure shall be for highway live loading condition and where waterline is crossing or running parallel to the railroad, corresponding minimum pipe design for railroad live loading condition shall govern (with or without casing).

C) Water main pipe materials shall be ductile iron pipe (DIP) or polyvinyl chloride (PVC) pipe. All water main pipe shall be new.

500.11 – CLEAN-UP

Clean-up operations shall follow excavation and construction a distance not to exceed six hundred feet.

SECTION 505 – PIPE AND FITTINGS INSTALLATION

505.01 – DESCRIPTION

This section covers installation of pipes in open cuts, in conformity with the lines, grades, and dimensions and as provided in applicable sections of these specifications.

505.02 – MATERIALS

505.02.01 – PIPE AND FITTINGS

Acceptable pipe materials and fittings shall meet the requirements of the appropriate sections listed below:

Pipe Material	Section
Ductile Iron Pipe (DIP)	524

Polyvinyl Chloride (PVC) Pipe	525
High Density Polyethylene (HDPE) Pipe	529

All pipe and fittings shall be new.

505.02.02 – EMBEDMENT

- A) **General** -Embedment material shall be 3/8" screenings. Prior to delivery, the Contractor shall submit laboratory sieve analysis test reports for materials to be used for embedment. Materials shall be approved by the Engineer prior to placement.
- B) **Delivery Tickets** - The Contractor shall submit delivery tickets for the purpose of verifying use of minimum quantities necessary to complete installation pursuant to the appropriate standard details and the minimum dimensions specified.

505.04 – CONSTRUCTION METHODS

- A) **Polyvinyl Chloride (PVC) Pipe** – All PVC pipe shall be embedded in accordance with ASTM D-2274, "Standard Recommended Practice for Underground installation of Thermoplastic Pressure Piping", and ASTM D-2321, "Standard Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe", and as shown on Detail "Typical Bedding and Trench Detail for PVC Pipe" and meeting the requirements of Section 525.
- B) **Ductile Iron Pipe (DIP)** – All ductile iron pipe shall be embedded as shown on Detail "Typical Bedding and Trench Detail for Ductile Iron Pipe.
- C) **High Density Polyethylene (HDPE)** pipe if laid by direct burial shall be embedded as directed by the Engineer; if place by the directional drilling method, no embedment is required.

505.04.01 – Place blue polyethylene Underground Warning Tape over all water mains. Warning tape shall have black lettering stating "Caution Buried Water Line Below" imprinted on it. Use 6-inch wide tape. See standard drawings for placement location.

505.04.02 – INSTALLATION REQUIREMENTS

- A) **Shipping, Handling and Storage** -Pipe shall be transported from the plant, where it is manufactured, to the job site employing special methods of packaging to prevent damage to the pipe. After the pipe is received at the job site, it shall be carefully inspected for any damage that may have occurred in transit. The pipe shall be handled at all times with care using padded slings or hooks. The pipe shall not be dropped, skidded or rolled against pipe already on the ground. If any damage occurs to pipe, the pipe shall be rejected. All pipe and accessories shall be stored on flat, level ground with no rocks or other objects under the pipe. Gaskets for push-on joints and pipe shall be stored in cool location out of direct sunlight in accordance with the manufacturer's recommendations.
 - 1. Pipe, fittings, specials, and other accessories shall be unloaded at the point of delivery, hauled to and distributed at the site of the project by the Contractor, and shall at all times be handled with extreme care to avoid damage thereto. Equipment, tools and methods used in unloading, reloading, hauling, and laying pipe and accessories shall be such that no damage is done to the pipe or any lining therein.

2. Cement lining in pipes or fittings which is broken or loosened in unloading or subsequent handling shall be repaired by and at the expense of the Contractor, under the direct supervision of the representative of the pipe manufacturer. All outside pipe coating which is damaged by the contractor shall be repaired, prior to laying the pipe or placing the backfill, by removing all damaged coating, wire brushing the exposed metal, and applying two coats of a permanently elastic coal tar paint of a type and quality equal to that used in originally coating the outside of the pipe and preferably of the same brand and formula. This paint shall be sufficiently hard before backfilling so that it will not be damaged thereby.
3. Pipe lines shall be accurately installed to the alignment and profile indicated on the approved pipe installation drawings furnished for the purpose. Grades and elevations shall be determined by the pipe sub-grade prepared as specified.
4. The maximum deflection of any pipe joint, made necessary by vertical and horizontal curves or offsets, shall not exceed the amount as recommended by the manufacturer of the pipe.
5. PLACING PIPE IN TRENCH. Proper equipment, implements, tools, and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. All pipe, fittings, hydrants and valves shall be carefully lowered into the trench, piece by piece, by means of cranes, derricks, tongs, slings, ropes or other suitable tools and equipment, in such a manner that no damage occurs to the pipe, pipe coating, pipe lining or to the trench sub-grade. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.
6. PIPE TO BE KEPT CLEAN. All earth, rubbish, dirt and other foreign matter shall be removed from the inside of all pipe and other appurtenances (and from the outside of the spigots), before lowering into the trench, and shall be kept clean by approved means during and after laying. At times when pipe laying is not in progress, all open ends of pipe and fittings shall be closed by approved means, and no trench water shall be permitted to enter the pipe.
7. INSPECTION OF PIPE. Before lowering, and while still suspended, the pipe shall be inspected for defects. Any defective, damaged or unsound pipe shall be rejected.
8. CUTTING PIPE. Cutting of pipe for closure pieces or for other reasons shall be done in a neat and workmanlike manner by a method which will not damage either the pipe or the pipe lining.

B) **Pipe Foundation** - No waterline shall be laid unless the foundation is in a condition satisfactory to the Engineer. Where trenches are excavated in soft, unsuitable, or rock material, trench bottom shall be stabilized as directed by the Engineer.

C) **Laying Requirements** -All pipes, specials, fittings and other appurtenances shall be examined carefully for damage and other defects before installation. The City retains the right to reject damaged and defective materials.

The pipe ends shall be free of all lumps, blisters and they shall be wiped clean of foreign materials such as dirt and sand before installation.

Pipe shall be laid with the bell ends facing in the direction of laying unless directed otherwise by the Engineer. Where pipe is laid on a slope of ten (10%) percent or greater laying shall start at the bottom and proceed up the slope.

When laying pipe is not in progress during the noon hour or overnight, the open ends of the pipe shall

be closed by watertight plugs. If water is in the trench the plugs shall be left in place until the trench is pumped dry.

Bell holes for bell-and-spigot pipe shall be excavated at proper intervals so that the barrel of the pipe will rest for its entire length upon the bottom of the trench. Bell holes shall be large enough to permit proper installation of pipe. Bell holes shall not be excavated more than ten (10) joints ahead of pipe laying. Filling and ramming earth or other material beneath the pipe to raise it to grade shall not be permitted.

The Contractor shall use every precaution at all times during construction of the pipeline. All pipe, specials, fittings, and other appurtenances shall be lowered carefully into the trench with suitable equipment, to prevent damage to the waterline materials. In rock trenches, plywood shields or other approved means shall be used to prevent the cradled pipe from swinging against the sides of the trench.

All joint preparation and joining operations shall comply with the instructions and recommendations of the pipe manufacturer and meet the joint requirements in the appropriate material section. Rubber gaskets shall be positioned on the joint in accordance with the manufacturer's recommendations. Immediately before joints are pushed together, all joint surfaces shall be coated with the lubricant furnished with the pipe.

Any damage to the pipe, from any cause during installation of the pipeline shall be cause for replacement, as directed by the Engineer, and at the expense of the Contractor.

After a section of pipe is properly installed and approved for backfill, the trench shall be backfilled and compacted.

505.06 – METHOD OF MEASUREMENT

Payment for "Water Line" shall be made at the unit price bid per lineal foot of pipe installed for each size. The price established shall be full compensation for all materials including pipe, short pieces and specials, trench excavation, embedment material, backfilling, labor, tools, equipment and incidentals necessary to complete this item of work. "Water Line" shall be measured along the pipe.

Payment for fitting shall be paid for by the pound. The price established shall be full compensation for all materials including fittings, trench excavation, backfilling, embedment material, concrete thrust blocks, labor, tools, equipment and incidentals necessary to complete this item of work.

505.07 – BASIS OF PAYMENT

(SIZE) (TYPE) WATERLINE	L.F.
FITTINGS	LB.

Such payment shall be compensation in full for furnishing all materials, labor, equipment, tools and incidentals, and for performing the work in accordance with these specifications.

SECTION 510 – WATER SERVICE LINE CONNECTIONS

510.01 – DESCRIPTION

510.01.01 – GENERAL

This section covers water service line connections in sizes five-eighths inch (5/8") through two inches (2") for use in buried service lines from the main to the meter valve or meter setting appurtenance in accordance with ANSI/AWWA C-800 Standard for Underground Service Line

Valves and Fittings or as modified herein. All water service lines and connections shall be installed as per city ordinances and standards.

510.01.02 – DEFINITIONS

The following definitions shall apply:

- A) **Adapter** -A fitting used to connect pipe, tubing, or other fittings with differing characteristics such as sizes, diameters, or material type.
- B) **Chamfer** - A bevel made on the end of a thread to facilitate thread engagement.
- C) **Corporation valve (stop)** - A valve attached to the water main to start a service connection, which is used to interrupt flow during installation or maintenance of the service line.
- D) **Coupling** - A fitting for connecting two pipes or tubing sections together.
- E) **Curb valve** -A valve installed in the water service line and accessible for operation from the surface of surface of the ground for routinely interrupting flow through the service line.
- F) **Driving thread** - A thread installed on the outlet end of corporation valves and used to hold the valve during installation.
- G) **Dry seal** -A type of pipe thread covered by ANSI/ASME B1.20.3. Dryseal pipe threads are based on the USA (American) pipe thread. They differ from the USA (American) pipe thread in that they are designed to seal pressure-tight joints without the need for sealing compounds.
- H) **Fitting** - A part used to connect piping or tubing.
- I) **Inlet** - The opening in a valve or fitting through which flow from the water main enters the valve or fitting.
- J) **N.P.T.** - National Pipe Thread as specified in ANSI/ASME B1.20.1.
- K) **Outlet** -The opening in a valve or fitting through which flow from the water main leaves the valve or fitting.
- L) **Tapping Clamp** - A fitting that attaches circumferentially to a pipe to provide for attachment of a corporation valve.

510.02 – MATERIALS

Fitting and valve materials in contact with potable water shall be copper or brass. No more than a weighted average of 0.25% of the wetted surface of pipes, pipe fittings, plumbing fittings and fixtures shall contain lead.

All service lines shall be seamless CTS pressure pipe meeting ANSI/AWWA C-901 and ASTM D2737. All corporation stops, curb stops and inlets and adapters shall be Mueller brand or approved equivalent Brass Fittings, unless noted otherwise. All service line installations, taps and connections shall comply with the City of Chickasha standards.

Component Parts - Component parts such as fasteners, seals, and packing may be of other materials selected for adequate endurance, corrosion resistance, and strength.

510.02.01 – DESIGN OF VALVES AND FITTINGS

General - Valves, fittings, and parts thereof shall be machined to the sizes and tolerances defined in

AWWA C-800. End connections shall be designed for the type of service line.

Pressure Rating - Service line valves and fittings shall be suitable for use with water at one hundred (100) degree F and one hundred fifty pounds per square inch pressure. (150 psi)

510.02.02 – DETAILED DESIGN OF VALVES AND FITTINGS

Dimensions of Corporation Valves:

A) **General** -Corporation valves shall be installed with drilling or tapping machines. Unless otherwise specified, the minimum inside diameter of the waterway through a corporation valve shall be large enough to accommodate the maximum drill sizes herein. Maximum drill sizes for installation of corporation valves and service clamps or saddles with a driving machine shall be as shown below.

Corporation Valve Size (inches)	Maximum Drill Size	
	Corporation Valve with AWWA Thread inlet	Corporation Valve with N.P.T Thread Inlet
¾	1 1/16	1 1/16
1	1 5/16	1 5/16
1 ½	1 7/16	1 7/16
2	1 15/16	1 3/4

B) **Overall Body Dimensions** -For corporation valves to be installed by a tapping machine, overall body dimensions shall conform with the dimensions listed below.

Corporation Valve Size (inches)	Maximum Radius (inches)	Maximum Length (less nut) (inches)
¾	1.50	4
1	1.50	4
1 ½	2.50	9 1/16
2	2.50	9 1/16

C) **Tapping Clamps** -Tapping Clamps shall conform to the requirements of Section 533.

D) Service Line Fittings

a. **General** -The fittings used in service lines shall be designed for connection to the service line. Small waterways and abrupt corners causing water turbulence and pressure drop shall be minimized.

510.02.03 – END CONNECTIONS

End connections shall be in conformance with AWWA C-800.

510.04 – CONSTRUCTION METHODS

510.04.01 – GENERAL

The following are general connection requirements only. Additional plumbing code and other requirements may be applicable, which are not included herein.

- A) Single taps shall be made at forty-five degree angles (45°) from crown of distribution main. When two (2) or more taps are to be made, they shall be a minimum of thirty-six (36") inches

apart and alternate from forty-five degrees (45°) to thirty degrees (30°) from crown of distribution main.

- B) Back/reverse tap may be allowed only under adverse conditions and only when approved by the Engineer.
- C) No tap shall be allowed on fire hydrant leads except under adverse conditions and only when approved by the Engineer.
- D) Direct taps shall be allowed into cast iron or ductile iron mains only.
- E) Tapping clamps shall be Mueller Single Section Servi-Seal All Stainless Steel Pipe Repair Clamps with integral CC Threaded service outlet, minimum 15" length or approved equal for three quarter inch (¾") to two inch (2") service line connections. Tapping clamp shall also conform with the requirement of Section 533. All other taps shall be accomplished using tapping sleeves in accordance with Section 532.
- F) When tapping clamps are installed a pressure test shall be performed. Tapping clamps shall hold a minimum of one hundred pounds per square inch (100 psi) of pressure for thirty (30) minutes.
- G) Service connections two (2") inches and smaller shall be by corporation valve (stop) of the same size as the service line and meter to be installed. Corporation valves shall be as specified in Section 510.02. Service connections to the main for service lines larger than two (2") inches shall be a branch connection.
- H) When tapping mains where it is necessary to remove part of the polyethylene wrapping, the polyethylene wrap shall be repaired or replaced in such a manner as to protect both the pipe and corporation valve. Any bedding material removed during excavation shall be replaced in kind and compacted.
- I) No tees shall be connected to existing water service lines three inches (3") and smaller in diameter providing water to a single meter of the same size.

510.04.02 – MATERIAL CERTIFICATION

Contractor shall provide a Type D certification for all materials used in service lines and service line connections.

510.05 – TESTING

Any valves or fittings found to be defective shall be replaced with new valves or fittings at the Contractor's expense.

510.07 – BASIS OF PAYMENT

All cost of service line connections shall be included in the price bid for water services.

SECTION 511 – WATER SERVICE LINES

511.01 – DESCRIPTION

511.01.01 – GENERAL

This section covers water service lines intended to be used from the connection to the meter valve for meter setting appurtenance in accordance with AWWA C-800 Standard for Underground Service Line Valve and Fitting or as modified herein. All water service lines shall be connected as per city ordinances.

511.01.02 – TYPES

Long Service (EA) is for one service line from the new water meter to a meter or meters on the opposite side of the street, irrespective of the number of meters served by one line. Short Service (EA) is for one service line from the new water main to a meter or meters on the same side of the street, irrespective of the number of meters served by one line.

511.02 – MATERIALS

All service lines shall be seamless CTS pressure pipe meeting ANSI/AWWA C-901 and ASTM D2737. All corporation stops, angle ball valves, curb stops and inlets and adapters shall be Mueller brand or approved equivalent Brass Fittings. All service line installations, taps and connections shall comply with the City of Chickasha Standards.

511.04 – CONSTRUCTION METHODS

The following are general construction requirements only. Additional plumbing code and other requirements may be applicable, which are not included herein.

A) Boring

1. Lines for all long services will be bored or punched under the existing road.
2. Service lines under street pavement shall not be spliced.
3. Street bores shall be a minimum of thirty (30") inches below the bottom of the street.
4. Service line bores shall be level.

B) Warning tape

Place blue polyethylene Underground Warning Tape over all service lines. Warning tape shall have black lettering stating "Caution Buried Water Line Below" imprinted on it. Use 6-inch wide tape.

511.06 – METHOD OF MEASUREMENT

The price established shall be full compensation for all materials including copper service lines, boring, fittings, connections to meter, labor, tools, equipment, and incidentals necessary to complete this item of work.

511.07 – BASIS OF PAYMENT

The items measured as provided above will be paid for at the contract unit price bid:

SHORT SERVICE (SIZE)	EA.
LONG SERVICE (SIZE)	EA.

Such payment shall be compensation in full for furnishing all materials, labor, equipment, tools and incidentals, and for performing the work in accordance with these specifications.

SECTION 513 - WET CONNECTIONS

513.01 – DESCRIPTION

This section covers wet connections for tie-in to existing mains. The connections shall be either a cross or tee as called for on the plans where tapping is not allowed.

513.04 – CONSTRUCTION METHODS

The wet connection shall begin with isolating the point of tie-in by closing of valves. The existing main shall then be cut where wet connection is to be made and the line drained. Contractor shall prevent all non-potable water and foreign materials from entering the water main by use of adequate pumps

and other necessary means.

513.06 – METHOD OF MEASUREMENT

"Wet Connection" will not be measured separately.

513.07 – BASIS OF PAYMENT

All cost of making wet connections shall be included in the price bid for fittings.

SECTION 514 – TAPPING CONNECTIONS

514.01 – DESCRIPTION

This section covers water main tapping for connections to existing water mains.

514.02 – MATERIALS

The following materials shall be used and meet the requirements of the appropriate Sections listed below.

Tapping Mechanism	Section
Tapping Sleeve	532
Tapping Valves	520.02.02

514.04 – CONSTRUCTION METHODS

A) Description - A tap is the cutting of a coupon, utilizing a tapping sleeve or saddle with tapping valve for a connection.

B) Methods

1. Direct taps -Direct taps shall be made when the main to be tapped is on the same horizontal plane as the branch. The cutting operation is to be done with a sharp shell-cutter tool, which shall be lubricated with the manufacturer's recommended cutting tool lubricant.

2. Swing Ties - Swing ties shall be made when the main to be tapped is either above or below the branch when called for on the plans or specified. A swing tie may consist of

- i. Waterline pipe
- ii. Tapping sleeve as necessary;
- iii. Tapping valve and Box;
- iv. Tap;
- v. Solid sleeve;
- vi. Forty-five degree (45°) bends.

514.06 – METHOD OF MEASUREMENT

Tapping Connection will not be measured separately.

514.07 – BASIS OF PAYMENT

All cost of making tap connections shall be included in the price bid for tapping valve with sleeve.

SECTION 516 – FIRE HYDRANTS

516.01 – DESCRIPTION

This section covers fire hydrants intended to be used for fire protection when specified or called for on the plans. The hydrant shall be located and positioned in such a way as to be accessible and protected from traffic.

516.02 – MATERIALS

516.02.01 – GENERAL

All fire hydrants furnished shall conform to AWWA C-502, as amended, or as modified herein. Fire hydrants shall be Mueller Super Centurion A-423, 3-way fire hydrant, 5 ¼" valve opening, 2-2 ½" hose nozzles, 1-4 1/2" pumper nozzle, 6" M.J. Shoe, red color, City of Chickasha threads or approved equal.

516.02.02 – SUBMITTALS

The Contractor shall provide three (3) copies of all submittals for fire hydrants. The submittal shall clearly identify the make, model, design, and metal characteristics for approval by the Engineer prior to installation.

Drawings shall show principal dimensions, metal thickness, construction details, materials used in all parts of the fire hydrant with ASTM designation and structural properties. Net assembled weight of hydrants shall be shown.

Specifications shall include comprehensive parts list with sufficient drawings or details to clearly identify parts.

516.02.03 – AFFIDAVIT OF COMPLIANCE

The Contractor shall provide an Affidavit of Compliance that fire hydrants furnished comply with all provisions of these specifications.

516.02.04 – TYPE OF SHUT-OFF

Type of shut-off shall be of the compression type with the flow.

516.02.05 – DELIVERY CLASSIFICATION

All hydrants shall be equipped with two (2) hose nozzles and one (1) steamer nozzle. Leaded in nozzles shall not be acceptable.

516.02.06 – INLET CONNECTION

Unless otherwise specified, the inlet connection shall be a mechanical joint hub complete with all joint accessories. All mechanical joint gland bolts shall be high strength, low alloy, corrosion resistant material, such as Cor-Ten or equal, as specified in ASTM A-252. The inlet valve opening shall be five and one-quarter (5¼") inches net.

516.02.07 – OUTLET CONNECTIONS

The outlet connections shall be two (2) hose nozzles, two and one-half inches (2½") in nominal I.D. 8-274 I.P. thread and one (1) pumper nozzle four and one-half inches (4 1/2") in nominal I.D. with NST threads.

516.02.08 – RESTRAINED JOINTS

Restrained Joints shall be furnished when specified or called for on the plans.

516.02.09 – NOZZLE CAP GASKET

Gaskets shall be furnished on all nozzle caps. Gaskets shall be neoprene.

516.02.10 – DRAIN VALVE AND OUTLET

A positive operating drain valve or valves shall be provided.

516.02.11 – PAINT

Fire hydrants shall be painted with two (2) coats of red enamel paint manufactured by Pittsburgh Paint or approved equal. Each coat of paint shall have a minimum dry thickness of two (2) mils.

516.02.12 – SHAPE AND SIZE OF OPERATING AND CAP NUTS

The operating and cap nuts shall be 1-1/2" Pentagonal nuts.

516.02.13 – BREAKABLE TYPE

Breakable type (traffic models) shall be furnished. A breakable type hydrant is one that requires no excavation and shall break at the design point.

516.02.14 – STAND PIPE, FLANGES, AND EXTENSIONS

Breakable parts of standpipe shall be located approximately three inches (3") but not more than five inches (5") above the ground line. These parts shall be of the breakable flange type, breakable coupling or integral flange with sawed bolts. Breakable flanges screwed to the standpipe shall not be accepted. The flange on each end shall have at least eight (8) bolts, or other acceptable method to permit proper orientation of nozzles in forty-five degree (45°) increments and shall be designed so that a wrench can be used on nuts and bolts. Extension of hydrant shall be made by adding at the ground line flange a new coupling and stem section equal to the length of the extension. Stem extensions made by adding new section of stem to the threaded section of the stem at the top of the hydrant shall not be acceptable.

516.02.15 – STEM

Provisions shall be made in the design of the stem to disconnect the stem from the hydrant parts above the standpipe break point in the event of traffic accidents.

516.02.16 – COUPLINGS

If breakable or sleeve type couplings are used, they shall have sufficient torsional strength such that a torsional failure of the stem shall occur at some point other than coupling. Design of the coupling shall be such that when the coupling is broken, no parts shall come loose and fall into hydrant, and the break shall not occur through the pins or bolts holding the coupling to the stem.

516.02.17 – GROUND LINE GASKETS

Gaskets furnished for ground line flanges shall be full face, or flange shall be recessed.

516.02.18 – MAIN AND VALVE SEATS

Main valve seats on the hydrant shall be of such design that incorrect positioning is impossible and

that the threads shall be adequately guided into position. Arrangements shall also be made to hold the main valve gasket in place during assembly. The main valve seat shall be made of bronze and threaded into a bronze retainer ring or it may be threaded into a heavy bronze bushing in the hydrant base. All bronze parts in constant contact with the water shall be of type "A", "D", or "E" bronze in accordance with Table 1, AWWA C-212.

516.02.19 – NOZZLE CAP CHAINS

All fire hydrants shall be equipped with nozzle cap chains.

516.02.20 – FLANGES

All flanges shall have a minimum thickness of seven-eighths inch (7/8"). Bolt hole edge distance shall be sufficient to provide full support for the bolt heads and nuts.

516.02.21 – OPERATING STEMS

Operating stems shall be high grade bronze, wrought iron or steel. Stem nuts shall be bronze. Where passing through O-rings, iron or steel stems shall have a bronze, stainless steel, or other non-corrodible metal sleeve. Operating threads shall be sealed against contact with water regardless of open or closed position of the main valve. An internal lubricant chamber shall be provided as a part of the dry top construction. An external access for adding lubricant shall be provided.

516.02.26 – O-RINGS

Fire hydrants shall be equipped with O-rings in lieu of stem packing.

516.02.27 – CAP NUTS

The hydrants shall have a cap nut to seal the bottom end of the stem threads against contact with water.

516.04 – CONSTRUCTION METHODS

516.04.01 – BURY LENGTH

Unless otherwise specified, hydrants shall be furnished with a depth of bury to match the water main depth.

516.04.02 – TAPPING OF DRAIN OPENING

Tapping of drain opening shall not be required.

516.04.03 – DIRECTION OF OPENING

The direction of opening shall be to the left or Counter-Clockwise. An arrow and the word "OPEN" shall be cast in relief to be clearly visible on the top of the hydrant, to designate the direction of opening. A minimum number of turns to open shall be ten (10).

516.04.04 – INSTALLATION

The hydrant shall be inspected and cleaned prior to installation. It shall be placed on a concrete mat not less than four inches (4") thick and sixteen inches (16") square. The rear side of the hydrant, opposite the pipe, shall be blocked with concrete between the hydrant and a vertical face of undisturbed earth. A minimum of seven (7) cubic feet of crushed rock shall be placed around and below the hydrant to allow the hydrant to properly drain. The hydrant shall be firmly supported prior to backfill.

516.05 – TESTING

Hydrostatic tests outlined in AWWA C-502 shall be complied with.

516.06 – METHOD OF MEASUREMENT

Payment for "Fire Hydrant Assembly" shall be made at the unit price bid per each. Price bid for "Fire Hydrant Assembly" shall be full compensation for equipment, labor and materials for complete and acceptable installation of a fire hydrant per City of Chickasha standards, including fire hydrant, TEE, Gate valve, extension pipe, riser pipe and up to five (5) linear feet of 6" diameter ductile iron pipe connection between fire hydrant and water main.

516.07 – BASIS OF PAYMENT

The items measured as provided above will be paid for at the contract unit price bid:

FIRE HYDRANT ASSEMBLY	EA.
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Such payment shall be compensation in full for furnishing all materials, labor, equipment, tools and incidentals, and for performing the work in accordance with these specifications.

SECTION 518 – THRUST BLOCKS

518.01 – DESCRIPTION

This section covers thrust blocks intended to be used to transmit unbalanced thrust forces into undisturbed soil.

518.02 – MATERIALS

High Early Strength Concrete shall be used for thrust blocks. Compressive strength of concrete shall be minimum 3500 psi at three (3) days.

518.04 – CONSTRUCTION METHODS

All construction shall be in accordance with the Standard Details for Thrust Blocks.

518.06 – METHOD OF MEASUREMENT

"Thrust Blocks" will not be measured separately.

518.07 – BASIS OF PAYMENT

All cost of installing thrust blocks shall be included in the price bid for water line.

SECTION 519 – BLOW-OFF CONNECTIONS

519.01 – DESCRIPTION

This section covers blow-off connections intended to be used to provide outlets for draining waterlines at dead ends.

519.04 – CONSTRUCTION METHODS

Blow-off connections shall be constructed of the size, detail and location shown on the plans. Blow-offs shall be provided with a shut-off valve. Blow off connections shall be constructed in accordance with standard details in contract.

519.06 – METHOD OF MEASUREMENT

Blow-off Connections will not be measured separately.

519.07 – BASIS OF PAYMENT

All costs of providing and installing blow-off connections shall be included in the price bid for waterline.

SECTION 520 – WATER VALVES

520.01 – DESCRIPTION

This section covers water valves of size and type specified or called for on the plans. Unless otherwise specified, all valves shall be gate valves. Valves specified shall be of the types shown in the following table:

Valve Type	Reference Standard
Gate (Resilient Seated)	AWWA C-509, C-550 and C111
Tapping	AWWA C-509, C-550 and C111
Check	AWWA C-508

520.02 – MATERIALS

The Contractor shall submit the following for approval prior to installation:

- A) Valve make and model
- B) Valve detail drawings
- C) Type "A" and "D" Certifications.

520.02.01 – GATE VALVES

- A) General - Gate valves shall conform to the requirements of AWWA C-509, C-550 and C-111 and shall be, bronze mounted, outside screw and yolk, non-rising stem, open counter-clockwise, close clockwise, mechanical joint both ends, resilient seated, "O-ring" for non-rising stem, and shall have 2" square operating nut.
- B) Pressure Rating - Valves produced conforming to AWWA C-509, C-550, and C-111 shall have a design working pressure of two hundred pounds per square inch (200 psi).
- C) Acceptable Manufacturers – Gate valves shall be Mueller or approved equal.

520.02.02 – TAPPING VALVES

- A) General - Valves to be used with tapping sleeves shall have connecting flanges (Standard Class 125) with centering lip on the valve flange to fit recess or counterbore on the outlet tapping sleeve flange. The outlet end of the valve shall have a combination mechanical joint end and tapping machine flange.
- B) Tapping valves shall conform to AWWA C-509 and C-550, except as modified for passage and clearance of tapping machine cutters. The opening through the valve shall be at least one-quarter inch ($\frac{1}{4}$ ") larger than nominal valve diameter. The outlet end of the valve shall have the desired joint connection for the intended pipe. Tapping Valves shall be Mueller Tapping Valve, or approved equivalent.

Tapping valves shall allow full size cutters to be used. Seating of the disc gate shall not require any sliding or wedging to achieve a zero leakage. A maximum of three (3) internal moving parts shall be required for operation of the valve. The stem collar shall be protected from outside grit, sand, etc., by dual O-rings above stem collar. There shall be an O-ring below stem collar sealing off lubrication chamber from line fluid. Pressure energized O-rings may be used in place of flat gaskets on flanged joints in valve body/bonnet.

All interior and exterior ferrous surfaces shall be protected against corrosion by factory-coated fusion-bonded epoxy coating. Coating shall be applied prior to assembly to insure coverage of all exposed areas, including bolt holes.

c) Acceptable Manufacturers - Tapping valves shall be Mueller or an approved equal:

520.02.04 – CHECK VALVES

A) General - Check valves shall conform to the requirements of AWWA C-508 Standard for Swing-Check Valves for Waterworks Service, two (2") inches through twenty-four (24") inches NPS. Check Valves shall be Mueller A2600-06BB Gravity operated Swing Check Valve or approved equal.

B) Pressure Ratings – Check valves conforming to AWWA C-550 shall have a working pressure rating of one hundred seventy-five pounds per square inch (175 psi).

C) Acceptable Manufacturers - Check valves shall be Mueller or approved equal.

D) Pressure Rating- Tapping valves manufactured conforming to AWWA C-509 and C-550 shall have 200 psi working pressure rating

520.04 – CONSTRUCTION METHODS

Gate valves shall be set with the stems plumb.

Check valves shall be set horizontally.

Tapping valves shall be installed in accordance with the recommendations of the pipe manufacturer being tapped.

Other types of valves shall be set in position shown on the plans or as directed by the Engineer.

At the site of the work and just prior to placing the valve in the trench, the valve shall be fully opened and closed and a record of the number of turns required for full operation shall be furnished to the Engineer. The inside of the valve shall be thoroughly cleaned before installation.

The valve shall be set on a firm base. Valves in PVC pipelines shall be supported by concrete independently of the pipe. The valve and the valve box shall be firmly supported and centered prior to backfill. Installation of valves shall also comply with the appropriate standard detail.

520.06 – METHOD OF MEASUREMENT

Payment for valves, valve boxes and valve vaults shall be made at the unit price bid per each for each type and size of valve. The price established shall be full compensation for all material including valve, valve boxes, valve vaults, installation, labor, tools, equipment and incidentals necessary to complete this item of work.

520.07 – BASIS OF PAYMENT

Unless otherwise called out on plans, the item measured as provided above will be paid for at the contract unit price bid:

(SIZE) (GATE) VALVE WITH BOX EA.
(SIZE) TAPPING VALVE AND SLEEVE EA.
(SIZE) CHECK VALVE AND VAULT EA.

Such payment shall be compensation in full for furnishing all materials, labor, equipment, tools and

incidentals, and for performing the work in accordance with these specifications.

SECTION 521 – VALVE BOXES

521.01 – DESCRIPTION

This section covers valve boxes intended to provide means to operate the valve.

521.02 – MATERIALS

- A) Valve Boxes - All valve boxes shall be Chickasha Standard three (3) piece cast iron of the extension type suitable for a depth of cover over the pipeline as required by the backfill requirements at each valve. Each valve box shall be provided with a suitable cast iron base and cover. All parts of valve boxes, bases, and covers shall be coated by dipping in hot bituminous base material. Covers shall have cast thereon an appropriate name designating the service for which the valve is to be used.

521.07 – BASIS OF PAYMENT

Payment for valve boxes shall be paid for as per Section 520.07.

SECTION 522 – HYDROSTATIC PRESSURE TESTING

522. 01 – DESCRIPTION

This section covers hydrostatic pressure testing of installed water mains in accordance with the requirements specified herein.

All pipelines shall be tested by means of hydrostatic pressure of not less than 150 pounds per square inch. If test plugs are used, they shall be furnished and installed by the Contractor at his own expense, together with all necessary anchors, braces and other devices necessary to withstand the hydrostatic pressure on such plug or plugs without placing any hydraulic thrust on the pipe line or any part thereof. The Contractor shall be solely responsible for any and all damage to the pipeline and public and private property, which might be caused by the failure of such test plugs or supports therefore. The allowable leakage shall not exceed 10 gallons per inch diameter per mile of pipe per 24 hours at 150 psi testing pressure.

After the section of line to be tested has been filled with water, the specified test pressure shall be applied by means of a force pump of such design and capacity that such pressure can be applied and maintained for the duration of the test period, which shall be not less than two (2) hours.

All water supplied to the line, after the initial filling thereof shall be metered by means of a tested water meter approved by the Engineer.

If any section of pipeline including specials, fitting and appurtenances are discovered to be damaged after the hydrostatic test, they shall be repaired or replaced with sound material and the test shall be repeated to the satisfaction of the Engineer. If any test of pipe installed indicates leakage greater than the allowable leakage, the contractor shall, at his own expense, locate and repair the source of leak in the pipeline until the leakage is within the specified allowance. All visible leaks are to be repaired regardless of the amount of leakage.

All pipelines shall meet the requirements of this section before any service taps are made, unless otherwise approved by the Engineer.

522.06 – METHOD OF MEASUREMENT

All costs for Hydrostatic Pressure Testing shall be included in the price bid for water line.

SECTION 523 – DISINFECTION

523.01 – DESCRIPTION

This section covers disinfection of water mains.

523.04 – CONSTRUCTION METHODS

523.04.01 – GENERAL

- A) Water Mains -All new water mains shall be disinfected before they are placed in service. All water mains taken out of service for inspecting, repairing, or other activity that might lead to contamination of water shall be disinfected before they are returned to service. All work shall comply with ODEQ regulations AWWA C-651 Standard for Disinfecting Water Mains and as described herein.
- B) Continuous-feed method disinfection per AWWA 651, Sec. 4.4.3 shall be used only. Contractor shall be responsible for collecting all water drained from the existing water main and from the new water main and disposing of it in accordance with all appropriate State and Federal regulations.
- D) All water mains shall meet the requirements of this section before any service taps are made.
- E) The City Engineer may require the water line be disinfected and tested for acceptance in sections less than 1,000 long.

523.04.02 – FLUSHING

Prior to chlorination, the line shall be completely flushed through all available hydrants and blow-offs with potable water at a velocity sufficient to adequately clean the pipe, hydrants and blow-offs. Valves shall be operated through their extreme open and closed positions during disinfection. During operations to collect samples for bacteriological testing, the Contractor shall completely flush the main through all available hydrants and blow-offs with potable water at a velocity sufficient to adequately clean the pipe, hydrants and blow-offs.

All water necessary for flushing shall be provided by the City.

523.04.03 – DISINFECTION

The disinfection of the pipeline and the bacteriologic and chemical tests shall be provided by the Contractor. The Contractor shall furnish the necessary equipment and materials for disinfection and testing. The Contractor shall furnish labor to make the necessary connections and shall provide any temporary drainage measures for disposal of the flushed water. Contractor shall obtain safe bacteriological samples on two consecutive days before placing the waterline into service.

All water mains shall meet the requirements of this section before any service taps are made.

523.06 – METHOD OF MEASUREMENT

Unless provide for otherwise, all costs of Disinfection shall be included in the price bid for water line. Contractor shall provide all material including disinfectants, flushing, de-chlorination, disinfection, hydrostatic pressure testing, labor, tools, equipment and incidentals necessary to complete this item of work.

SECTION 524 – DUCTILE IRON PIPE (DIP)

524.01 – DESCRIPTION

This section covers ductile iron pipe and fittings, for pressure applications, intended to be used for conveyance of potable water, in sizes six inches (6") through twelve inches (12").

524.02 – MATERIALS

524.02.01 – GENERAL

All ductile iron pipe and fittings and installation of same shall conform to the requirements of the following standards listed below or as modified herein.

- A) ANSI/AWWA C-150/A 21.50, Thickness design of Ductile Iron Pipe
- B) ANSI/AWWA C-151/A 21.51, Ductile Iron Pipe, Centrifugally Cast
- C) ANSI/AWWA C-111/A 21.11, Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.
- D) ANSI/AWWA C-104/A 21.4, Cement Mortar Lining for Ductile Iron Pipe for Water.
- E) ANSI/AWWA C-600, Installation of Ductile Iron Water Mains and Their Appurtenances.
- F) ANSI/AWWA C-115/A 21.15, Flanged Ductile Iron Pipe with Threaded Flanges.
- G) ANSI/AWWA C-116/A 21.16, Protective Fusion-Bonded Epoxy Coatings for Interior and Exterior surface of Ductile Iron and Gray Iron Fitting
- H) ANSI/AWWA C-153/A 21.53, Ductile Iron Compact Fittings
- I) NSF/ANSI 61, Drinking Water System Components –Health Effects

524.02.02 – SUBMITTALS

The Contractor shall submit the following and shall receive approval of same from the Engineer prior to incorporating any materials into the work.

Review and approval of the Contractor submittals, by the Engineer, shall not be construed in any way as relieving the Contractor and the manufacturers of their responsibilities for manufacturing ductile iron pipe and fittings as described herein.

- A) General - Detail drawings of pipes, specials, fittings, and joints.
- B) Certification - Type "A" and "D" certification for pipe, specials, fittings, gaskets, and lining material pursuant to, but not limited to, applicable standards in Section 524. The affidavits of compliance and test reports shall be certified by a registered professional engineer.
- C) Copies - The Contractor shall provide three (3) copies of all submittals.

524.02.03 – DESIGN BASIS

- A) General - All ductile iron pipes are designed in accordance with AWWA C-150/ANSI 21.50. The designs are based on prism load of ordinary clay backfill with a unit weight of one hundred twenty pound per cubic feet (120 pcf), maximum horizontal ring deflection of three (3%) percent, design factor safety of two (2), and for AASHTO HS-20 truck highway (HWY) or Cooper axle E-80 railroad (RR) live loading conditions.

- B) Depth of Cover - The minimum design depth of cover shall be five (5') feet. Pipe to be installed inside a casing shall be designed for full cover including live load (a single H-20 or Railroad E-80) neglecting the casing.
- C) Deflection – The allowable deflection for the specified mortar lining system is three (3%) percent. Deflection calculation is in accordance with AWWA C-150.
- D) Bending and Hoop Stresses -The bending and hoop stress requirements are met in accordance with AWWA C-150.

E) Buckling

1. Buried Installations - The controlling load for buried pipes is determined from the greater of hydrostatic and earth loads plus vacuum or hydrostatic and earth load plus live load with a factor of safety of two (2.0) as determined in accordance with Section 6.3 of AWWA M-11. It is assumed that the groundwater level is equal to natural ground surface and the ground is fully saturated.
2. Unburied Installations - For unburied pipes, the internal collapsing vacuum pressure is used in determining the minimum wall thickness(es) in accordance with equation 4-2 of AWWA M11 for a factor of safety of 1.5 against buckling. The Poisson's ratio is 0.28 and modulus of elasticity is 52×10^6 psi.
3. Vacuum Pressure - For both buried and unburied installations, the internal collapsing vacuum pressure is taken as 14.7 psi.

524.02.04 – MINIMUM PIPE DESIGN FOR DUCTILE IRON PIPE

Unless otherwise specified, ductile iron pipe and fittings for buried installations, including boring, shall have the following minimum nominal thickness(es), shown below.

For boring, installations, the minimum pipe design shall be equal to or greater than the minimum pipe design on either side of the installation.

Minimum Pipe Design for Ductile Iron Pipe		
Pipe Size (inches)	Nominal Push on Joint Wall Thickness Class 50 (Inches)	Flange Joints Class 53 (inches)
6"	0.25"	0.34"
8"	0.27"	0.36"
10"	0.29"	0.38"
12"	0.31"	0.40"

524.02.06 – PIPE JOINTS AND FITTINGS

- A) General - All specials and fittings may be used with push-on, mechanical, or flanged joints conforming to the requirements of AWWA/ANSI C-110/A 21.16. Fittings with push-on joints shall be installed with thrust blocks. Mechanical joints shall be adequately protected against unbalanced forces. All joints shall have the same pressure rating as the pipe of which they are a part and shall meet the requirements of AWWA/ANSI C-111/A 21.11. All pipe shall be marked in accordance with Sec. 4.7 of AWWA C-151.
- B) Push-on Joints - Push-on joints are a rubber gasket compression type joint meeting the requirements of AWWA C-111. Push-on joints shall have a deflection capability of three degrees

(3°).

C) Mechanical Joints - A mechanical joint is a bolted joint of the stuffing-box type. Each joint shall consist of a bell that is cast integrally with the pipe or fitting and provided with an exterior flange having bolt holes or slots, and a socket with annular recesses for the sealing gasket and the plain end of the pipe or fitting, a pipe or fitting plain end, a sealing gasket, a follower gland with bolt holes, and T-head and hexagonal nuts.

D) Flanged Joints - The flanged joints for ductile iron pipe shall be in accordance with AWWA C-111. Bolts, gaskets, and installation shall meet the requirements of AWWA C-115, Appendix A. The flanged joints for specials and fittings shall meet the requirements of AWWA C-110.

The flanges shall be rated for two hundred fifty (250 psi) pounds per square inch working pressure with bolt-hole drillings as for Class 125 flanges for service at temperatures ranging from twenty degrees (20°) to one hundred fifty degrees F (150°F) are pressure temperature rated for one hundred fifty (150) to two hundred pounds per square inch (200 psi) as shown in ANSI B 16.1. All flanged joints shall be made with single piece, red rubber gaskets one-eighth (1/8") inch thick. Gaskets shall be full face for exposed installations and ring type or full faced for buried service meeting AWWA C-110, Appendix A requirements. As directed by the Engineer or shown on plans, flange joints meeting the requirements of ASME/ANSI B-16.1 may be used.

E) Mechanical Joint Restraints

Mechanical Joint Restraints may be used only at locations approved by the Engineer. Typical examples where the Engineer may permit use of Mechanical Joint Restraints are: creek crossings, locations where excavation depth exceeds five feet and bends greater than 22 1/2° are required to match new pipe to existing pipes and locations where required connections or other laying conditions do not permit sufficient time to complete thrust blocks prior to returning water mains to service.

Mechanical Joint Restraints will not be used in lieu of thrust blocks.

Mechanical Joint Restraints, if permitted, shall be as follows or approved equal. Mechanical Joint Restraints such as Ford Meter Box Company Uni-Flange Retainer Glands, EBAA Iron Sales Mega-Lug Series 1100 and other models that require set screws or bolts in direct contact with the pipe will not be permitted for use on PVC pipe.

Restrained Joints		
Company	Size	Type
American Cast Iron Pipe Co.	6" to 12"	Flex-Ring
EBAA Iron Sales Co.	6" to 12"	Mega-Lug Series 1100
Ford Meter Box Co.	6" to 12"	Uni-Flange
US Pipe and Foundry Co.	6" to 12"	TR-Flex
N/A	6" to 12"	¾" all thread with Duc Lug

F) Sleeve Couplings - All sleeve couplings, except as noted on the plans or otherwise specified, shall be restrained with tie rods and shall be designed for the pipe design pressure and maximum allowable stress not to exceed sixty-five percent (65%) of minimum yield strength of steel used. Sleeve couplings shall be:

Dresser Style 38
Rockwell Steel Coupling 511
Smith Blair
Approved Equal

Sleeve Couplings shall be compact fittings meeting the requirements of AWWA C-153 and AWWA C-110

524.02.07 – COATING AND LINING

- A) Exterior Coating - The exterior of ductile-iron pipe, specials and fittings shall be coated with the asphalt coating in accordance with AWWA C-151, Section 516. The coating shall have a minimum thickness of one (1) mil. The finished coating shall be smooth, continuous and strongly adherent to the pipe. Any damage to the outside coating during shipping, storage, handling and installation shall be field repaired with a fresh coating in accordance with the manufacturer's recommendations.
- B) Interior Lining - Unless otherwise called for on the plans or specified, the interior of ductile-iron pipe, specials and fittings shall be cement mortar lined in the shop, with centrifugally spun lining in accordance with AWWA C-104. The Portland cement for cement mortar lining shall be in accordance with the requirements of ASTM C-150, Type I cement. Field repair of lining shall be made in accordance with AWWA C-104, Section 4-7.2.

524.02.08 – CORROSION PROTECTION

When specified or called for on the plans, all ductile-iron pipe, specials, fittings and other appurtenances shall be polyethylene encased in accordance with AWWA C-105/ANSI A 21.5. Exposure to sunlight of polyethylene wrapped pipe shall be kept to a minimum to prevent deterioration of polyethylene. Damage to polyethylene wrapping shall be prevented during backfilling operations. The minimum thickness for polyethylene is eight (8) mils.

524.05 – SOURCE QUALITY CONTROL TESTING

- A) Ductile Iron Pipe shall be tested at the manufacturer's plant by the manufacturer in accordance with Sec. 5.2 of AWWA C-151.
- B) Ductile Iron fittings shall be tested at the manufacturer's plant by the manufacturer in accordance with Sec. 5.2 of AWWA C-153.
- C) Joint Testing – Joints shall be tested and meet the performance requirements established in AWWA C-111/ANSI A 21.11, Section 11-9 and as modified herein. The working pressure rating of the joint shall be established by subjecting the joints to three (3%) percent of the pipe produced to hydrostatic pressure of twice the rated working pressure, but in no event less than twice the minimum working pressure rating shown below. At least two (2) joints shall be hydrostatically tested at a deflected angle of the degrees (3°) at the above specified pressure rating.

The minimum working pressure ratings for joints shall be 350 psi.

- D) Contractor shall provide certifications stating the pipe and fittings meet these requirements.
- E) Welding - All welding shall be done by qualified welders. The ductile-iron pipe manufacturer shall be responsible for quality control and testing of all welding done in the plant during fabrication of special fittings.

Inspection - The City retains the right to inspect the pipe, specials and fittings, all work performed and materials furnished, at the manufacturer's plant and at the project site and to independently monitor the fabrication of the pipe, specials and fittings. Such inspection shall not relieve the Contractor or the manufacturer of their responsibilities to furnish material and perform work in accordance with these

specifications.

524.06 – METHOD OF MEASUREMENT

Payment shall be made pursuant to Section 505 for water line.

524.07 – BASIS OF PAYMENT

Such payment shall be compensation in full for furnishing all materials, labor, equipment, tools and incidentals, and for performing the work in accordance with these specifications.

SECTION 525 – POLYVINYL CHLORIDE (PVC) PIPE

525.01 – DESCRIPTION

This section covers polyvinyl chloride (PVC) pipe for pressure applications, intended to be used for conveyance of potable water, in sizes six inch (6") through twelve inch (12") diameter.

525.02 – MATERIALS

PVC pipe shall be produced by extrusion from Class 12454-A or 12454-B PVC compound providing a hydrostatic design basis (HDB) of four thousand pounds per square inch (4,000 psi).

525.02.01 – GENERAL

All PVC pipe and installation of same shall conform to the requirements of the following standards listed below or as modified herein.

AWWA C605 – Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for water

AWWA C-900-PVC pressure pipe, 4 inch through 12 inch for water distribution.

AWWA M-23 – PVC pipe Design and Installation.

ASTM D-2774-Recommended Practice for Underground Installation of Thermoplastic Pressure Piping.

ASTM D-2827-Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.

ASTM D-3139-Specifications for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

ASTM F-477-Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

NSF 14-Plastic Piping System Components and Related Materials. PPI TR3-Policies and Procedures for Developing Recommended Hydrostatic Design Stresses for Thermoplastic Pipe Materials.

NSF/ANSI 61 Drinking Water System Components – Health Effects.

525.02.02 – SUBMITTALS

The Contractor shall submit the following and shall receive approval of same from the Engineer prior to incorporating any materials into the work.

Review and approval of the Contractor submittals, by the Engineer, shall not be construed in any way as relieving the Contractor and the manufacturers of their responsibilities for manufacturing PVC pipe and fittings as described herein.

A) General -Detail drawings of pipes

B) Certification - Type "A" and "D" certification for pipe, specials, fittings, gaskets, and lining material. The affidavits of compliance and test reports shall be certified by a registered professional engineer.

C) Guides - The manufacturer's pipe installation guide, standard pipe material repair guide, and

written quality control manual shall be provided by all suppliers who have not previously provided same to the City of Chickasha, or if same has been revised since last provided to the City of Chickasha.

D) Mill Test Reports - Mill test reports of materials used in the fabrication of pipe.

E) Copies - The Contractor shall provide three (3) copies of all submittals.

525.02.03 – DESIGN BASIS

A) General - The PVC pipe is designed in accordance with AWWA M23, or as modified herein, and shall conform to DR 14.

B) Depth of Cover - The minimum design depth of cover shall be five feet (5'). The pipe to be installed inside a casing shall be designed for full cover including live load (a single H-20 or Railroad E-80) neglecting the casing.

C) Allowable Stresses – For pipes six (6") inches through twelve 12" inches, the allowable design stress is sixteen hundred pounds per square inch (1,600 psi), as established per AWWA C-900.

D) Dimension Ratio (DR) - Pipe DR shall be DR 14.

E) Deflection - The allowable deflection is five (5%) percent of the nominal diameter. Deflections are determined based on the following:

a. Deflection lag factor = 1.0

b. Bedding Constant = 0.10

c. Modulus of soil reaction, $E' = 1000$ psi

d. Earth load considered is the prism load of ordinary clay backfill with a unit weight of one hundred and twenty (120 pcf) pounds per cubic foot, compacted to 90% density (ASTM D-698).

e. A highway live loading of AASHTO HS-20 truck, or railroad live loading of Cooper Axle E-80.

525.02.04 – DIMENSION RATIO (DR)

PVC pipe for buried installations including boring, shall have dimension ratio (DR 14).

For boring installations, the minimum dimension ratio shall be equal to or greater than the minimum dimension ratio on either side of the installation.

525.02.05 – DIMENSIONS

All PVC pipe shall have Cast-Iron-Pipe equivalent (C.I.) outside diameter (O.D.) dimensions.

525.02.06 – PIPE JOINTS AND FITTINGS

A) Fittings for use with PVC pipe shall conform to provisions of AWWA C110/A21.10 and shall be short-bodied style. Fittings shall be mechanical joint type. Pressure rating shall conform to the requirements of Section 524.02.06 for ductile iron pipes and fittings. The outside coating for fittings shall conform to the requirements of Section 524.02.07.

B) Mechanical Joint Restraints -

Mechanical Joint Restraints may be used only at locations approved by the Engineer. Typical examples where the Engineer may permit use of Mechanical Joint Restraints are: creek crossings, locations where excavation depth exceeds five feet and bends greater than $22\frac{1}{2}^\circ$ are required to match new pipe to existing pipes and locations where required connections or other laying conditions do not permit sufficient time to complete thrust blocks prior to returning water mains to service.

Mechanical Joint Restraints will not be used in lieu of thrust blocks.

Mechanical Joint Restraints, if permitted, shall be as follows or approved equal. Mechanical Joint Restraints such as Ford Meter Box Company Uni-Flange Retainer Glands, EBAA Iron Sales Mega-Lug Series 1100 and other models that require set screws or bolts in direct contact with the pipe will not be permitted for use on PVC pipe.

Restrained Joints		
Company	Size	Type
American Cast Iron Pipe Co.	6" to 12"	Flex-Ring
Ford Meter Box Co.	6" to 12"	Uni-Flange
US Pipe and Foundry Co.	6" to 12"	TR-Flex
N/A	6" to 12"	¾" all thread with Duc Lug

525.03 – SOURCE QUALITY CONTROL TESTING

- A) Polyvinyl chloride Pipe shall be tested at the manufacturer's plant by the manufacturer in accordance with Sec. 5.1 of AWWA C-900.
- B) Ductile Iron Fittings shall be tested in accordance with Section 524.05 B)
- C) Contactor shall provide certifications stating the pipe meets the requirements of these specifications.

525.04 – CONSTRUCTION METHODS

The owner retains the right to inspect the pipe, specials and fittings, all work performed and materials furnished at the manufacturer's plant and at the project site and to independently monitor the fabrication of the pipe, specials and fittings. Such inspection shall not relieve the Contractor or the manufacturer of their responsibilities to furnish material and perform the work in accordance with these specifications.

During installation of PVC pipe, the contractor shall place a locator wire along with the pipe in accordance with the standard drawings. The wire is to be placed continuously throughout the extent of the pipeline. Wire shall be copper 14 AWG single conductor type THHN or THWN. All field splices shall be in waterproof couplings for underground installations. Wire shall extend up into access points as directed by the Engineer. Cost of locator wire shall be included with the price bid for water line.

525.05 – DISINFECTION AND HYDROSTATIC PRESSURE TESTING

Disinfection and Hydrostatic Pressure Testing shall be accomplished in accordance with Section 522 and Section 523.

525.07 – BASIS OF PAYMENT

Payment shall be made pursuant to Section 505.

SECTION 526 – TRACE WIRE INSTALLATION

526.01 - GENERAL

This Section governs trace wire installation on PVC water mains. Contractor shall provide and install a trace wire and trace wire access boxes. A 14 gauge or larger trace wire shall be installed on all PVC water mains.

Typical hydrant branches, that are perpendicular to the water main, do not require trace wire. Trace wire shall be installed on non-typical hydrant branches (i.e. dog-legged hydrant branch).

Take care to protect the wire insulation and repair it with electrical tape if the insulation is damaged.

Refer to the standard drawings for additional details.

526.02 - APPROVED TRACE WIRE MATERIAL

A.) Trace Wire

1. Trace wire for direct bury installations shall be #14 AWG Copper Clad Steel wire as manufactured by Copperhead Industries, LLC #14 AWG solid Copper wire with 30 mil high molecular weight polyethylene insulation as manufactured by Agave Wire LTD, or approved equal.

2. Direct Bury Splice Kits DBR/Y-6 as manufactured by 3M or approved equal.

A.) Trace Wire Access Box shall be Snake Pit Roadway Box as manufactured by Copperhead Industries, LLC or approved equal.

526.03 - TRACE WIRE CONNECTIONS

Joining Ends of Trace Wire: Connections into existing trace wire, connections between one spool of trace wire to another, and other similar connections shall be made using a direct bury splice kit.

Joining Trace Wire - Branch to Main: Connections of trace wire at tees, crosses, and at locations where the trace wire will be brought to the surface shall be conducted using a direct bury splice kit.

526.04 - INSTALLATION

Trace wire shall be installed in a continuous fashion. Install trace wire in the bottom of the trench along the centerline of the trench prior to placing bedding.

Bring trace wire to surface at every valve box, and dead end and as called out in the drawings. Trace wire shall be brought to the surface at least every five hundred (500) feet. Take care not to damage the wire coating. Repair damaged coating with electrical tape.

Trace wire shall be brought to the surface in a separate access box. The trace wire shall be brought to the surface according to standard drawings.

Testing – all trace wire shall be tested for continuity by the Contractor in the presence of the inspector prior to acceptance.

526.06 – METHOD OF MEASUREMENT

Trace wire and Trace wire access boxes will not be measured separately.

526.07 – BASIS OF PAYMENT

All costs of trace wire and access boxes shall be included in the price bid for waterline.

SECTION 527 – BORING

527.01 – DESCRIPTION

This section covers furnishing of pipe by boring and casing as shown on the plans or specified.

Boring and casing consists of the initial installation of a steel casing pipe, installed mechanically, and with a suitable assembly designed to produce a smooth, straight shaft at the established line and grade. The pipe is then installed inside the casing pipe pursuant to the Standard Detail for Boring.

527.02 – MATERIALS

For casing pipe materials and submittal requirements, refer to section 528.

527.04 - CONSTRUCTION METHODS

A) General – Where pipe is required to be installed under railroad embankments, highways, streets, or other facilities by boring and casing, construction shall be made in such a manner that will not interfere with the operation of the railroad, street, highway, or other facility, and shall not weaken or damage any embankment or structure. During construction operations, barricades and lights to safeguard traffic and pedestrians shall be furnished and maintained, until such time as the backfill has been completed after which the barricades and lights shall be removed from the site.

The Contractor shall take proper precautions to avoid excavating earth or rock or shattering rock beyond the limits of excavation shown on the plans. All damages caused by the construction to either surface or subsurface structures, shall be repaired or replaced by the Contractor at his own cost and expense.

Suitable pits, shafts, or trenches shall be excavated for the purpose of conducting the boring and casing operations and for placing end joints of the pipe. Wherever end trenches are cut in the sides of the embankment or beyond it, such work shall be sheeted securely and braced in a manner satisfactory to the Engineer to prevent earth caving.

The removal of any obstruction that may be found to conflict with the placing of the pipe shall not be measured for payment nor paid for as a separate contract pay item. The removal of any such obstruction shall be included in the cost of other items.

Once the casing installation has commenced it shall be continued uninterrupted around the clock until the pipe has been installed between the specified limits.

Any pipe damaged during operations shall be removed and replaced by the contractor at his expense.

The pits or trenches excavated to facilitate the operations shall be backfilled immediately after the pipe has been installed.

B) Boring Requirements - Work shall comply with the Standard Detail for Boring. The excavation and backfill for pits shall be as outlined in Section 500.

Boring without the concurrent installation of a casing pipe shall not be permitted, unless shown on plans or directed by the Engineer. All joints in casing pipe shall be welded. Casing pipe shall extend through the entire fill and be installed in a manner that shall not disrupt traffic nor damage roadway grade and surface. The introduction of water into the excavation shall be prohibited.

The size of the bored hole shall not exceed the outside diameter of the pipe bell or casing pipe more than one inch (1"). The use of water or other fluids in connection with the boring operation shall only be permitted when approved by the Engineer.

Nothing contained herein shall be construed as relieving the Contractor from his responsibility for the safety of the work and for all damage to persons and property.

C) Skid Supports

Plastic or rubber skid supports, shall be used and fastened securely to the carrier pipe with steel strapping, cables or clamps. Use of petroleum products shall not be allowed as a lubricant to ease installation. Skid support spacing and position shall be in accordance with the Standard Detail for Boring.

D) Casing Pipe End Seals - Both ends of the casing pipe shall be sealed with a pull-on type EPDM, neoprene or comparable material flexible end seal manufactured for this purpose. End Seals shall be secured with stainless steel straps or clamps.

E) Filling Annular Space - The annular space between the waterline pipe and the steel casing pipe shall not be filled.

527.06 – METHOD OF MEASUREMENT

Bored and cased pipe shall be measured by the lineal foot of pipe bored and cased. Payment shall be made at the unit price bid per lineal foot for each size. The price established shall be full compensation for furnishing and placing all materials including steel casing pipe, carrier pipe, grout or concrete, excavation and backfill, sheeting, shoring, bracing and drainage, disposal of all surplus materials, labor, tools, equipment, and incidentals necessary to complete this item of work

527.07 – BASIS OF PAYMENT

The items measured as provided above will be paid for at the contract unit price bid:

(PIPE SIZE) Bored/Cased..... L.F.

Such payment shall be compensation in full for furnishing all materials, labor, equipment, tools and incidentals, and for performing the work in accordance with these specifications.

SECTION 528 – STEEL CASING PIPE

528.01 - DESCRIPTION

This section covers steel pipe intended to be used as a casing pipe for boring installations.

528.02 – MATERIALS

528.02.01 – SUBMITTALS

The Contractor shall submit the following, provided that all applicable requirements are met, and that visual inspection at destination shows the workmanship and condition of material to be satisfactory.

- A) Type "A" certification for pipe
- B) Shop drawings of pipe, joints and seams
- C) Documentation of manufacturer's on-going quality control program.

528.02.02 – GENERAL

- A) General -Steel pipe shall conform to ASTM A-139, Standard Specification for Electric-Fusion (ARC)-Welded Steel Pipe (NPS 4 and Over). The steel material shall be new, smooth wall, carbon steel, Grade B, with minimum sixty thousand pounds per square inch (60,000 psi)

tensile strength, and minimum thirty-five thousand pounds per square inch (35,000 psi) yield strength.

The Pipe shall be straight seam pipe, shall be one hundred (100%) percent welded, and the weld's height over the outside wall surface shall be equal to or less than three-sixteenths (3/16") inch. All steel pipe shall be square cut and shall have a roundness such that the difference between the major and minor outside diameters shall not exceed one percent (1%) of the specified nominal outside diameter or one-fourth inch (¼"), whichever is less. The outside circumference must be within plus or minus (±) one percent (1%) of the nominal circumference or within plus or minus (±) one-half inch (½"), which is less. The pipe shall have a maximum allowable straightness deviation in any ten foot (10') length of one-eighth inch (1/8"). Steel pipe joints shall be continuously welded with an approved butt weld. The welds shall attain the full strength of the pipe and shall result in a fully watertight section. The welded joints shall conform to the requirements of AWWA C-206.

B) Boring Installation

1. Casing Pipe Size – Steel casing pipe shall have the follow minimum inside diameters:

Pipe Nominal Size (inches)	Casing Pipe Inside Diameter (inches)
6	10
8	14
10	16
12	20

2. Casing Pipe Thickness - Steel casing pipe wall thickness shall be 3/8" minimum.

528.07 – BASIS OF PAYMENT

Payment shall be made pursuant to the appropriate Section of 505.

SECTION 529 – HIGH DENSITY POLYETHYLENE (HDPE) PIPE

529.01 – DESCRIPTION

This specification lists the requirements for the material (pipe and fittings) and joining methods for high density polyethylene pipe (HDPE) piping systems for potable water supply, in sizes six inches (6") through twelve inches (12").

529.02 – MATERIALS

529.02.01 – GENERAL

Unless otherwise specified, references to documents shall mean the latest published edition of the referenced document in effect at the bid date of the project.

- ANSI/AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings, 4 In. through 65 In., for Waterworks
- AWWA M55 Manual of Water Supply Practices, PE Pipe–Design and Installation
- PPI Handbook of Polyethylene Pipe
- PPI Material Handling Guide for HDPE Pipe and Fittings
- PPI TR-38 Bolt Torque for Polyethylene Flanged Joints
- PPI TN-42 Recommended Minimum Training Guidelines for PE Pipe Butt Fusion Joining Operators for Municipal and Industrial Projects
- ASTM F 714 Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside

Diameter

- ASTM F 1055 Standard Specification for Electrofusion Type Polyethylene Fittings for Outside Diameter Controlled Polyethylene and Crosslinked Polyethylene (PEX) Pipe and
- ASTM F 1290 Standard Practice for Electrofusion Joining Polyolefin Pipe and Fittings
- ASTM F 2164 Standard Practice for Field Leak Testing of Polyethylene (PE) Pressure Piping Systems Using Hydrostatic Pressure
- ASTM F2206 Standard Specification for Fabricated Fittings of Butt-Fused Polyethylene (PE) Plastic Pipe, Fittings, Sheet Stock, Plate Stock, or Block Stock
- ASTM F 2620 Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings
- ASTM D 2683 Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing
- ASTM D 2737 Standard Specification for Polyethylene (PE) Plastic Tubing
- ASTM F 2880 Standard Specification for Lap-Joint Type Flange Adapters for Polyethylene Pressure Pipe in Nominal Pipe Sizes 3/4 in. to 65 in.
- ASTM F 3124 Standard Practice for Data Recording the Procedure Used to Produce Heat Butt Fusion Joints
- ASTM D 3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing
- ASTM D 3035 Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter
- ASTM D 3350 Standard Specification for Polyethylene Plastics Pipe and Fittings Materials
- NSF/ANSI 61, Drinking Water System Components –Health Effects

529.02.02 – HIGH DENSITY POLYETHYLENE MATERIALS

A) Resin and Material Requirements

All material shall be manufactured from a PE 4710 resin listed in Plastic Pipe Institute (PPI) TR-4. The resin material shall meet the specifications of ASTM D 3350 with a minimum cell classification of 445474C. HDPE pipe and fittings shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. HDPE products shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.

B) HDPE Pipe

1. Pipe shall be made of HDPE material with a minimum material designation code of PE4710 and with a minimum Cell Classification as noted above. The polyethylene compound shall be suitably protected against degradation by ultraviolet light by means of carbon black of not less than 2 percent. The manufacture of the HDPE resin shall certify the cell classification indicated.
2. Pipe sizes 3" and larger shall have a manufacturing standard of ASTM F 714. Pipe Dimension Ratio (DR) shall be as specified on plans. Pipe Outside Diameter shall be DIOD (ductile iron OD).
3. Pipe shall meet AWWA C906 (4" to 65"), and shall be listed as meeting NSF-61.
4. Pipe shall be manufactured by a manufacturer certified for such manufacture by the Plastic Pipes Institute.

C) HDPE Fittings

1. Butt Fusion Fittings- Fittings shall be made of HDPE material with a minimum material designation code of PE4710 and with a minimum Cell Classification as noted above. Fittings shall have a minimum long-term pressure rating equal to or greater than the pipe to which they are joined unless otherwise specified on the plans or accepted by owner/engineer. All fittings

shall meet the requirements of AWWA C906.

- a. Molded fittings shall comply with the requirements of ASTM D 3261.
 - b. Each fitting will be marked per ASTM F 2206.
 - c. Fusion pressure and temperature of fabricated fittings shall be recorded and such data shall be provided in the product submittal. Each fitting shall be stamped with unique joint number that corresponds to the joint report.
 - d. Socket fittings shall meet ASTM D 2683
2. Electrofusion Fittings - Fittings shall be made of HDPE material with a minimum material designation code of PE 4710 and with a minimum Cell Classification as noted in 2.01.A. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have a minimum long-term pressure rating equal to or greater than the pipe to which they are joined unless otherwise specified on the plans.
 3. Bolted Connections – Flanged and Mechanical Joint Adapters can be made to ASTM D 3261 or if machined, must meet the requirements of ASTM F 2206. Flanges and MJ Adapters shall be fused onto the pipe and have a minimum long-term pressure rating equal to or greater than the pipe unless otherwise specified on the plans.

529.02.03 – SUBMITTALS

The Contractor shall submit the following and shall receive approval of same from the Engineer prior to incorporating any materials into the work. Review and approval of the Contractor submittals, by the Engineer, shall not be construed in any way as relieving the Contractor and the manufacturers of their responsibilities for manufacturing ductile iron pipe and fittings as described herein.

- A) General - Detail drawings of pipes, specials, fittings, and joints.
- B) Certification - Type "A" and "D" certification for pipe, specials, fittings, gaskets, and lining material pursuant to, but not limited to, applicable standards in Section 529.02.01. The affidavits of compliance and test reports shall be certified by a registered professional engineer.
- C) Copies - The Contractor shall provide three (3) copies of all submittals.

529.02.04 – DESIGN BASIS

- A) General - All HDPE pipes are to be designed in accordance with AWWA Manual M55.
- B) Depth of Cover - The minimum design depth of cover shall be five (5') feet. Pipe to be installed inside a casing shall be designed for full cover including live load (a single H-20 or Railroad E-80) neglecting the casing.

529.03 – SOURCE QUALITY CONTROL TESTING

- A) High Density Polyethylene Pipe shall be tested at the manufacturer's plant by the manufacturer in accordance with Section 5 of AWWA C-906.
- B) Contractor shall provide certifications stating the pipe and fittings meet these requirements.

Inspection - The Owner retains the right to inspect the pipe, specials and fittings, all work performed and materials furnished, at the manufacturer's plant and at the project site and to independently monitor the fabrication of the pipe, specials and fittings. Such inspection shall not relieve the Contractor or the manufacturer of their responsibilities to furnish material and perform work in

accordance with these specifications.

529.04 – TRANSPORTATION, HANDLING AND STORAGE

A) General - All HDPE pipe and fittings shall be cut, joined, and installed in accordance with the manufacturer's recommendations. Joining, laying, and pulling of polyethylene pipe shall be accomplished by personnel experienced in working with polyethylene pipe systems.

B) TRANSPORTATION, UNLOADING AND STORAGE

1. The manufacturer shall package product in a manner designed to deliver the pipe and fittings to the project neatly, intact and without physical damage. During transportation each pipe shall rest on suitable pads, strips skids, or blocks securely wedged or tied in place. The transportation carriers shall use appropriate methods and intermittent checks to insure the pipe is properly supported, stacked and restrained during transportation such that the pipe is not nicked, gouged, or physically damaged. The transportation carrier shall provide tarpaulins to cover any potable water pipe subject to exposure to diesel exhaust or smoke.
2. During loading, transportation, and unloading, every precaution should be taken to prevent damage to the pipe. Cuts or gouges that reduce the wall thickness by more than 10% is not acceptable. Locations with such damage shall be cut out and discarded at the expense of the contractor.
3. Handle the pipe in accordance with the PPI Handbook of Polyethylene Pipe. All pipe and accessories shall be loaded and unloaded by lifting with hoists or by skidding in order to avoid shock or damage. Under no circumstances shall materials be dropped. Pipe handled on skidways shall not be rolled or skidded against pipe on the ground. Slings, hooks or pipe tongs shall be padded and used in such a manner as to prevent damage to the exterior surface or interior of the pipe. All pipe and fittings shall be subjected to visual inspection at time of delivery and before they are lowered into the trench to be laid. Joints or fittings that do not conform to these specifications will be rejected and must be removed immediately by the Contractor.
4. The interior of the pipe as well as all sealing surfaces of mating components (i.e. flange faces) shall be kept free from dirt or foreign matter at all times.
5. Pipe shall not be stacked higher than the limits recommended by the manufacturer. The bottom tiers shall be kept off the ground on timbers, rails, or concrete. Pipe shall not be stored close to heat sources.
6. The open ends of all sections of joined and/or installed pipe (not in service) shall be plugged to prevent animals or foreign material from entering the pipe line or pipe section. The practice of stuffing cloth or paper in the open ends of the pipe will not be permitted. Waterproof nightcaps of approved design may be used but they shall be so constructed that they will prevent the entrance of any type of natural precipitation into the pipe and will be secured to the pipe in such a manner that the wind cannot blow them loose.
7. Where possible, the pipe shall be raised and supported at a suitable distance from the open end such that the open end will be below the level of the pipe at the point of support.

C) PIPE INSPECTION

All pipe and fittings shall be subjected to visual inspection at time of delivery and before they are installed or lowered into the trench to be laid. Defective, damaged, or unsound pipe will be rejected. Cuts, punctures, or gouges that penetrate or reduce the wall thickness by 10% or more are not acceptable. Locations with such damage shall be cut out and discarded at the expense of the contractor. Joints or fittings that do not conform to these specifications will be rejected and must be removed immediately by the Contractor.

D) HANDLING PIPE

1. The handling of the pipeline shall be in such a manner that the pipe is not damaged by dragging it over sharp and cutting objects. Sections of the pipes with cuts and gouges exceeding 10 percent of the pipe wall thickness or kinked sections shall be removed and the ends rejoined.
2. Refer to the PPI Material Handling Guide for HDPE Pipe and Fittings for recommendations, guidelines and instructions regarding the handling, lifting, loading, storing and installing polyethylene pipe and fittings.

529.05 – FUSING PIPE AND FITTINGS

E) FUSION JOINING REQUIREMENTS

1. All HDPE pipe shall be joined to itself by the heat fusion process which produces homogeneous, seal, leak tight joints. Tie-ins between sections of HDPE pipe shall be made by butt fusion whenever possible.
2. Butt Fusion: The pipe shall be joined by the butt fusion procedure outlined in ASTM F 2620 or PPI TR-33. All fusion joints shall be made in compliance with the pipe or fitting manufacturer's recommendations. Fusion joints shall be made by qualified fusion technicians per PPI TN-42. A record or certificate of training for the fusion operator must be provided that documents training to the fundamentals of ASTM F 2620. Considerations should be given to and provisions made for adverse weather conditions, such as temperatures below freezing, precipitation, or wind, which is accepted by the owner/engineer.

F) FUSION OPERATORS

1. The employer of the fusion machine operator is responsible for the fusion joint quality of the fusion weld made by that individual. The employer is responsible for documenting all qualification and training records of that individual.
2. All HDPE fusion equipment operators shall be qualified to the procedure used to perform pipe joining for the type(s) and size(s) of pipes to be used in the project. Fusion equipment operators shall have current, formal training on all fusion equipment employed on the project. Training received more than two years prior to operation with no evidence of activity within the past 6 months shall not be considered current.
3. For Projects with at least 5,000 feet or with pipe larger than 24 inches, operators or their supervisor must have a current McElroy Fusion Training Certificate for the equipment to be used on the project.

D) BUTT FUSION EQUIPMENT

1. For 6" and larger pipe sizes, the pipe butt fusion machine shall be a self-contained hydraulic fusion machine capable of butt fusing HDPE pipe. The carriage must be removable from the chassis for in-ditch use. The machine must be compatible with an electronic data recording device. Accessories will include all butt fusion inserts for the specified range of pipe sizes, a pyrometer kit for checking the surface temperature of the heater, extension cord (25' minimum), and hydraulic extension hoses (minimum of four). The butt fusion machine will be McElroy, or approved equivalent.
2. In areas where there may be insufficient space to layout the entire length of fused pipe to be pulled-back, the Contractor shall utilize a continuous HDPE pipe fusion equipment such as a PolyHorse by McElroy or other means in order to fuse the length of pipe necessary for the installation. The Contractor shall be responsible for securing and obtaining permission/permits from adjacent property if necessary, for staging and/or fusing of the pipe and HDD equipment at no additional cost to the Owner.

E) FUSION DATA RECORDING

1. For 6" and larger pipe sizes, McElroy DataLogger or equivalent fusion data recorder shall be used to record all fusion welds on hydraulically operated fusion machines. The device shall be capable of meeting the requirements of ASTM F 3124, "Standard Practice for Data Recording the Procedure used to Produce Heat Butt Fusion Joints in Plastic Piping Systems or Fittings". The device, or combination of devices, shall record the following variables of each fused joint:
 - a. Heater surface temperature immediately before inserting the heater plate. Alternatively, the heater plate may be measured with a pyrometer and entered into the weld record.
 - b. Gauge pressure during the initial heat cycle
 - c. Gauge pressure and elapsed time during the heat-soak cycle
 - d. Heater removal (dwell) time
 - e. Gauge pressure and elapsed time during the fusing/cool cycle
 - f. Drag pressure
 - g. Pipe diameter and wall thickness
 - h. Type of HDPE material (Specification and Classification) and manufacturer
 - i. Fusion Machine Identification
2. The device shall record the operator, a unique operator ID number, the date and time of each weld.
3. Records showing the device is up to date on all required calibration shall be available for presentation when requested.
4. All fusion welds should be traceable to the report (via operator and weld ID) with an indentation weld stamp or by permanent paint marker/pen next to fusion weld.
5. When requested prior to commencement of work, a weld location map may be requested by the owner or owner's representative.

F) BUTT FUSION EXAMINATION AND TESTING

1. Examinations
 - a. Visual: For pipe sections, examine the full exterior circumference for bead uniformity before cutting. After cutting the pipe section, review the interior bead. All beads should have visually acceptable bead formation as shown in Fig 4 and Appendix X2 of ASTM F 2620. In addition, the following characteristics are expected:
 - 1) There shall be no evidence of cracks or incomplete fusing
 - 2) There shall be no evidence of captured objects (e.g., pipe shavings, facer ribbons) between bonded surfaces.
 - 3) Variations in upset bead heights on opposite sides of the cleavage and around the circumference of fused pipe joints are acceptable.
 - 4) The apex of the cleavage between the upset beads of the fused joint shall remain above the base material surface
 - 5) Fused joints shall not display visible angular misalignment, and outside diameter mismatch shall be less than 10% of the nominal wall thickness
 - 6) Fusion data record review that meet criteria as listed below can be used as additional verification of visual indicators.
 - b. Fusion Data Record Review: The fusion data record for each fused joint shall be compared to the approved fusion procedure. The reviewer shall verify the following:
 - 1) That all data required by section 529.02.05E) was recorded
 - 2) Interfacial pressure was within the acceptable range

- 3) Heater surface temperature was within the acceptable range
- 4) Butt fusion pressure applied during the fusing/cool cycle was correctly calculated to include drag pressure, fell within the acceptable range for the applicable size and agrees with the recorded hydraulic fusing pressure.
- 5) Butt fusing pressure was reduced to a value less than or equal to drag pressure at the beginning of the heat soak cycle.
- 6) Fusing machine was opened at the end of the heat soak cycle, the heater was removed, and the end were brought together at the fusion pressure with the acceptable time range
- 7) Cooling time at butt fusing pressure met the minimum time specified
- c. If the recorded data in section 529.02.05 F) is outside the limits of the acceptable range, the joint is unacceptable.
- d. Frequency. Records for test fusion joints should be reviewed immediately after the joint is completed. Fusion joints for jobsite fusions should be reviewed daily or before being covered with backfill.

2. Mechanical Tests

- a. The Owner reserves the right to require the Contractor to mechanically test the fused pipe if any other test or inspection indicates noncompliance with approved procedures.
- b. If Mechanical tests are required:
 - 1) The fusion shall be allowed to cool completely, then fusion test straps shall be cut out.
 - 2) All samples shall be labeled with operator information. Testing must be done at 73 degrees F plus or minus 5 degrees. The test temperature and sample size are critical to testing. Testing performed at cold or elevated temperatures may not give similar results to tests performed at ambient temperatures.
 - 3) Each pipe sample weld shall be subjected to testing at two locations 180 degrees apart from each other in the joint weld. All specimens shall be tested by one of the following methods:
 - 4) Reverse Bend Test are allowed for pipe sizes 4" IPS or smaller. The specimens shall be removed and tested in accordance with ASTM F 2620, Appendix X4.
 - 5) Guided Side Bend Test are allowed for all pipe sizes 4" IPS and larger. The specimens shall be removed and tested.
 - 6) Hydrostatic Burst Test is allowed for pipe sizes 2"-24". The specimen length should measure 6 times pipe diameter with the butt fusion joint in the center of the specimen. The specimen should be tested in a tank filled with water, and testing conditions monitored and recorded with computerized equipment. The specimen will be tested at 4 times pipe rated pressure for 5 minutes with no failure of joint allowed.
- c. Results of any mechanical test shall be documented. Information on the weld and operator shall be transferred from the sample to the testing record.

529.06 – INSTALLATION

A) INSTALLATION

1. Safety: The Contractor shall carry out his operations in strict conformance with all Occupational

Safety and Health Administration and manufacturers' safety requirements.

2. Direct Burial

- a. Buried HDPE pipe and fittings shall be installed in accordance with ASTM D 2321 or ASTM D 2774 for pressure systems and AWWA Manual of Practice M55 Chapter 8. The Design Window identified in AWWA M55 Chapter 5 (page 65 of 2006 version) shall be considered acceptable design and installation conditions.
- b. Unless noted otherwise, no thrust blocks shall be placed in the HDPE pipe system since the fused system is fully restrained.

3. Trenchless Installation Methods

- a. Installation of HDPE Pipe by Horizontal Directional Drilling shall follow the guidelines of ASTM F1962 or PPI TR-46 and the following requirements. If the following requirements conflict with ASTM F1962 or PPI TR-46, the following requirements shall govern.
 - 1.) HDD Subcontractor shall be a firm actively engaged in horizontal directional drilling for a minimum of five (5) years. Submit documentation verifying compliance prior to beginning work.
 - 2.) Contractor and its HDD Subcontractor shall be responsible for all Design Considerations, Construction Safety, Construction Practices and Drilling Fluid Containment and Disposal related to HDD installation of the steel casing. Contractor and its HDD Subcontractor shall follow the North American Society of Trenchless Technology (NASTT) Horizontal Directional Drilling (HDD) Good Practices Guidelines, latest edition.
 - 3.) Prior to beginning work, Contractor shall submit to the Owner a typewritten Work Plan providing detail of the proposed procedure and schedule to execute the project. The work plan will be comprehensive, realistic, and based on actual working conditions for this particular project. The work plan shall document the planning required to successfully complete the project. The work plan shall include complete descriptions of proposed plans, procedures, equipment, personnel, and if applicable, supporting material, for the following:
 - a.) Drilling operations: describe the pilot hole drilling procedure, the reaming operation, the pullback procedure and illustrate the plan.
 - b.) Profile of the bore plotted at a scale appropriate for the crossing and acceptable to the Engineer.
 - c.) HDD site layout including entry and exit points.
 - d.) Directional drilling equipment list to include at a minimum: drilling rig, drill bit, back-reamer, mud mixing and pumping systems, down-hole tools, guidance system, and rig safety system. Provide calibration records for guidance equipment.
 - e.) Drilling fluid management plan: drilling fluid types and specifications, cleaning and recycling equipment, estimated flow rates, procedures for minimizing drilling fluid escape, and the method/location for final disposal of waste drilling fluids. Provide the MSDS for all drilling fluid additives that will be used.
 - f.) Pipe storage and handling details.
 - g.) Pipeline assembly and installation procedures.
 - h.) MSDS of any potentially hazardous substances to be used.
 - i.) Contingency plans for possible problems.
 - 4.) Contractor shall clean the work site of all excess slurry or spoils within forty-eight (48) hours of completing installation.
 - 5.) Contractor shall submit to the Owner a bore log to the Owner within seven (7) days

- of the completion of each bore path. The bore log shall include all of the following:
 - a.) Name of person collecting data, including title, position and company name.
 - b.) The detection method used, bore diameter, utility diameter, drilling fluid composition, composition of any other materials used to fill the annular void between the bore and the utility diameter, or utilities placed out of service.
 - c.) A plan view of the bore path showing depths and offset dimensions to an accuracy of within one (1) inch of the physically exposed beginning and end points of the bore and other exposed points along the path and indicate if the bore failed.
 - d.) A profile or log of the bore depths to the nearest inch of the facility. Said profile or log shall be referenced to the benchmarks() shown on the plans.
 - 6.) Bore or reaming hole diameter shall not exceed 1.5 times the casing O.D.
 - 7.) Contractor shall conduct reaming and back-pulling operations continuously until completion of the installation of casing.
 - 8.) Contractor shall dispose of or recycle drilling fluids consistent with local, state and federal regulations.
4. Pipe Assembly: Pipe lengths shall be stored in such a location and manner as to eliminate the possibility of scoring, gouges or otherwise damaging the pipe.
- a. Sections of the pipe shall be assembled and joined together prior to insertion of the pipe. Assembly shall be accomplished above ground. If the liner is to be dragged when transported or inserted, then sleds, rollers or other similar devices shall be furnished and utilized by the contractor to protect the pipe wall from damage due to cuts, gouges, or scrapes.
 - b. Joining shall be accomplished by the Thermal Butt Fusion method, in strict accordance with the Manufacturer's recommendations and with ASTM F 2620 or PPI TR-33. During fusion, pipes shall be given adequate support on rollers to allow them free movement.
 - c. All completed joints shall be watertight at the rated pressure for the pipe and shall have strength characteristics equal to or greater than the pipe itself. Improperly made or damaged joints shall be repaired or replaced as directed by the Owner at the Contractor's expense. The Owner shall be provided with samples of butt fused joints for testing upon request.
 - d. Mechanical connection of HDPE to auxiliary equipment such as valves, pumps and fittings shall use mechanical joint adapters and other devices in conformance with the PPI Handbook of Polyethylene Pipe and AWWA Manual of Practice M55.
 - e. Mechanical coupling shall be made by qualified technicians. Qualification of the field technician shall be demonstrated by evidence of mechanical coupling training with the past year. This training shall be on the equipment and pipe components to be utilized for this project.
5. Installation of HDPE pipe and fittings shall be completed in accordance with ASTM D2321 or ASTM2774 for pressure systems and AWWA Manual of Practice M55.
- a. The HDPE shall be lubricated in such a manner and with such materials as recommended by the pipe manufacturer.
 - b. A pulling head shall be attached to the leading end of the polyethylene liner with a power winch cable connected thereto. The power winch and cable shall be of sufficient

rating to pull the liner through the existing pipeline. Winching forces shall be continuously monitored. The Contractor shall provide all pulleys, rollers, bumpers, and other equipment required to protect the existing pipeline and the pipe from damage during the pulling operation. Any damage to the existing pipeline or lining shall be rectified by the Contractor at his own expense.

- c. Caution must be taken not to stretch the pipe beyond its elastic limit in the event of an impediment. The Contractor shall maintain on hand such equipment as might be required to withdraw the liner.
- d. Once insertion is initiated, the Contractor shall complete the pull without interruption.
- e. After insertion, the liner shall be allowed a minimum of twelve hours (or as otherwise recommended by the pipe manufacturer) to reach temperature equilibrium with the existing pipeline and to stress-relieve itself. After the liner has reached temperature equilibrium and stress-relieved itself, the lining shall be cut and finished, as required.

B) FLUSHING, CLEANING AND DISINFECTING

- 1. All mains shall be cleaned and flushed to remove all foreign matter.
- 2. Cleaning and disinfecting of potable water systems shall be in accordance with AWWA C651 and AWWA Manual of Practice M55 Chapter 9, and PPI Handbook of Polyethylene Pipe Chapter 2 (2nd Edition). The disinfection chemicals should be limited to less than 12% active chlorine. The duration of the disinfection should not exceed 24 hours. Upon completion, the system should be thoroughly flushed with fresh water, and sampled to verify the disinfectant chlorine level has been reduced to potable drinking water concentrations in all service water tubing and branch lateral pipes.
- 3. Obtain safe bacteriological samples on two consecutive days before placing the waterline into service.

C) TESTING AND LEAKAGE

- 1. All pumps, valves, temporary connections, temporary bulkheads, meters, gauges and other measuring devices shall be furnished, installed and operated by the Contractor and all such equipment and devices and their installation shall be approved by the Owner's Representative. The contractor shall restrain pipe, components, and test equipment as required to insure testing can be accomplished in a safe manner, including protection of personnel, equipment, and public in the event of a failure during testing.
- 2. The pressure gauges or data recorders should be calibrated and sufficiently sized to provide mid-range data (pressure tested will not be below 10% or greater than 90% of gauge capacity) that result in easy reading, interpretation. Gauges shall be accurate to within 2% of full scale with increments no greater than 10 psi.
- 3. Pressure Pipelines-Pressure testing shall be conducted in accordance with requirements and recommendations of ASTM F 2164 (Field Leak Testing of Polyethylene Pressure Piping Systems Using Hydrostatic Pressure), AWWA Manual of Practice M55 Chapter 9, and PPI Handbook of Polyethylene Pipe Chapter 2 (2nd Edition). Pneumatic (compressed air) leakage testing of HDPE pressure piping is prohibited for safety reasons.
 - a. The section of pipe to be tested shall be filled with potable approved by the Owner/Engineer. While the system is being filled with water, air shall be carefully and completely exhausted. If permanent air vents are not located at all high points, the Contractor shall install fittings and valves at such points so the air can be expelled as the pipe system is slowly filled with water.
 - b. If the Contractor elects to perform hydrostatic testing against valves in an existing

distribution system, it does so at his own risk and will bear the cost of any damages to the existing valve, piping system, private or public property, or the new pipeline under test.

- c. The test procedure for HDPE pipe consists of two steps: 1) the initial phase or expansion phase and 2) the test phase. During the initial/expansion phase, sufficient make-up water shall be added hourly for 3 hours to return to the test pressure. During the test phase, the expansion phase pressure is reduced by 10 psi to test phase pressure and monitored for at least one hour (3 hours maximum).
- d. Under no circumstances shall the total time under test exceed eight (8) hours. If the test is not completed due to leakage, equipment failure or any other reason, depressurize the test section and permit the system to "relax" for eight (8) hours prior to the next testing sequence.
- e. The test pressure should be related to the lowest point in elevation along the test section's vertical pipeline profile.
- f. All pressure and leakage testing shall be done in the presence of a representative of the Owner.
- g. The test pressure shall be 1.5 times the operating pressure at the lowest point in the system. In accordance with section 9.8 of ASTM F 2164, the pipe shall pass if the final pressure is within 5% of the test phase pressure for the testing period (3 hours maximum). If the test section fails this test, the Contractor shall repair or replace all defective materials and/or workmanship at no additional cost to the Owner.
- h. Leakage must not exceed 10 gal/inch diameter per mile of pipe per 24 hours at 150 psi testing pressure.

529.07 – METHOD OF MEASUREMENT

Payment shall be made pursuant to Section 505 for water line.

529.08 – BASIS OF PAYMENT

Such payment shall be compensation in full for furnishing all materials, labor, equipment, tools and incidentals, and for performing the work in accordance with these specifications.

532 – TAPPING SLEEVES

532.01 - DESCRIPTION

This section covers tapping sleeves intended to be used for tapping water mains.

532.02 - MATERIALS

Tapping sleeves shall be manufactured in accordance with AWWA C-110 and equipped with gaskets made in accordance with AWWA C-111. Tapping Sleeve shall be Ductile Iron. Tapping sleeves shall be Mueller H-615 M. J. Tapping sleeve, or approved equivalent. Stainless Steel sleeves will not be permitted.

532.04 – CONSTRUCTION METHODS

The installation shall conform to the recommendation of the manufacturer of the pipe being tapped. Tapping sleeves shall be pressure tested. Sleeves shall maintain 150 psi for a minimum of two hours.

532.06 – METHOD OF MEASUREMENT

Payment for "Tapping Sleeve" shall be included in the unit price bid per each for Tapping Valve and Sleeve. The price established shall be full compensation for furnishing and placing of all materials including tapping sleeve, labor, tools, equipment, and incidentals necessary to complete this item of work.

532.07 – BASIS OF PAYMENT The items measured as provided above will be paid for at the contract unit price bid:

(SIZE) TAPPING VALVE AND SLEEVE..... EA.

Such payment shall be compensation in full for furnishing all materials, labor, equipment, tools and incidentals, and for performing the work in accordance with these specifications.

SECTION 533 – TAPPING CLAMPS

533.01 – DESCRIPTION

This section covers tapping clamps used for tapping water mains.

533.04 – CONSTRUCTION METHODS

- A) General -Tapping clamps shall have a body with a threaded outlet, seal, and suitable means for attachment to the main. The body shall be made to conform to the outside configuration of the main. Tapping clamps shall be designed to provide a drip-tight connection when used as a service connection to the main.
- B) Tapping clamps shall be required when tapping other than cast iron or ductile iron pipe. Clamps may be required on older cast-iron and ductile iron as directed by the Engineer. Tapping clamps shall be the same size as the service line. The reducing of tapping clamps shall not be allowed.
- C) Tapping Clamps shall meet the requirements of Section 510.

533.06 – METHOD OF MEASUREMENTS

Tapping clamp(s) will not be measured separately.

533.07 – BASIS OF PAYMENT

All cost of tapping clamps shall be included in the price bid for water services.

Such payment shall be compensation in full for furnishing all materials, labor, equipment, tools and incidentals, and for performing the work in accordance with these specifications.

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SECTION 500 – WATER MAINS

SUPPLEMENT – LARGE WATER MAINS

SECTION 500 – CONSTRUCTION REQUIREMENTS

500.01 – DESCRIPTION

This supplement to Section 500 provides general requirements for construction of water mains with nominal diameter of 16" through 20" as described herein. The intent of this supplement is to contain requirements specific to these sizes of water mains, in addition to those requirements listed in Section 500. The specifications listed herein, where in conflict with Section 500 specifications for water mains in size 6" through 12", shall supersede those contained in Section 500 for water mains in size 6" through 12".

All design, materials, construction, sampling and testing shall comply with ODEQ rules and regulations and AWWA Standards.

500.02 - EXCAVATION AND BACKFILLING

A.) PIPE TRENCH EXCAVATION

The minimum width of trench cut for each size of pipe shall be as follows:

SIZE OF PIPE (inches)	WIDTH OF TRENCH (inches)
16	32
18	34
20	36

500.09 – DEPTH OF COVER

Where not otherwise indicated on plans, the pipe shall be laid at an elevation that will provide after completion, a minimum depth of cover over the top of pipe of thirty inches (30") below the surface. Maximum depth of cover over the top of the pipe shall be 14 feet.

500.10 – STANDARD DESIGN CONDITIONS

A) **Standard Design Pressures** - Unless otherwise specified, all pipes and fittings shall be designed for the following minimum pressure conditions:

Minimum Internal Pressure (psi)		
Working	Surge	Design
150	100	250

B) **Live Loading** -Unless otherwise specified or called for on the plans, minimum pipe design corresponding to the specified design pressure shall be for highway live loading condition and where waterline is crossing or running parallel to the railroad, corresponding minimum pipe design for railroad live loading condition shall govern (with or without casing).

C) Large water main pipe materials shall be ductile iron pipe (DIP). All water main pipe shall be new.

END OF SECTION

SECTION 505 – PIPE AND FITTINGS INSTALLATION

505.01 – DESCRIPTION

This section covers installation of pipes in open-cuts, in conformity with the lines, grades, and dimensions and as provided in applicable sections of these specifications.

505.02 – MATERIALS

505.02.01 – PIPE AND FITTINGS

Acceptable pipe materials and fittings shall meet the requirements of the appropriate sections listed below:

Pipe Material	Section
Ductile Iron Pipe (DIP)	524

All pipe and fittings shall be new.

SECTION 518 – THRUST BLOCKS

518.01 – DESCRIPTION

This section covers thrust blocks intended to be used to transmit unbalanced thrust forces into undisturbed soil.

518.02 – MATERIALS

High Early Strength Concrete shall be used for thrust blocks. Compressive strength of concrete shall be minimum 3500 psi at three (3) days.

518.04 – CONSTRUCTION METHODS

All construction shall be in accordance with the Large Water Main Standard Details for Thrust Blocks.

518.06 – METHOD OF MEASUREMENT

"Thrust Blocks" will not be measured and paid for separately.

518.07 – BASIS OF PAYMENT

All cost of installing thrust blocks shall be included in the price bid for water line.

SECTION 524 – DUCTILE IRON PIPE (DIP)

524.01 – DESCRIPTION

This section covers ductile iron pipe and fittings, for pressure applications, intended to be used for conveyance of potable water, in sizes sixteen inches (16") through twenty inches (20").

524.02 – MATERIALS

524.02.01 – GENERAL

All ductile iron pipe and fittings and installation of same shall conform to the requirements of the following standards listed below or as modified herein.

A) ANSI/AWWA C-150/A 21.50, Thickness design of Ductile Iron Pipe

B) ANSI/AWWA C-151/A 21.51, Ductile Iron Pipe, Centrifugally Cast

C) ANSI/AWWA C-111/A 21.11, Rubber Gasket Joints for Ductile Iron and Gray Iron Pressure Pipe and Fittings.

D) ANSI/AWWA C-104/A 21.4, Cement Mortar Lining for Ductile Iron Pipe for Water.

- E) ANSI/AWWA C-600, Installation of Ductile Iron Water Mains and Their Appurtenances.
- F) ANSI/AWWA C-115/A 21.15, Flanged Ductile Iron Pipe with Threaded Flanges.
- G) ANSI/AWWA C-116/A 21.16, Protective Fusion-Bonded Epoxy Coatings for Interior and Exterior surface of Ductile Iron and Gray Iron Fitting
- H) ANSI/AWWA C-153/A 21.53, Ductile Iron Compact Fittings
- I) NSF/ANSI 61, Drinking Water System Components –Health Effects

524.02.02 – SUBMITTALS

The Contractor shall submit the following and shall receive approval of same from the Engineer prior to incorporating any materials into the work.

Review and approval of the Contractor submittals, by the Engineer, shall not be construed in any way as relieving the Contractor and the manufacturers of their responsibilities for manufacturing ductile iron pipe and fittings as described herein.

- A) General - Detail drawings of pipes, specials, fittings, and joints.
- B) Certification - Type "A" and "D" certification for pipe, specials, fittings, gaskets, and lining material pursuant to, but not limited to, applicable standards in Section 524. The affidavits of compliance and test reports shall be certified by a registered professional engineer.
- C) Copies - The Contractor shall provide three (3) copies of all submittals.

524.02.03 – DESIGN BASIS

- A) General

All ductile iron pipes are designed in accordance with AWWA C-150/ANSI 21.50. The designs are based on prism load of ordinary clay backfill with a unit weight of one hundred twenty pound per cubic feet (120 pcf), maximum horizontal ring deflection of three (3%) percent, design factor safety of two (2), and for AASHTO HS-20 truck highway (HWY) or Cooper axle E-80 railroad (RR) live loading conditions.
 - B) Depth of Cover

The minimum design depth of cover shall be thirty inches (30"). Pipe to be installed inside a casing shall be designed for full cover including live load (a single H-20 or Railroad E-80) neglecting the casing.
 - C) Laying Condition

Type 3 Laying Conditions, as defined in AWWA C150 shall be used for all Large Water Mains. In accordance with AWWA C150, the description of Type 3 Laying Conditions is pipe-bedded in four inches minimum loose soil, with backfill lightly consolidated to top of pipe. Loose soil is defined as "native soil excavated from the trench free of rocks, foreign material, and frozen earth"
 - D) Deflection

The allowable defection for the specified mortar lining system is three (3%) percent. Deflection calculation is in accordance with AWWA C150.
 - E) Bending and Hoop Stresses

The bending and hoop stress requirements are met in accordance with AWWA C150.
 - F) Buckling
1. Buried Installations
- The controlling load for buried pipes is determined from the greater of hydrostatic and earth loads plus vacuum or hydrostatic and earth load plus live load with a factor of safety of two (2.0) as determined in accordance with Section 6.3 of AWWA M-11. It is assumed that the groundwater level is equal to natural ground surface and the ground is fully saturated.

2. Unburied Installations

For unburied pipes, the internal collapsing vacuum pressure is used in determining the minimum wall thickness in accordance with equation 4-2 of AWWA M11 for a factor of safety of 1.5 against buckling. The Poisson's ratio is 0.28 and modulus of elasticity is 52×10^6 psi.

3. Vacuum Pressure

For both buried and unburied installations, the internal collapsing vacuum pressure is taken as 14.7 psi.

524.02.04 – MINIMUM PIPE DESIGN FOR DUCTILE IRON PIPE

Unless otherwise specified, ductile iron pipe and fittings for buried installations, including boring, shall have the following minimum nominal wall thickness, shown below.

For boring, installations, the minimum pipe design shall be equal to or greater than the minimum pipe design on either side of the installation.

Minimum Pipe Design for Ductile Iron Pipe		
Pipe Size (inches)	Nominal Push-on Joint Wall Thickness Pressure Class 250 (Inches)	Flange Joints Class 53 (inches)
16	0.30	0.43
18	0.31	0.44
20	0.33	0.45

524.02.06 – PIPE JOINTS AND FITTINGS

A) General

All specials and fittings may be used with push-on, mechanical, or flanged joints conforming to the requirements of AWWA/ANSI C-110/A 21.16. Fittings with push-on joints shall be installed with thrust blocks or mechanical joint restraints. Mechanical joints shall be adequately protected against unbalanced forces. All joints shall have the same pressure rating as the pipe of which they are a part and shall meet the requirements of AWWA/ANSI C-111/A 21.11. All pipe shall be marked in accordance with Sec. 4.7 of AWWA C-151.

B) Push-on Joints

Push-on joints are a rubber gasket compression type joint meeting the requirements of AWWA C-111. Push-on joints shall have a deflection capability of three degrees (3°).

C) Mechanical Joints

A mechanical joint is a bolted joint of the stuffing-box type. Each joint shall consist of a bell that is cast integrally with the pipe or fitting and provided with an exterior flange having bolt holes or slots, and a socket with annular recesses for the sealing gasket and the plain end of the pipe or fitting, a pipe or fitting plain end, a sealing gasket, a follower gland with bolt holes, and T-head and hexagonal nuts.

D) Flanged Joints

The flanged joints for ductile iron pipe shall be in accordance with AWWA C-111. Bolts, gaskets, and installation shall meet the requirements of AWWA C-115, Appendix A. The flanged joints for specials and fittings shall meet the requirements of AWWA C-110.

The flanges shall be rated for two hundred fifty (250 psi) pounds per square inch working pressure with bolt-hole drillings as for Class 125 flanges for service at temperatures ranging from twenty degrees (20°) to one hundred fifty degrees F (150°F) are pressure temperature rated for one hundred fifty (150) to two hundred pounds per square inch (200 psi) as shown in ANSI B 16.1. All flanged joints shall be made with single piece, red rubber gaskets one-eighth (1/8") inch thick. Gaskets shall be full face for exposed installations and ring type or full faced for buried service meeting AWWA C-110, Appendix A requirements. As directed by the Engineer or shown on plans, flange joints meeting the requirements of ASME/ANSI B-16.1 may be used.

E) Mechanical Joint Restraints

Mechanical Joint Restraints may be used in conjunction with, or in lieu of, thrust blocks. Use of Mechanical Joint Restraints in lieu of thrust blocks relies in part on minimum lengths of restrained pipe. The procedure for determining the minimum length of restrained pipe shall follow "Thrust Restraint Design for Ductile Iron Pipe", Sixth Edition as published by the Ductile Iron Pipe Research Association, or other design procedure approved by the City Engineer.

Use of Mechanical Joint Restraints in conjunction with or in lieu of thrust blocks shall be designed by a Professional Engineer registered in the State of Oklahoma. All design calculations and resultant dimensions and installation information shall be submitted to the City Engineer for review and approval prior to use.

Mechanical Joint Restraints, if used, shall be as follows or approved equal.

Company	Type
EBAA Iron Sales Co.	Mega-Lug Series 1100
N/A	¾" all thread with Duc Lug

F) Sleeve Couplings

All sleeve couplings, except as noted on the plans or otherwise specified, shall be restrained with tie rods and shall be designed for the pipe design pressure and maximum allowable stress not to exceed sixty-five percent (65%) of minimum yield strength of steel used. Sleeve couplings shall be:

Dresser Style 38
Smith Blair
Approved Equal

Sleeve Couplings shall be compact fittings meeting the requirements of AWWA C-153 and AWWA C-110

524.02.07 – COATING AND LINING

A) Exterior Coating

The exterior of ductile-iron pipe, specials and fittings shall be coated with the asphalt coating in accordance with AWWA C-151, Section 516. The coating shall have a minimum thickness of one (1) mil. The finished coating shall be smooth, continuous and strongly adherent to the pipe. Any damage to the outside coating during shipping, storage, handling and installation shall be field repaired with a fresh coating in accordance with the manufacturer's recommendations.

B) Interior Lining

Unless otherwise called for on the plans or specified, the interior of ductile-iron pipe, specials and fittings shall be cement mortar lined in the shop, with centrifugally spun lining in accordance with AWWA C-104. The Portland cement for cement mortar lining shall be in accordance with the requirements of ASTM C-150, Type I cement. Field repair of lining shall be made in accordance with AWWA C-104, Section 4-7.2.

524.02.08 – CORROSION PROTECTION

When specified or called for on the plans, all ductile-iron pipe, specials, fittings and other appurtenances shall be polyethylene encased in accordance with AWWA C-105/ANSI A 21.5. Exposure to sunlight of polyethylene wrapped pipe shall be kept to a minimum to prevent deterioration of polyethylene. Damage to polyethylene wrapping shall be prevented during backfilling operations. The minimum thickness for polyethylene is eight (8) mils.

524.05 – SOURCE QUALITY CONTROL TESTING

A) Ductile Iron Pipe shall be tested at the manufacturer's plant by the manufacturer in accordance with Sec. 5.2 of AWWA C-151.

B) Ductile Iron fittings shall be tested at the manufacturer's plant by the manufacturer in accordance with Sec. 5.2 of AWWA C-153.

C) Joint Testing

Joints shall be tested and meet the performance requirements established in AWWA C-111/ANSI A 21.11, Section 11-9 and as modified herein. The working pressure rating of the joint shall be established by subjecting the joints to three (3%) percent of the pipe produced to hydrostatic pressure of twice the rated working pressure, but in no event less than twice the minimum working pressure rating shown below. At least two (2) joints shall be hydrostatically tested at a deflected angle of the degrees (3°) at the above specified pressure rating.

The minimum working pressure ratings for joints shall be 350 psi.

D) Contractor shall provide certifications stating the pipe and fittings meet these requirements.

E) Welding

All welding shall be done by qualified welders. The ductile-iron pipe manufacturer shall be responsible for quality control and testing of all welding done in the plant during fabrication of special fittings.

F) Inspection

The City retains the right to inspect the pipe, specials and fittings, all work performed and materials furnished, at the manufacturer's plant and at the project site and to independently monitor the fabrication of the pipe, specials and fittings. Such inspection shall not relieve the Contractor or the manufacturer of their responsibilities to furnish material and perform work in accordance with these specifications.

524.06 – METHOD OF MEASUREMENT

Payment shall be made pursuant to Section 505 for water line.

524.07 – BASIS OF PAYMENT

Such payment shall be compensation in full for furnishing all materials, labor, equipment, tools and incidentals, and for performing the work in accordance with these specifications.

SECTION 528 – STEEL CASING PIPE

528.01 - DESCRIPTION

This section covers steel pipe intended to be used as a casing pipe for boring installations.

END OF PAGE

528.02 – MATERIALS

528.02.01 – SUBMITTALS

The Contractor shall submit the following, provided that all applicable requirements are met, and that visual inspection at destination shows the workmanship and condition of material to be satisfactory.

- A) Type "A" certification for pipe
- B) Shop drawings of pipe, joints and seams
- C) Documentation of manufacturer's on-going quality control program.

528.02.02 – GENERAL

A) General

Steel pipe shall conform to ASTM A-139, Standard Specification for Electric-Fusion (ARC)-Welded Steel Pipe (NPS 4 and Over). The steel material shall be new, smooth wall, carbon steel, Grade B, with minimum sixty thousand pounds per square inch (60,000 psi) tensile strength, and minimum thirty-five thousand pounds per square inch (35,000 psi) yield strength.

The Pipe shall be straight seam pipe, shall be one hundred (100%) percent welded, and the weld's height over the outside wall surface shall be equal to or less than three-sixteenths ($\frac{3}{16}$ ") inch. All steel pipe shall be square cut and shall have a roundness such that the difference between the major and minor outside diameters shall not exceed one percent (1%) of the specified nominal outside diameter or one-fourth inch ($\frac{1}{4}$ "), whichever is less. The outside circumference must be within plus or minus ($\pm$) one percent (1%) of the nominal circumference or within plus or minus ($\pm$) one-half inch ($\frac{1}{2}$ "), which is less. The pipe shall have a maximum allowable straightness deviation in any ten foot (10') length of one-eighth inch ($\frac{1}{8}$ "). Steel pipe joints shall be continuously welded with an approved butt weld. The welds shall attain the full strength of the pipe and shall result in a fully watertight section. The welded joints shall conform to the requirements of AWWA C-206.

B) Boring Installation

1. Casing Pipe Size – Steel casing pipe shall have the follow minimum inside diameters:

Pipe Nominal Size (inches)	Casing Pipe Inside Diameter (inches)
16	24
18	28
20	30

2. Casing Pipe Thickness - Steel casing pipe wall thickness shall be $\frac{3}{8}$ " minimum.

528.07 – BASIS OF PAYMENT

Payment shall be made pursuant to the appropriate Section of 505.

UTILITY COMPANIES

CITY OF CHICKASHA
LINE MAINTENANCE DEPT
405-222-6082
117 N. 4TH STREET
CHICKASHA, OK 73018

AT&T
811

AEP-PSO
405-222-7626

CENTERPOINT ENERGY
405-224-2740
619 W. CHICKASHA AVE.
CHICKASHA, OK 73018

SUDDENLINK
877-612-5036
1108 S. 4TH STREET
CHICKASHA, OK 73018

CHICKASHA MUNICIPAL AUTHORITY

PLAN OF PROPOSED EMERGENCY WATER LINE REPAIR/REPLACEMENT STILLWATER CENTRAL RAILROAD NEAR CHICKASHA WATER TREATMENT PLANT RFP CMA-2407

KEITH JOHNSON
GENERAL MANAGER

JIM CROSBY
PUBLIC WORKS DIRECTOR

PRIOR TO PERFORMING ANY GRADING OR EXCAVATING WORK, THE CONTRACTOR SHALL CALL OKIE811, THE OKLAHOMA ONE-CALL SYSTEM NOT LESS THAN 48 HOURS IN ADVANCE AND SHALL VERIFY OR ESTABLISH THE EXACT LOCATION AND DEPTH OF ALL UNDERGROUND LINES.



PROJECT
LOCATION

NOTE: BEFORE EXCAVATING CONTRACTOR SHALL CALL BLAKE H HARVEY STILLWATER RAILROAD AT 405-229-6232.

THE PROJECT LIES ENTIRELY WITHIN THE CORPORATE LIMITS OF THE CITY OF CHICKASHA.

CITY OF CHICKASHA/CHICKASHA MUNICIPAL AUTHORITY STANDARDS AND SPECIFICATIONS, OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY RULES AND REGULATIONS, STILLWATER RAILROAD PERMIT REQUIREMENTS AND DETAILS PROVIDED HEREIN SHALL GOVERN THE WORK.

THE STREETS, PAVEMENTS, STRUCTURES, UTILITIES AND OTHER FEATURES SHOWN HAVE BEEN DRAWN BASED ON INFORMATION THAT IS NOT 3RD ORDER ACCURATE. THE ENGINEER MAKES NO GUARANTEE, EXPRESSED OR IMPLIED, THAT THE STREETS, PAVEMENTS, STRUCTURES, UTILITIES AND OTHER FEATURES SHOWN COMPRISE ALL SUCH FEATURES IN THE AREA, IN SERVICE OR ABANDONED. THE ENGINEER FURTHER DOES NOT WARRANT THAT THE FEATURES SHOWN ARE IN THE EXACT LOCATION INDICATED.

LOCATION MAP

INDEX OF SHEETS

SHEET NUMBER	SHEET TITLE
1	TITLE SHEET
2	PAY QUANTITIES AND NOTES
G1	GENERAL SITE PLAN
3	WATER MAIN PLAN AND PROFILE
WM-1	WATER MAIN DETAILS
WM-2	WATER MAIN DETAILS
WM-3	WATER MAIN DETAILS
WM-4	WATER MAIN DETAILS
WM-5	WATER MAIN DETAILS
WM-L1	LARGE WATER MAIN DETAILS
WM-L2	LARGE WATER MAIN DETAILS
WM-L3	LARGE WATER MAIN DETAILS
WM-L4	LARGE WATER MAIN DETAILS

DATE APPROVED BY CHICKASHA MUNICIPAL AUTHORITY

WATER TREATMENT PLANT

10/25/2025

DATE RANDALL SCOTT VAUGHN, OKLA. REG. NO. 15194



PREPARED BY:



CHISHOLM TRAIL CONSULTING, LLC
OK CA 7771
PO BOX 684
MARLOW, OK 73055
580-467-8130

GENERAL CONSTRUCTION NOTES

ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE ODEQ RULES AND REGULATIONS, AWWA STANDARDS, UNION PACIFIC RAILROAD PERMIT AND CITY OF CHICKASHA/CHICKASHA MUNICIPAL AUTHORITY STANDARD SPECIFICATIONS AND CONSTRUCTION DRAWINGS.

ALL COSTS OF MAINTENANCE DURING CONSTRUCTION AND BEFORE THE PROJECT IS ACCEPTED SHALL BE INCLUDED IN THE UNIT PRICES BID ON THE VARIOUS PAY ITEMS. THE CONTRACTOR SHALL MAINTAIN THE WORK DURING CONSTRUCTION AND UNTIL THE PROJECT IS ACCEPTED. THIS MAINTENANCE SHALL CONSTITUTE CONTINUOUS AND EFFECTIVE WORK PROSECUTED DAY BY DAY, WITH ADEQUATE EQUIPMENT AND FORCES TO THE END THAT THE DRAINAGE CHANNEL, PRIVATE PROPERTY AND STRUCTURES ARE KEPT IN A SATISFACTORY CONDITION AT ALL TIMES. IF THE CONTRACTOR, AT ANY TIME, FAILS TO COMPLY WITH THESE PROVISIONS, THE OWNER'S REPRESENTATIVE MAY IMMEDIATELY NOTIFY THE CONTRACTOR OF SUCH NON-COMPLIANCE. IF THE CONTRACTOR FAILS TO REMEDY UNSATISFACTORY MAINTENANCE WITHIN 24 HOURS AFTER RECEIPT OF SUCH NOTICE, THE OWNER MAY IMMEDIATELY PROCEED TO MAINTAIN THE PROJECT, AND THE ENTIRE COST OF THIS MAINTENANCE WILL BE DEDUCTED FROM MONIES DUES OR BECOME DUE TO THE CONTRACTOR ON THIS CONTRACT.

COORDINATE WITH THE CHICKASHA MUNICIPAL AUTHORITY (CMA) REGARDING START WORK DATE.

REVISIONS PROPOSED BY THE CONTRACTOR SHALL BE SUBMITTED TO THE OWNER'S REPRESENTATIVE FOR APPROVAL PRIOR TO BEGINNING ANY CONSTRUCTION SUBJECT TO THE REVISION.

ACCESS ROAD TO THE WATER TREATMENT PLANT SHALL REMAIN OPEN TO ALL TRAFFIC AT ALL TIMES..

GENERAL CONSTRUCTION NOTES (CONT.)

THE CONTRACTOR SHALL TAKE ALL NECESSARY STEPS TO ENSURE ADEQUATE DRAINAGE DURING CONSTRUCTION. COST TO BE INCLUDED IN OTHER ITEMS OF WORK.

ANY DAMAGE CAUSED BY THE CONTRACTOR TO ANY STRUCTURES, ROADWAY SURFACES, STRIPING, RAISED PAVEMENT MARKERS, SIGNS, GUARDRAIL, AND SLOPES SHALL BE REPAIRED AT CONTRACTORS EXPENSE TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE.

BIDDERS SHALL FULLY INFORM THEMSELVES OF THE NATURE OF THE WORK AND CONDITIONS UNDER WHICH IT WILL BE PERFORMED. THE CONTRACTOR SHALL ADOPT METHODS CONSISTENT WITH GOOD CONSTRUCTION PRACTICE AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE IN EXISTING RIGHT-OF-WAY. ANY DAMAGE DONE DUE TO CONTRACTOR'S NEGLIGENCE SHALL BE PREPARED AT THE CONTRACTOR'S EXPENSE TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE.

THE PRICE BID ON ALL ITEMS SHALL INCLUDE ALL MATERIALS, LABOR, AND INCIDENTALS NECESSARY TO COMPLETE THE WORK AS SHOWN ON THE PLANS.

EXISTING UTILITIES MAY OR MAY NOT BE SHOWN ON PLAN SHEETS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE INFLICTED TO THE EXISTING UNDERGROUND UTILITIES WITHIN THE PROJECT AREA AS A RESULT OF THEIR DIGGING, TRENCHING, BORING, ETC..... PRIOR TO DIGGING NEAR THE UTILITIES, THE CONTRACTOR SHALL CALL THE "OKIE 811" NOTIFICATION CENTER FOR A LIST OF ALL UNDERGROUND FACILITIES REGISTERED IN THE AREA OF CONSTRUCTION. THE "OKIE 811" NOTIFICATION CENTER MAY BE NOTIFIED ONLINE AT okie811.org, BY CALLING 811 OR 1-800-522-6543. DEPTH OF EXISTING UTILITIES SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

CONCRETE MIXTURES CONTAINING SLAG OR SILICA FUME WILL NOT BE ACCEPTED.

THE CHICKASHA MUNICIPAL AUTHORITY WILL COORDINATE ANY NECESSARY UTILITY RELOCATIONS.

WATER MAIN MATERIALS AND INSTALLATION SHALL MEET REQUIREMENTS OF ODEQ 252:626 AND THE DETAILS PROVIDED.

THE PROJECT SHALL BE CONSTRUCTED SUCH THAT ACCESS TO ALL PROPERTIES IS MAINTAINED AT ALL TIMES.

SUMMARY OF QUANTITIES				
PAY ITEM	PAY ITEM DESCRIPTION	NOTES	UNITS	EST QTY
1	18" DIP WATER MAIN, TRENCHED UNCAS	1	LF	190
2	18" DIP WATER MAIN, INSTALLED IN CASING		LF	70
3	28" DIA. 7/16" WALL THICKNESS CASING INSTALLED	2	LF	70
4	18" MJ SLEEVES, INSTALLED	3	EA	2
5	18" X 45° MJ BEND, INSTALLED	3	EA	3
6	18" X 22.5° MJ BEND, INSTALLED	3	EA	2
7	18" MJ GATE VALVE W/ BOX, INSTALLED	3	EA	1
8	18" REPAIR CLAMP, INSTALLED		EA	1
9	DEWTERING		LSUM	1
10	DISINFECTION		LSUM	1
11	HYDROSTATIC PRESSURE TESTING		LSUM	1
12	FENCE REMOVAL AND REPLACEMENT		LF	200
13	RAILROAD FLAGGING	4	LSUM	1
14	RAILROAD CONSTRUCTION OBSERVATION	4	LSUM	1
15	RAILROAD SAFETY	4	LSUM	1
16	INSURANCE	4	LSUM	1

PAY ITEM NOTES:

PAYMENT WILL BE MADE ACCORDING TO THE SUMMARY OF QUANTITIES.

(1) PRICE BID FOR THIS ITEM SHALL INCLUDE THE COST OF TRENCHING, BEDDING IF NECESSARY AND BACKFILL.

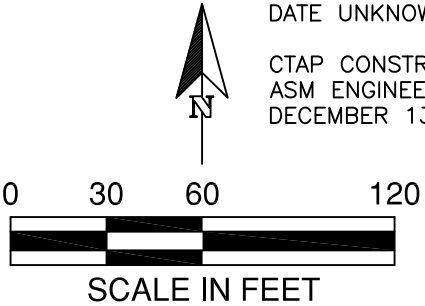
(2) PRICE BID FOR THIS ITEM SHALL INCLUDE THE COST OF EXCAVATION AND BACKFILL OF BORE PITS.

(3) PRICE BID TO INCLUDE COST OF ACCESSORIES, ETC. FOR A COMPLETE INSTALLATION.

(4) PRICE BID TO INCLUDE ALL COSTS ASSOCIATED WITH STILLWATER CENTRAL RAILROAD REQUIREMENTS. COOPERATE WITH RAILROAD REPRESENTATIVES.

IF FEASIBLE, INSTALL REPAIR CLAMP ON EXISTING LINE TO FACILITATE OWNER'S CONTINUED USE OF THE WATERLINE.

THE STREETS, PAVEMENTS, STRUCTURES, UTILITIES AND OTHER FEATURES SHOWN HAVE BEEN LOCATED BASED ON FIELD MEASUREMENTS THAT ARE NOT 3RD ORDER ACCURATE. THE ENGINEER MAKES NO GUARANTEE, EXPRESSED OR IMPLIED, THAT THE STREETS, PAVEMENTS, STRUCTURES, UTILITIES AND OTHER FEATURES SHOWN COMPRISE ALL SUCH FEATURES IN THE AREA, IN SERVICE OR ABANDONED. THE ENGINEER FURTHER DOES NOT WARRANT THAT THE FEATURES SHOWN ARE IN THE EXACT LOCATION INDICATED.



SOURCES FOR EXISTING FACILITIES INFORMATION:

CHICKASHA MUNICIPAL AUTHORITY
FILTER MEDIA REPLACEMENT (FINAL REVIEW)
BY OLSSON ASSOCIATES

CITY OF CHICKASHA PROJECT 2015-030
DISINFECTION BY-PRODUCTS CONTROL
IMPLEMENTATION BY CH GUERNSEY

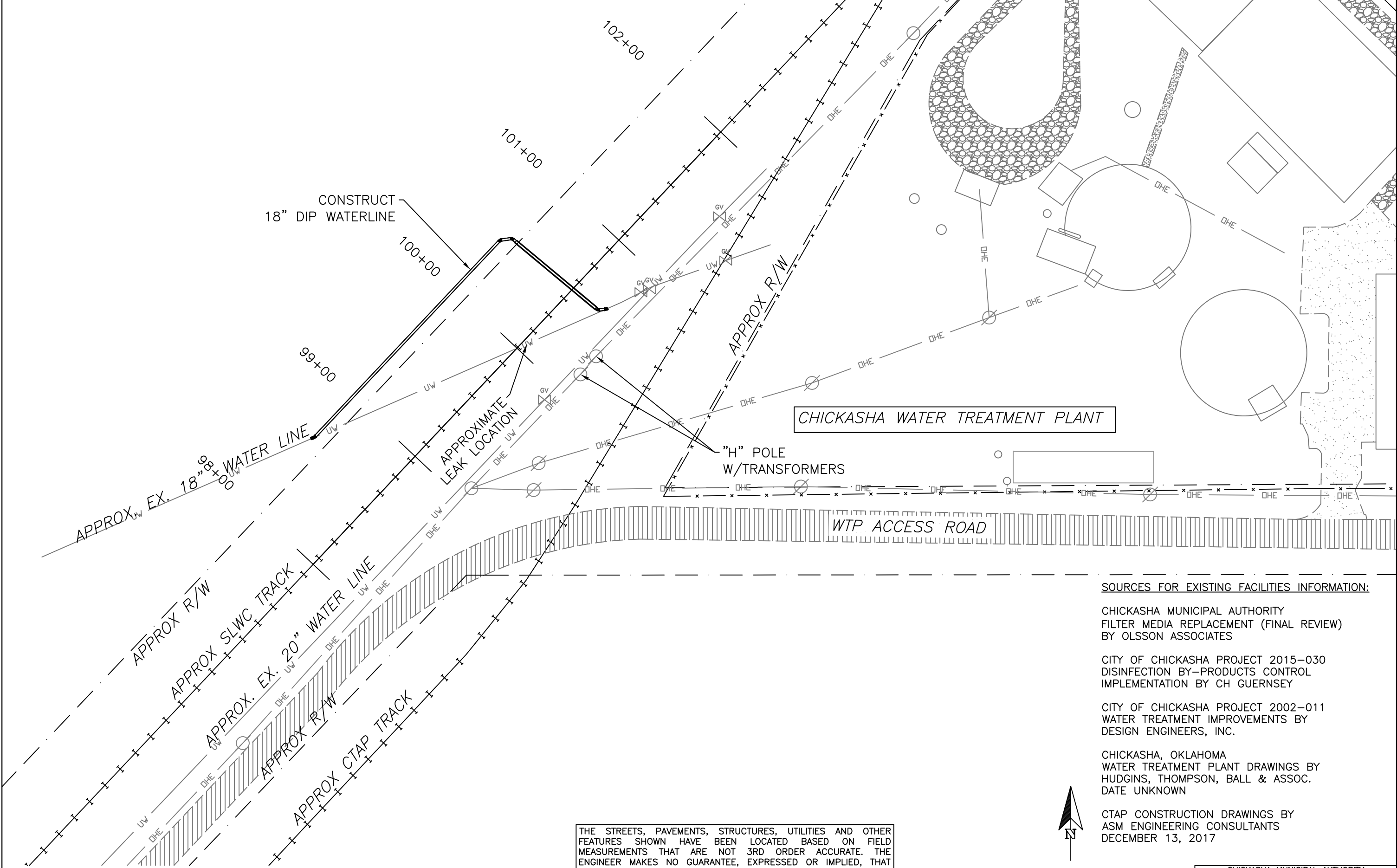
CITY OF CHICKASHA PROJECT 2002-011
WATER TREATMENT IMPROVEMENTS BY
DESIGN ENGINEERS, INC.

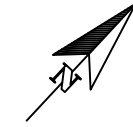
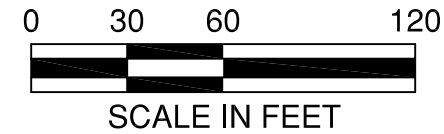
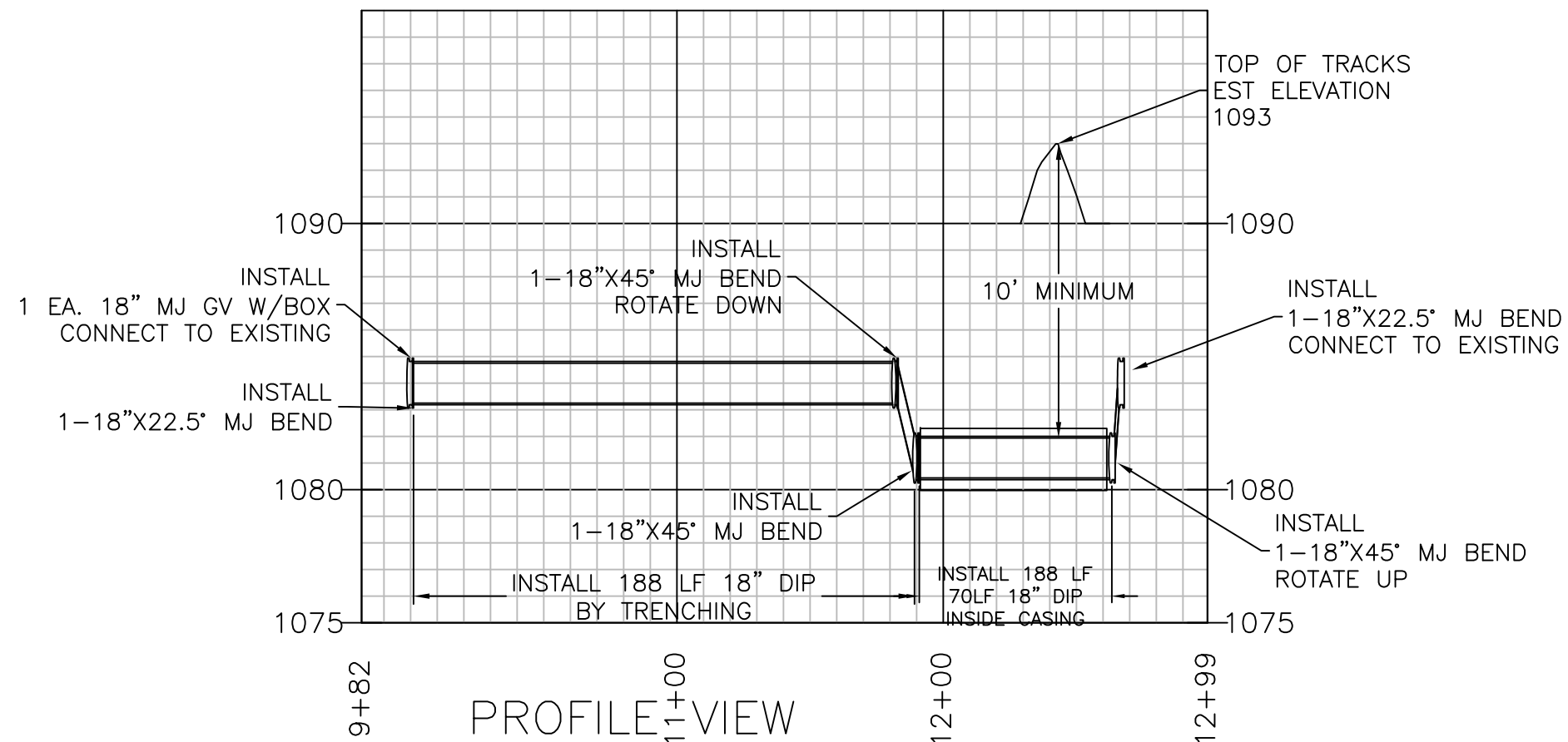
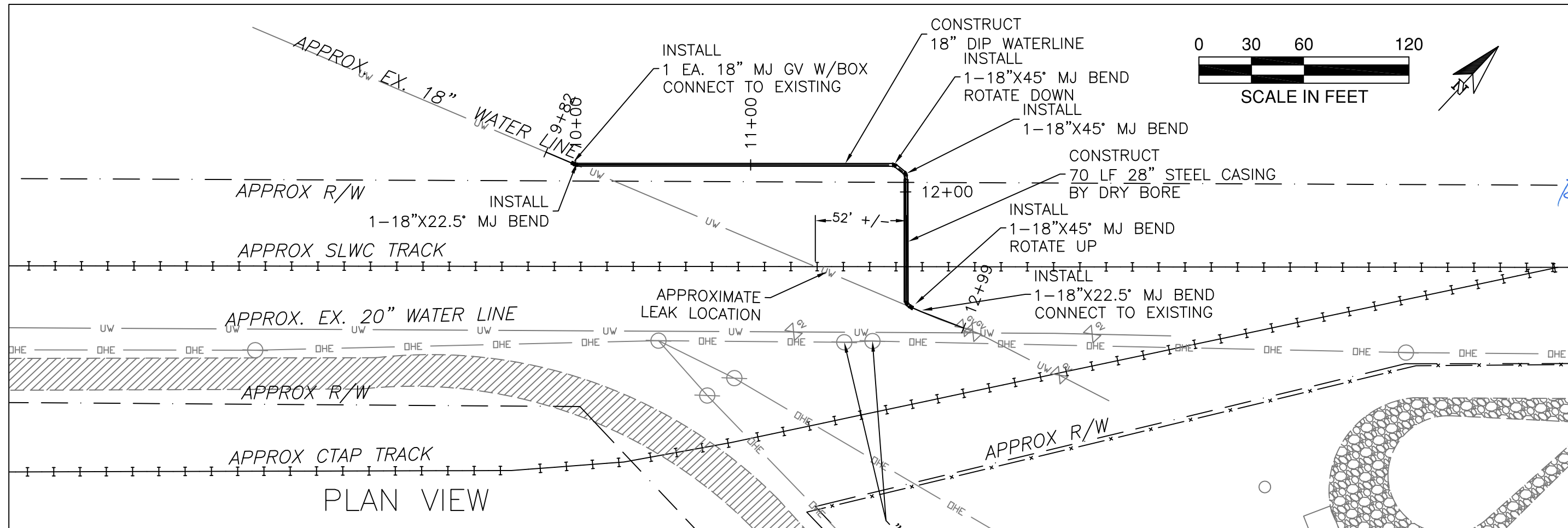
CHICKASHA, OKLAHOMA
WATER TREATMENT PLANT DRAWINGS BY
HUDGINS, THOMPSON, BALL & ASSOC.
DATE UNKNOWN

CTAP CONSTRUCTION DRAWINGS BY
ASM ENGINEERING CONSULTANTS
DECEMBER 13, 2017

CHICKASHA MUNICIPAL AUTHORITY
EMERGENCY WATER LINE REPAIR/REPLACEMENT
STILLWATER CENTRAL RAILROAD AT WTP

CTC GENERAL SITE PLAN
AS NOTED 10/24/2017





10/25/2025	
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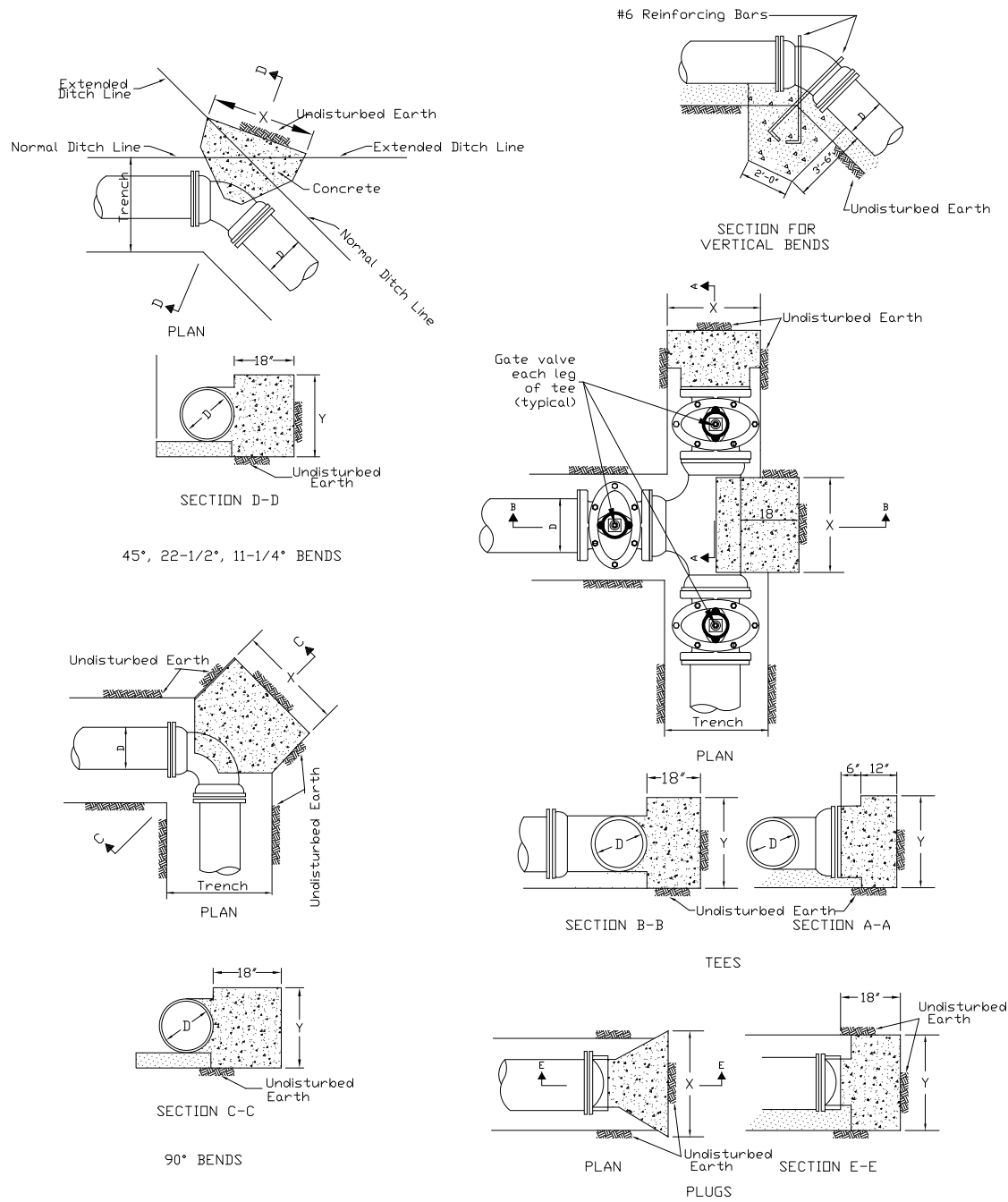
Project
CMA-2407
EMERGENCY WATERLINE
REPAIR/REPLACEMENT
Chickasha, OK

Revisions		
#	Description	Date
1	CLARIFY PIPE DIMENSIONS LTRT	9/27/2024

Sheet Title

**PLAN AND PROFILE
ALONG WATERLINE**

Scale: AS NOTED	Sheet #:
Drawn: RSV	3
Checked: RSV	
Date: 10/25/2024	



Pipe Size (inches)	Trench Width (inches)	DIMENSIONS FOR CONCRETE THRUST BLOCKS (feet)											
		TEE, FH or PLUG		PLUG/BLOWOFF		90° Bends		45° Bends		22 1/2° Bends		11 1/4° Bends	
		X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
6	20	2.0	1.5	2.5	1.5	3.0	1.5	1.5	1.5	1.0	1.5	1.0	1.5
8	22	2.5	2.0	3.0	2.0	3.5	2.0	2.0	2.0	1.0	2.0	1.0	2.0
10	24	4.0	2.0	4.5	2.0	5.5	2.0	3.0	2.0	1.5	2.0	1.0	2.0
12	28	4.0	3.0	4.5	3.0	5.0	3.0	3.0	3.0	1.5	3.0	1.0	3.0

CONCRETE THRUST BLOCKS SHALL BE CAST IN PLACE CONCRETE WITH 3,500 PSI COMPRESSIVE STRENGTH AT 3 DAYS.

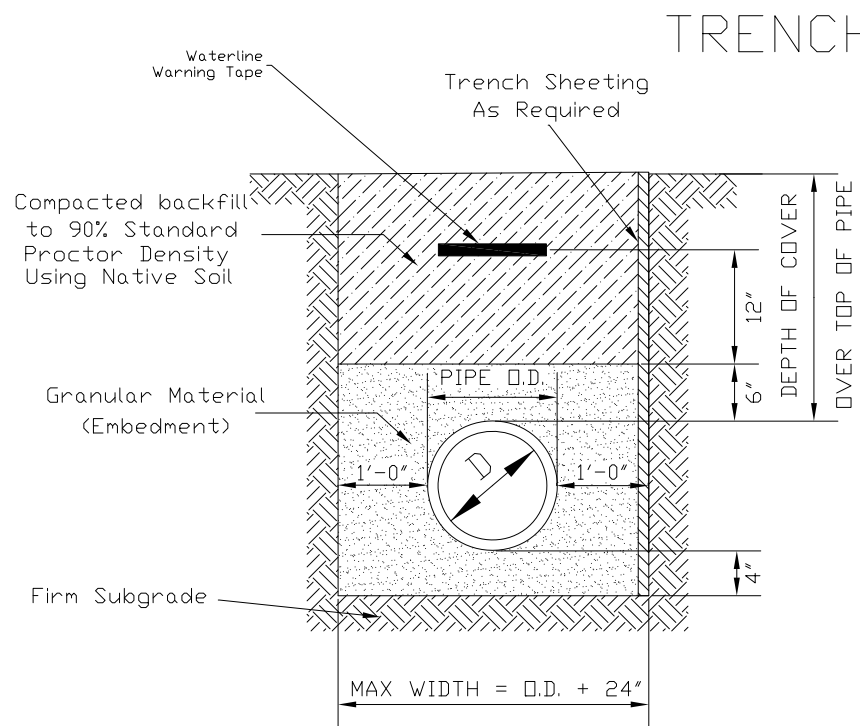
PLACE MINIMUM 8 MIL VISQUEEN BETWEEN THRUST BLOCK AND PIPE OR FITTING

ALL THRUST BLOCKS SHALL BE FORMED USING LUMBER OR SIMILAR SUITABLE MATERIAL

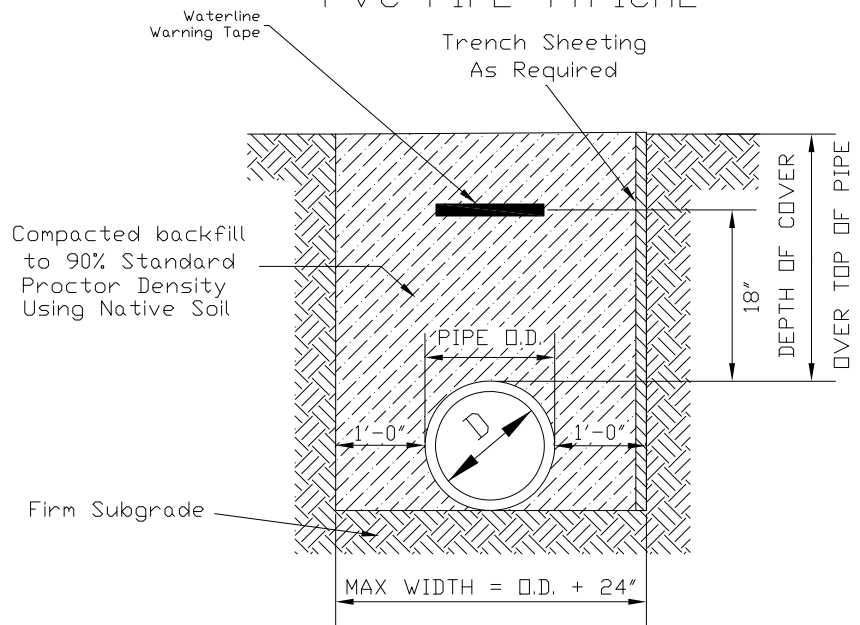
CONCRETE THRUST BLOCK DETAILS

GENERAL INSTALLATION NOTES

1. PLACE WATER MAIN THREE (3) FEET BEHIND CURB.
2. DO NOT PLACE WATER MAIN UNDER STREETS, ROADS OR CURBS, EXCEPT AT CROSSINGS.
3. PLACE GATE VALVES ON EACH LEG OF ALL TEES.



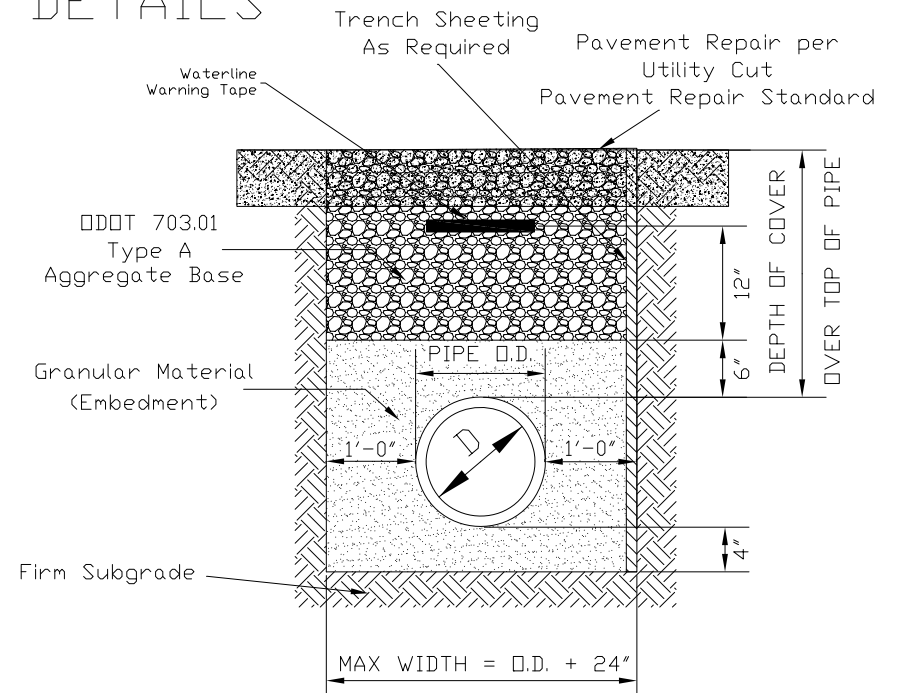
PVC PIPE TYPICAL



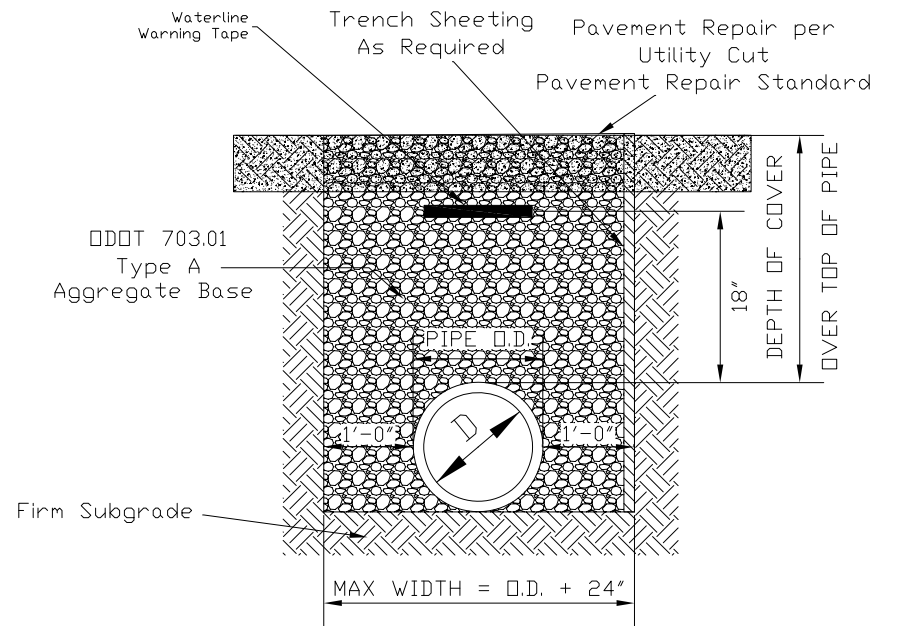
DUCTILE IRON PIPE TYPICAL

TRENCH WIDTHS		
NOMINAL PIPE DIAMETER (INCHES)	MINIMUM TRENCH WIDTH (INCHES)	MAXIMUM TRENCH WIDTH (INCHES)
6	20	31
8	22	36
10	24	38
12	28	40

TRENCH DETAILS



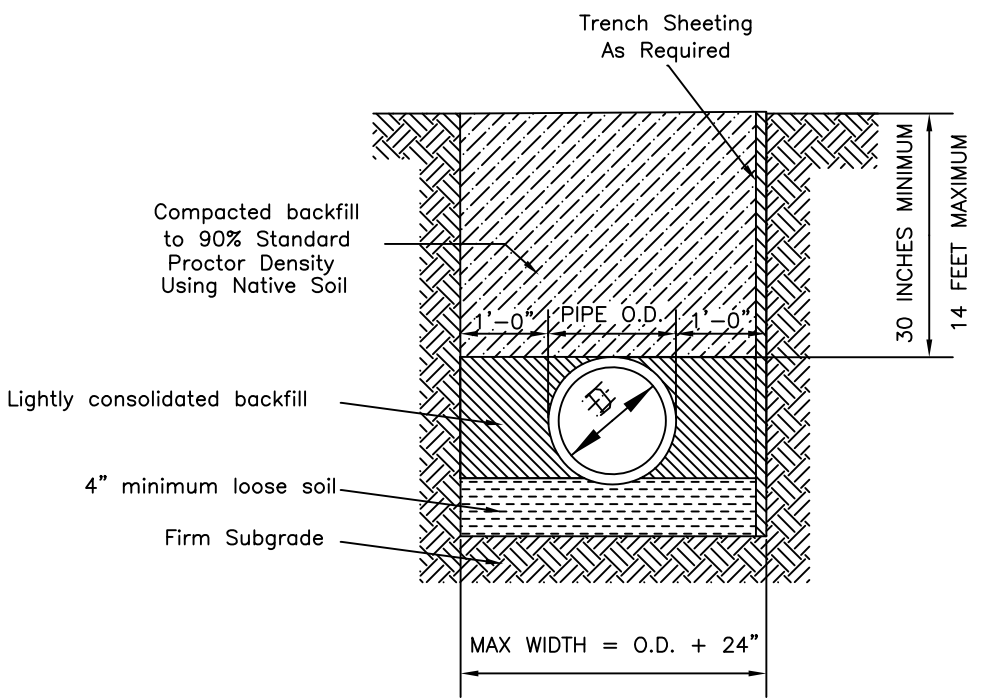
PVC PIPE UNDER DRIVES, STREETS AND ALLEYS



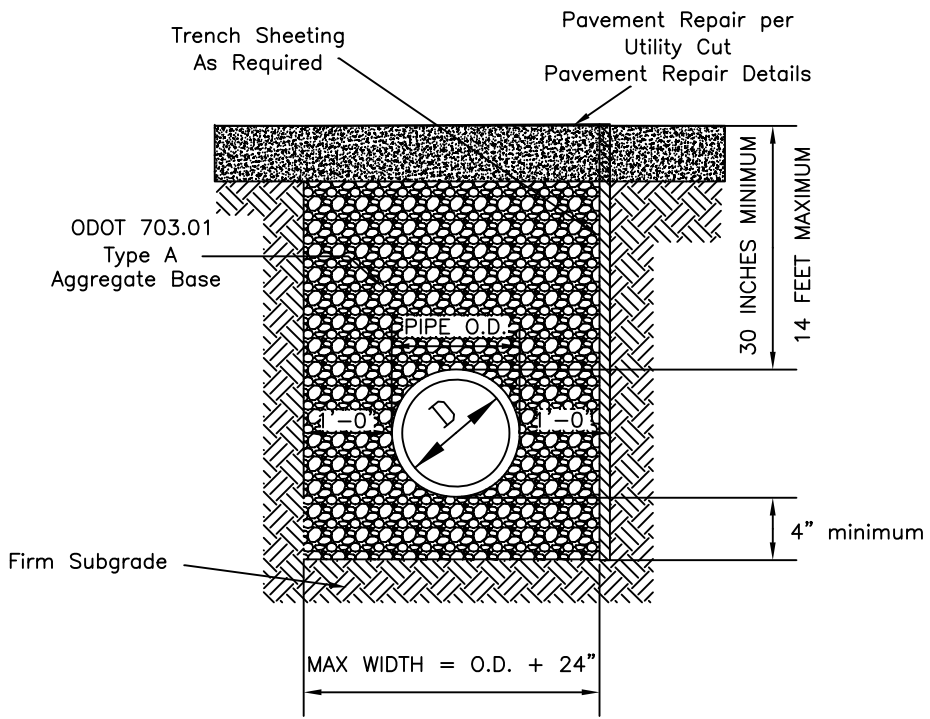
DUCTILE IRON PIPE UNDER DRIVES, STREETS AND ALLEYS

PREPARED BY: CHISHOLM TRAIL CONSULTING, LLC 2124 SCOTT LANE DUNCAN, OKLAHOMA 73533 CA 0K7771 RANDALL SCOTT VAUGHN, P.E. 15194	CITY OF CHICKASHA, OKLAHOMA STANDARD DRAWINGS APPROVED AND ADOPTED BY THE CITY COUNCIL THIS ____ DAY OF _____, 202___. MAYOR _____ ATTEST: CITY CLERK _____ WATER MAIN DETAILS DO NOT SCALE
DIGITALLY SIGNED 12/1/2022	Page 109 of 119

TRENCH DETAILS



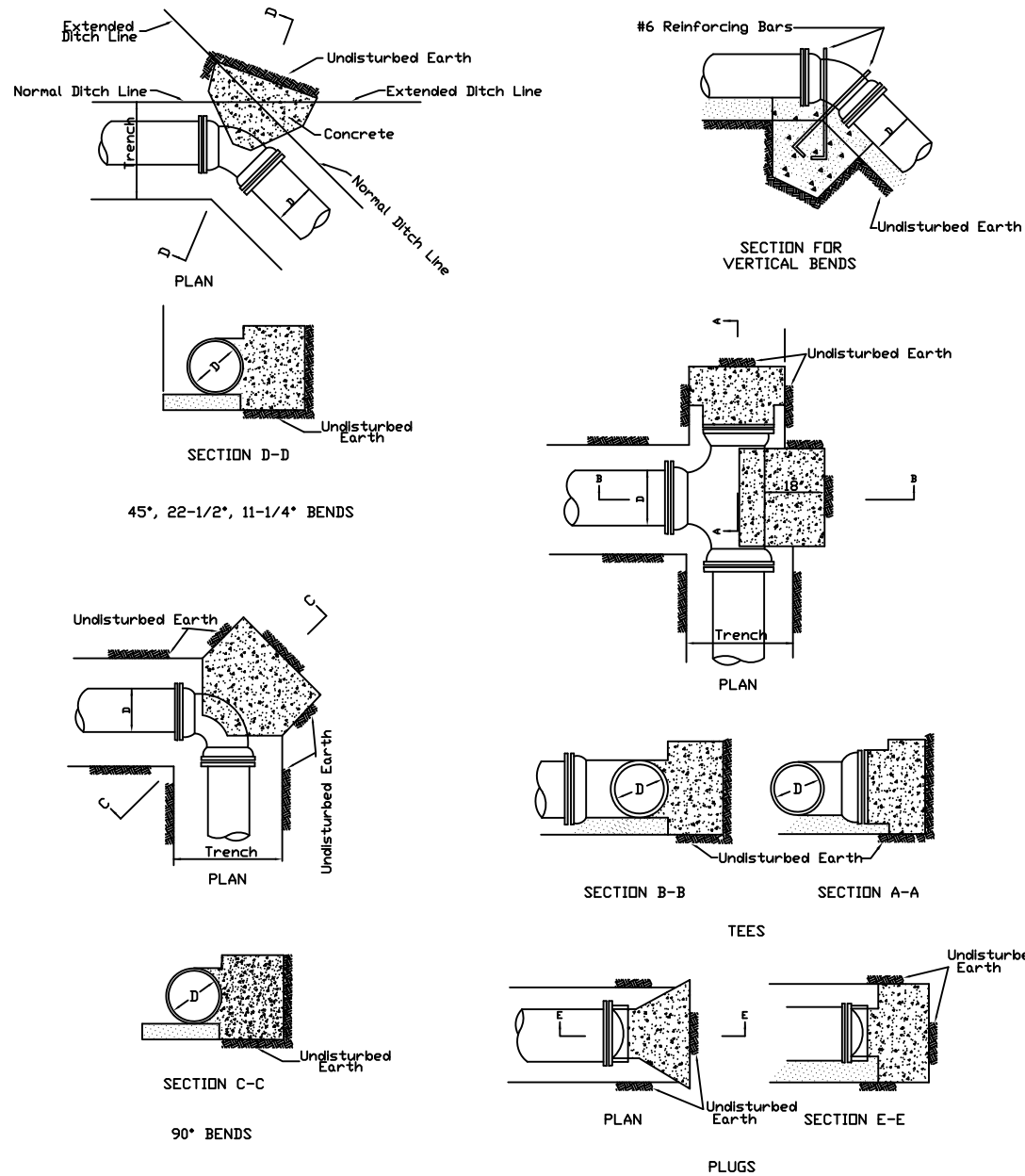
DUCTILE IRON PIPE TYPICAL



DUCTILE IRON PIPE UNDER
DRIVES, STREETS AND ALLEYS

TRENCH WIDTHS		
NOMINAL PIPE DIAMETER (INCHES)	MINIMUM TRENCH WIDTH (INCHES)	MAXIMUM TRENCH WIDTH (INCHES)
16	32	41
18	34	43
20	36	45

TYPE 3 LAYING CONDITIONS AS DEFINED IN AWWA C150 SHALL BE USED.
PIPE SHALL BE BEDDED IN MINIMUM FOUR INCHES OF LOOSE SOIL, WITH
BACKFILL LIGHTLY CONSOLIDATED TO TOP OF PIPE.



CONCRETE THRUST BLOCKS SHALL BE CAST IN PLACE CONCRETE WITH 3,500 PSI COMPRESSIVE STRENGTH AT 3 DAYS.

PLACE MINIMUM 8 MIL VISQUEEN BETWEEN THRUST BLOCK AND PIPE OR FITTING

ALL THRUST BLOCKS SHALL BE FORMED USING LUMBER OR SIMILAR SUITABLE MATERIAL

CONCRETE THRUST BLOCK DETAILS

I. HORIZONTAL AND DOWNWARD THRUST

Follow this procedure to arrive at the area of thrust block required for distributing horizontal and downward thrust to undisturbed soil.

A. Multiply anticipated working pressure (p_w) of the water main by 1.50. This represents application of a Safety Factor. If this calculation results in less than 150, use 150.

B. Multiply pressure obtained from step A by the value shown in Table 1 for the appropriate fitting and pipe size. This is the total thrust in pounds at the fitting (F).

C. Use Table 2 to determine the bearing strength (s_b) of the soil at the specific location.

D. Divide the thrust obtained from step B by the bearing strength of the soil obtained from step C in order to arrive at the area required for thrust block in square feet.

II. UPWARD THRUST

Follow this procedure to arrive at the quantity of concrete

A. Perform same calculations as in steps I.A and I.B.

B. Divide the thrust obtained from step I.B above by 150 pounds per cubic foot (concrete density) to arrive at the quantity of concrete required in cubic feet.

C. Reinforce the concrete per Standard Drawings.

Working pressure: Maximum internal pressure exerted under normal operating conditions.

Block Height shall be equal to or less than one-half the depth from top of ground to bottom of block, but not less than the pipe diameter.

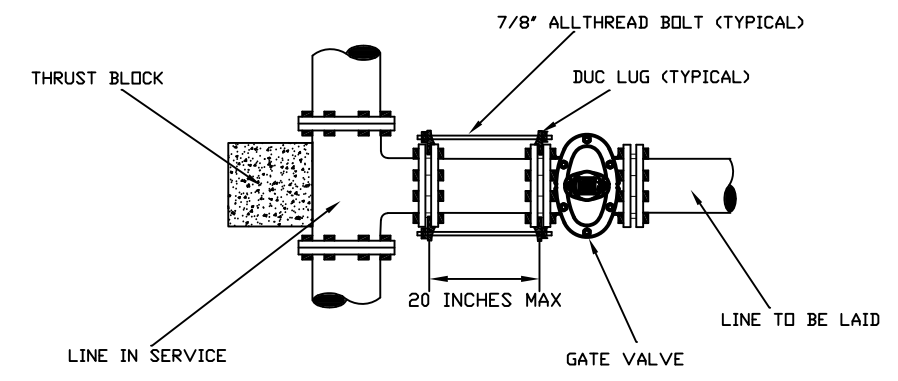
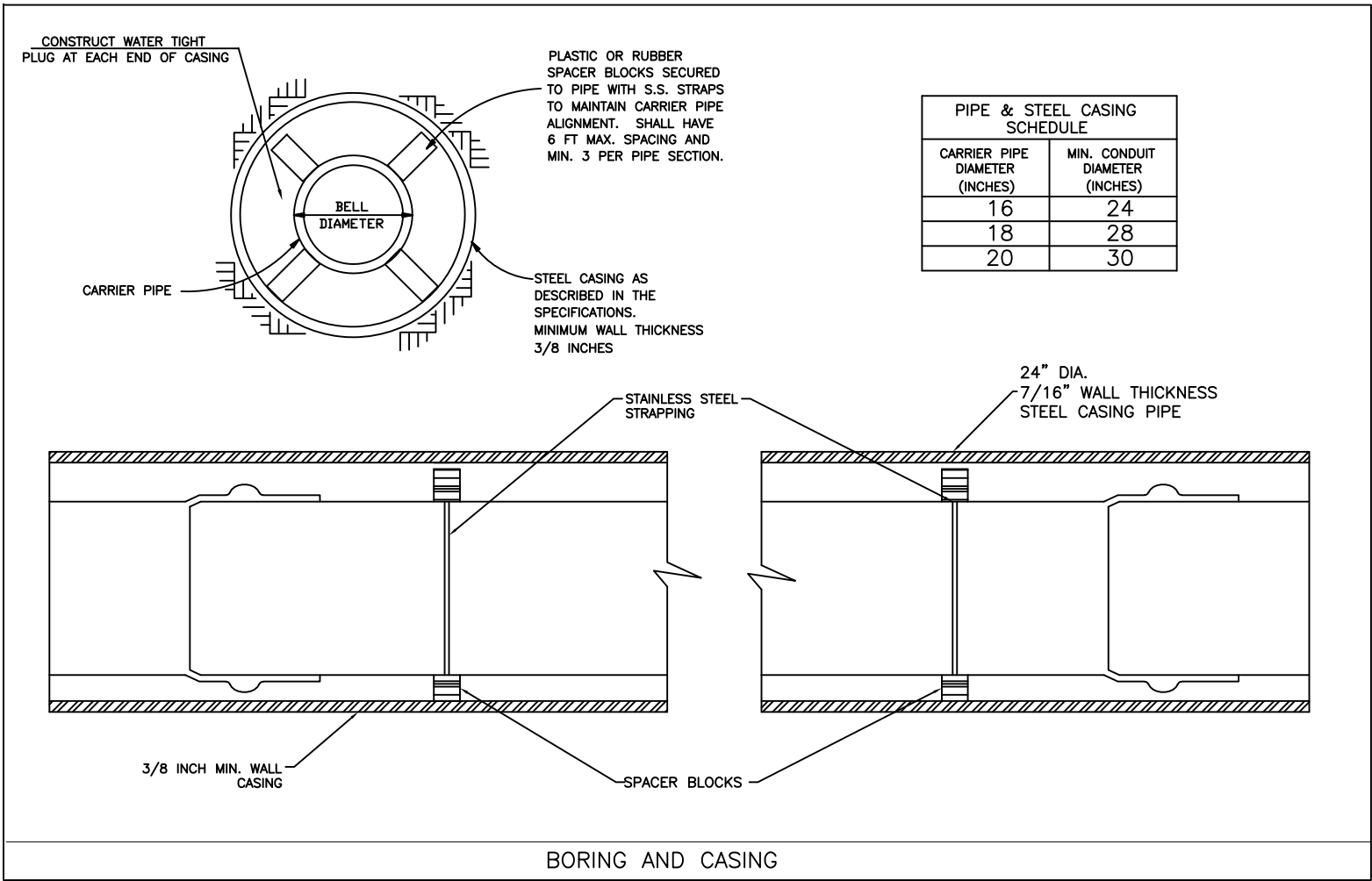
Block Width to Block Height ratio shall be between 1 and 2.

TABLE 1

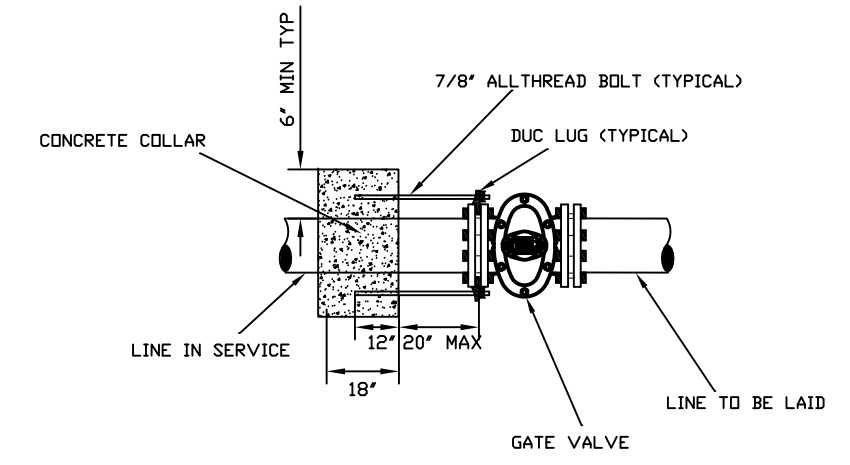
Pipe Nominal Size (inches)	Dead End, Tee or FH	90 Degree Bend	45 Degree Bend	22 1/2 Degree Bend	11 1/4 Degree Bend
16	238	336	182	93	47
18	299	422	229	117	59
20	366	518	280	143	72

TABLE 2

SOILS TYPE	BEARING STRENGTH (psi)
Sound shale or sandstone	10,000
Cemented Gravel and Sand (difficult to pick)	4,000
Coarse and fine compact Sand	3,000
Medium Clay (can be spaded)	2,000
Soft Clay	1,000
Muck	0



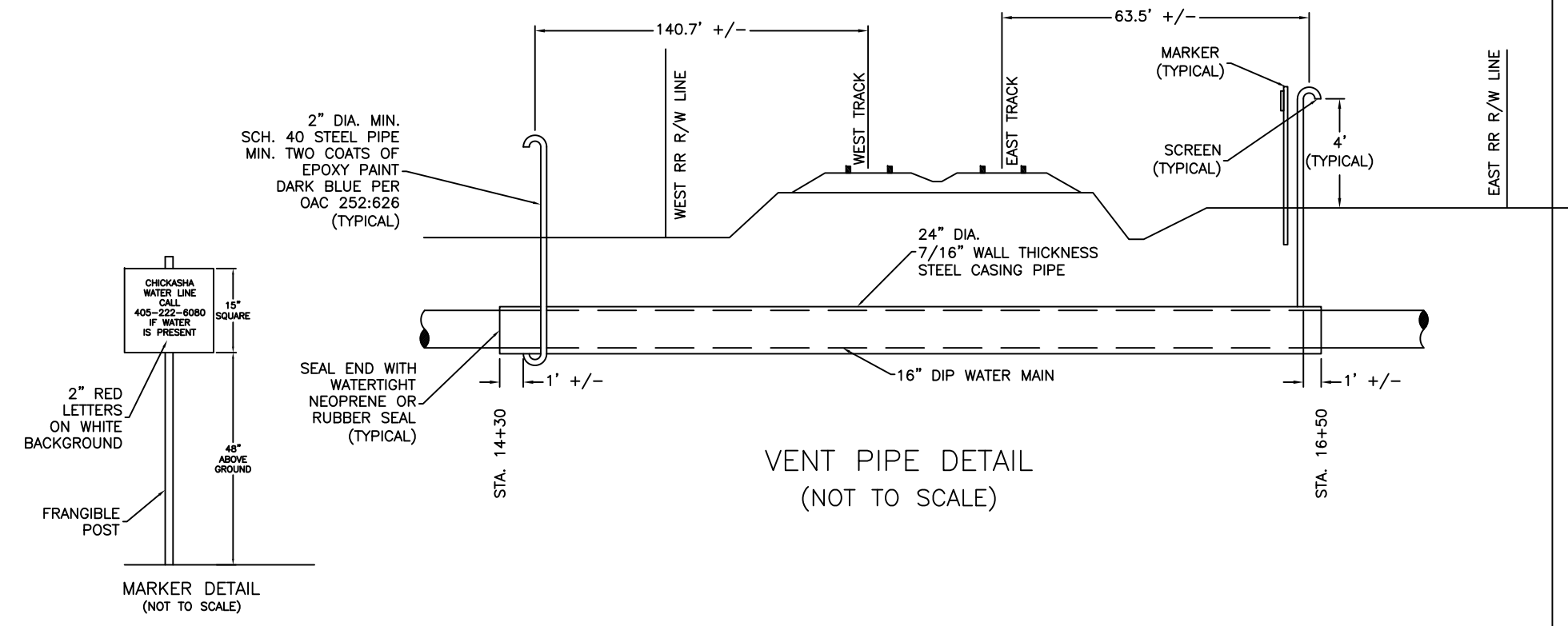
NOTE: USE NUMBER OF BOLTS W/ DUC LUGS ACCORDING TO THE SCHEDULE BELOW, EQUALLY SPACED.

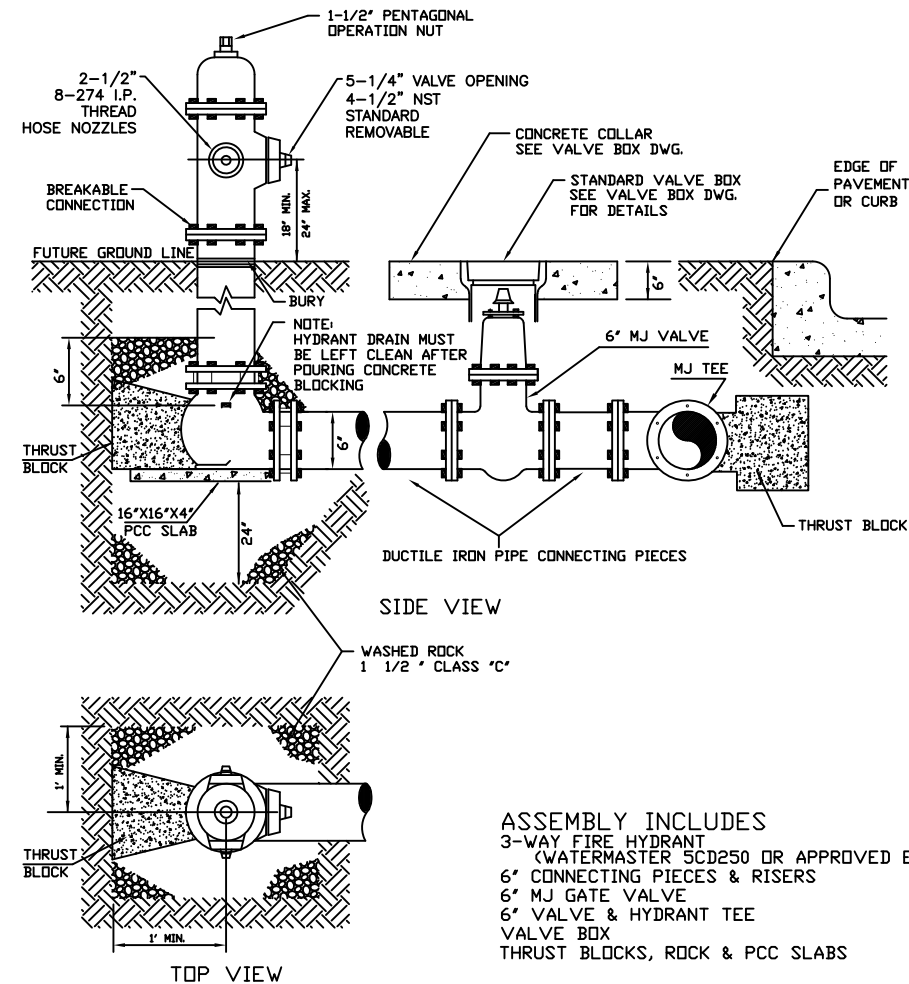


NOTE: USE NUMBER OF BOLTS W/ DUC LUGS ACCORDING TO THE SCHEDULE BELOW, EQUALLY SPACED.

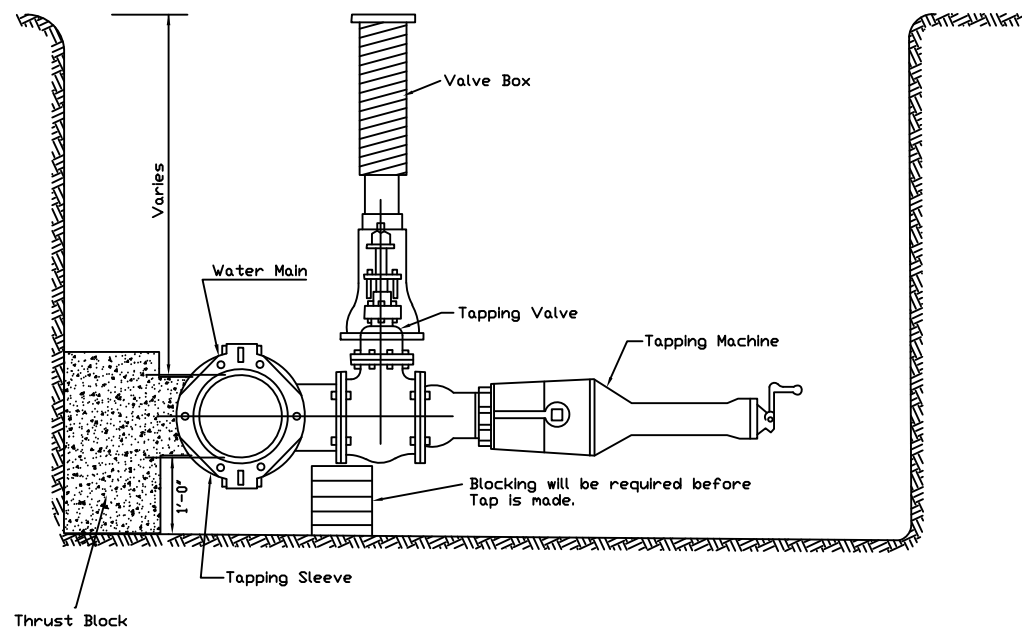
PIPE SIZE	MINIMUM NUMBER OF BOLTS
16"	8
18"	8
20"	10

TYPICAL MECHANICAL JOINT RESTRAINTS
USING 7/8-INCH ALL-THREAD BOLTS AND DUC LUGS

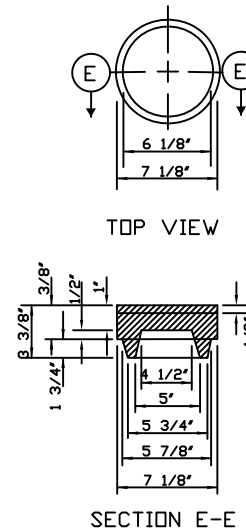
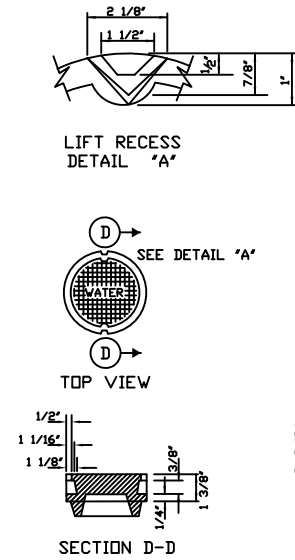
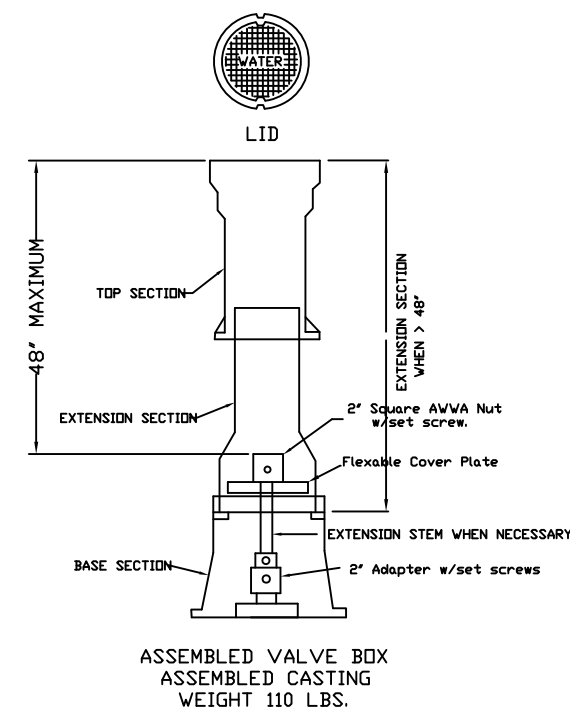
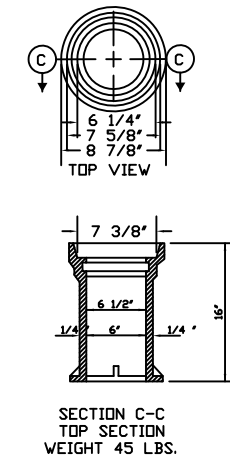
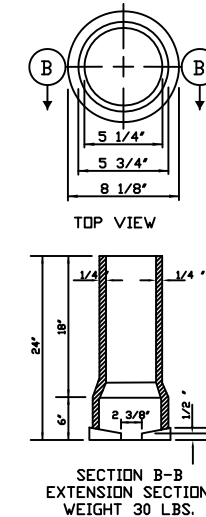
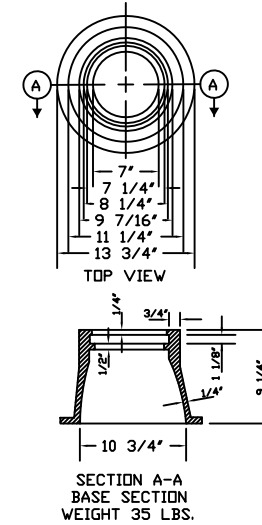




FIRE HYDRANT ASSEMBLY



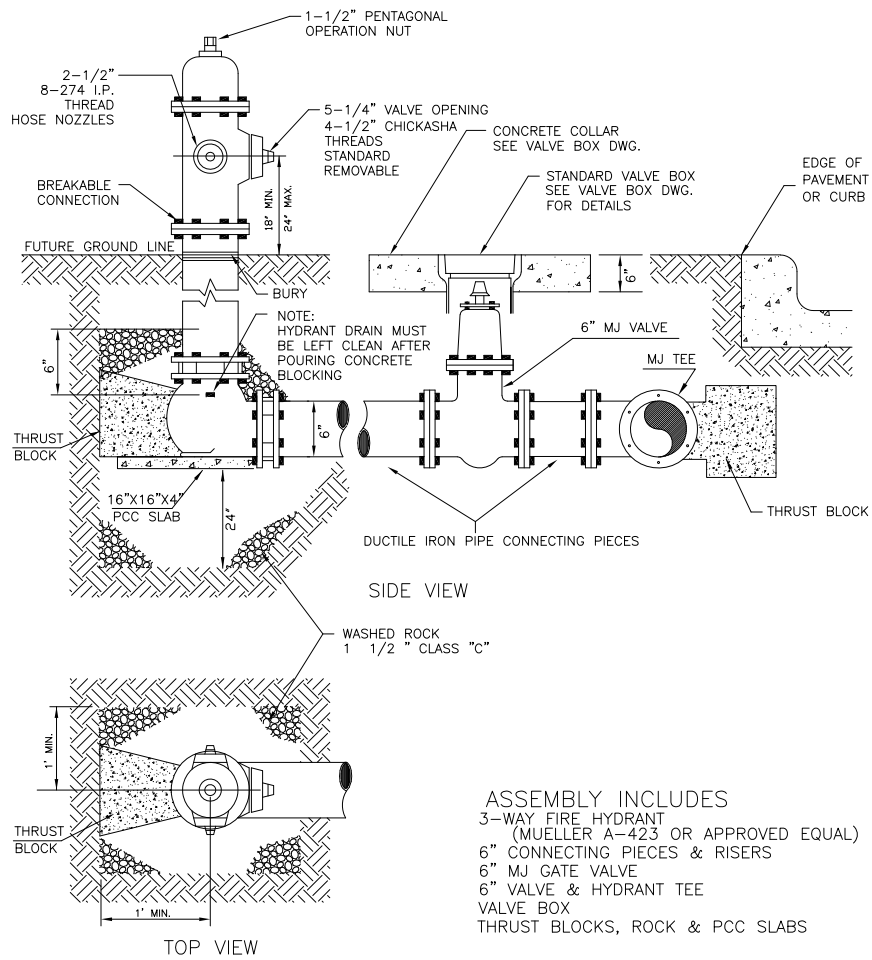
BLOCKING FOR TAPPING VALVE



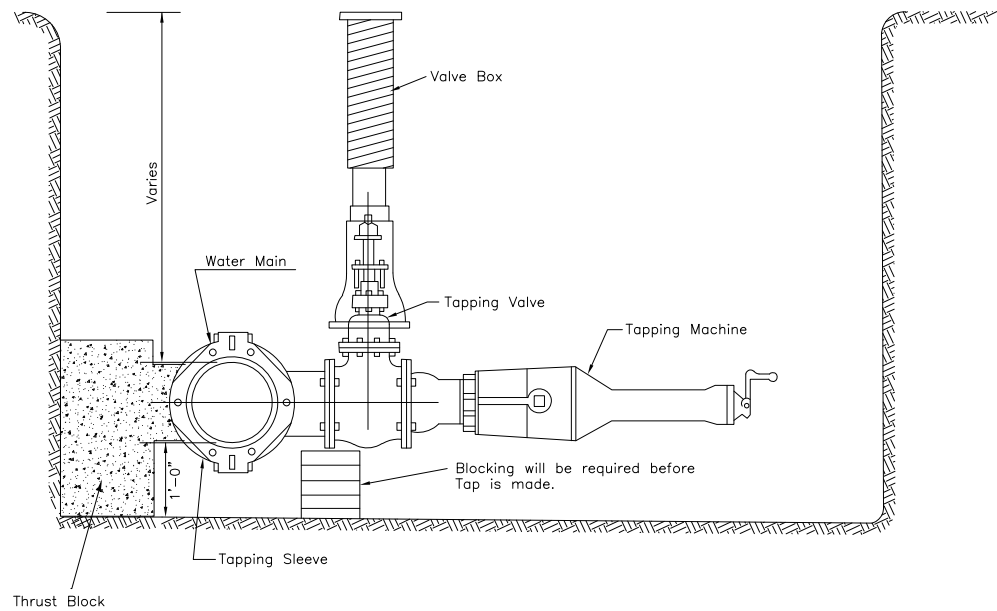
NOTES:

1. WATER LINE CONTRACTOR SHALL PLACE TWO FOOT (2') SQUARE CONCRETE COLLAR SIX INCHES (6") THICK AROUND EACH WATER VALVE BOX TOP AFTER FINAL GRADING HAS BEEN COMPLETED AND TRENCHES HAVE SETTLED. ALL COST OF COLLAR TO BE INCLUDED IN THE COST OF THE VALVE BOX.
2. VALVE BOXES REQUIRING OVER TWO ADDITIONAL BOTTOM SECTIONS SHALL BE EXTENDED USING CAST OR DUCTILE IRON PIPE WITH A BOTTOM AND TOP SECTION PLACED ON TOP OF THE CAST OR DUCTILE IRON PIPE.

CAST IRON VALVE BOX AND LID

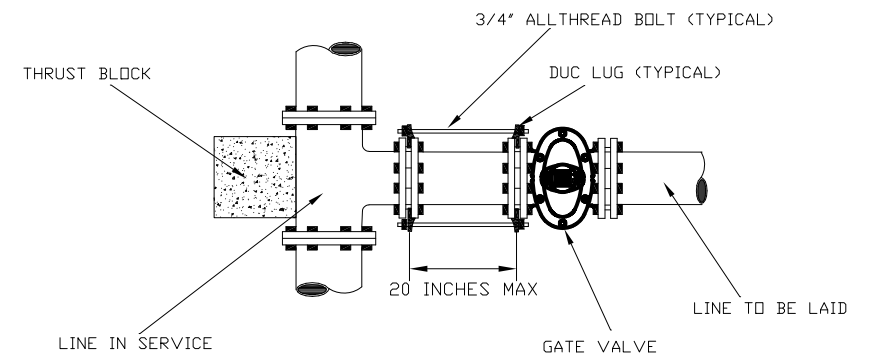
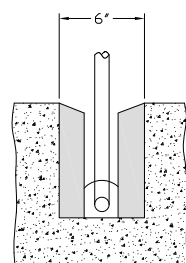
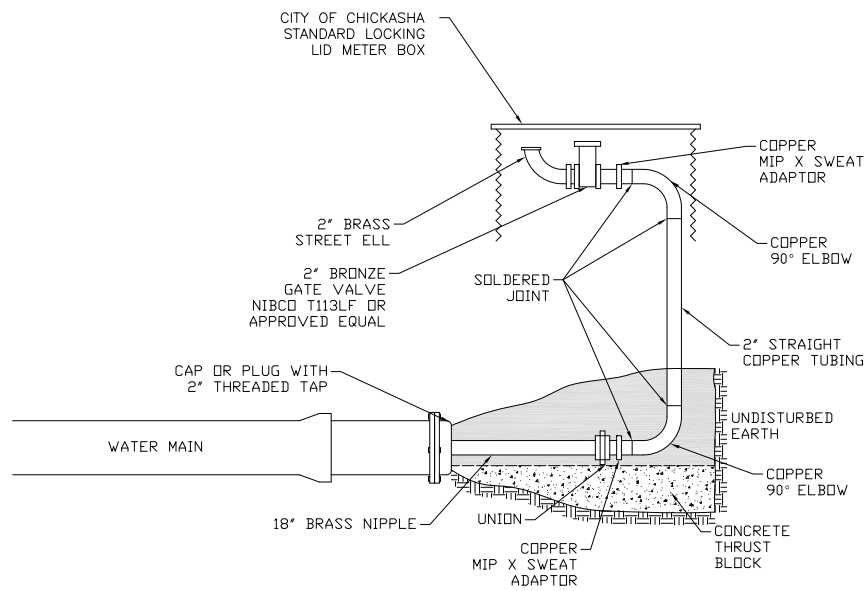
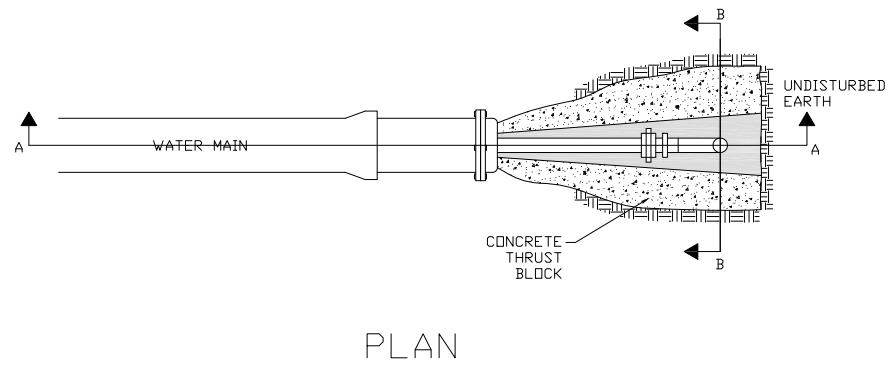


FIRE HYDRANT ASSEMBLY

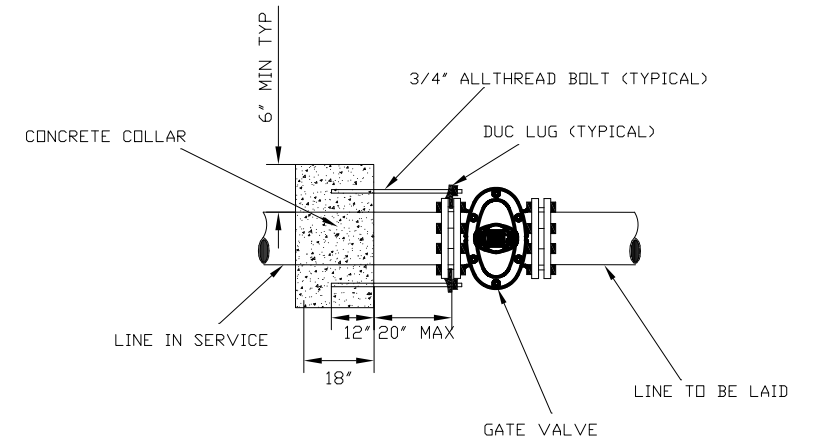


BLOCKING FOR TAPPING VALVE

2" BLOWOFF FOR DEAD END WATERLINE



NOTE: USE NUMBER OF BOLTS W/ DUC LUGS ACCORDING TO THE SCHEDULE BELOW, EQUALLY SPACED.

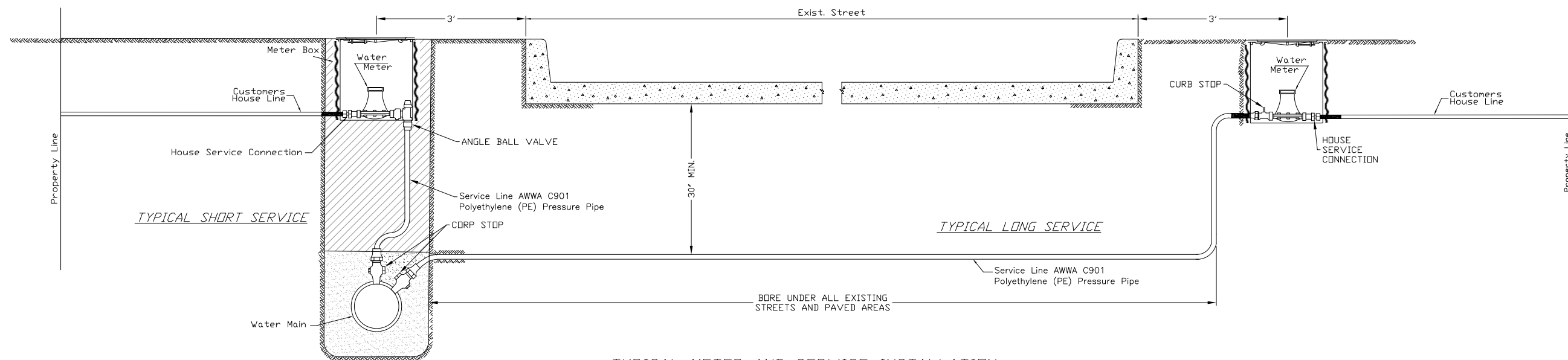


NOTE: USE NUMBER OF BOLTS W/ DUC LUGS ACCORDING TO THE SCHEDULE BELOW, EQUALLY SPACED.

PIPE SIZE	MINIMUM NUMBER OF BOLTS
6"	2
8"	3
10"	4
12"	4

TYPICAL MECHANICAL JOINT RESTRAINTS
USING 3/4-INCH ALL-THREAD BOLTS AND DUC LUGS

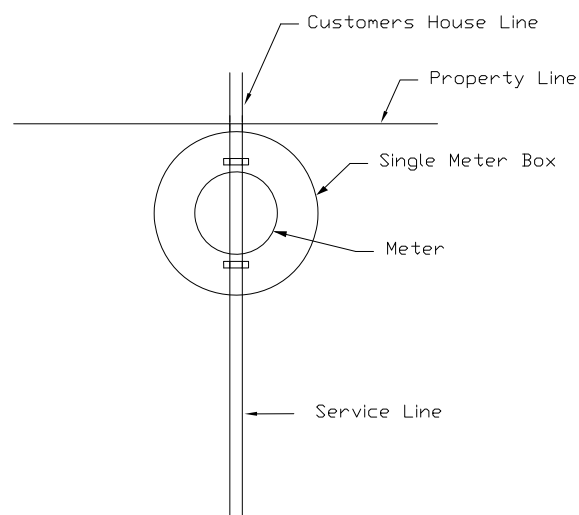
PREPARED BY: CHISHOLM TRAIL CONSULTING, LLC 2124 SCOTT LANE DUNCAN, OKLAHOMA 73533 CA 0K7771 RANDALL SCOTT VAUGHN, P.E. 15194		CITY OF CHICKASHA, OKLAHOMA STANDARD DRAWINGS APPROVED AND ADOPTED BY THE CITY COUNCIL THIS ____ DAY OF _____, 202___.	
MAYOR _____		ATTEST: CITY CLERK _____	
WATER MAIN DETAILS DO NOT SCALE		12/1/2022	



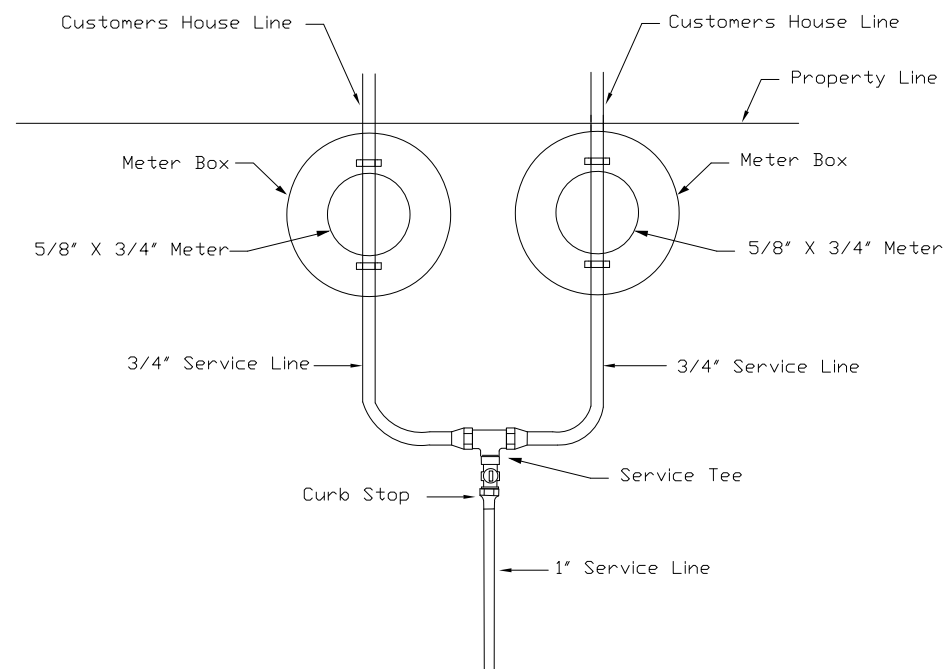
TYPICAL METER AND SERVICE INSTALLATION
(NOT TO SCALE)

METER AND SERVICE LINE INSTALLATION NOTES

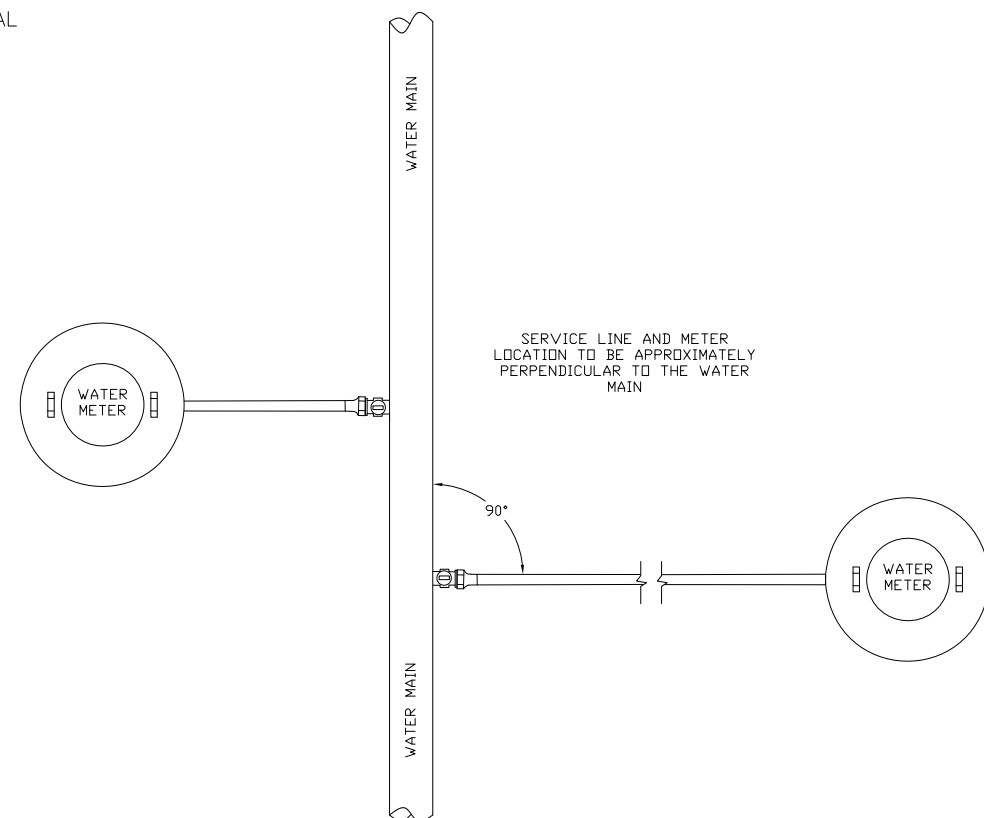
1. DEVELOPER SHALL INSTALL SERVICE LINES FROM CORP STOP TO CURB STOP OR ANGLE BALL VALVE, AS APPLICABLE.
2. DEVELOPER SHALL PLACE TEMPORARY MARKER PIPE APPROVED BY THE OWNER OVER END OF EACH SERVICE LINE.
3. PLACE TRACER WIRE WITH SERVICE LINE. REFER TO SHEET WM5 FOR TYPICAL INSTALLATION REQUIREMENTS.
4. DO NOT PLACE SERVICE LINES UNDER DRIVEWAYS.
5. CITY OF CHICKASHA/CHICKASHA MUNICIPAL AUTHORITY PERSONNEL WILL INSTALL METERS AND METER BOXES.



TYPICAL SINGLE METER SETTING



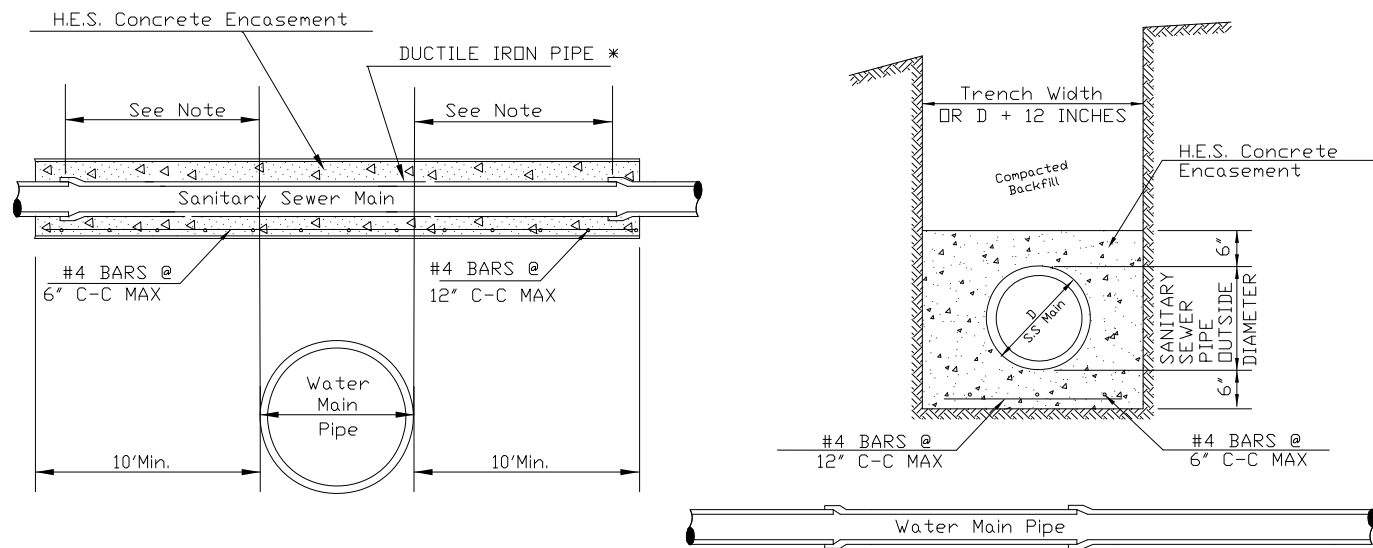
TYPICAL DOUBLE METER SETTING



ALL FITTINGS SHALL BE MUELLER OR APPROVED EQUAL
CORP STOP: MUELLER H-15000
CURB STOP: MUELLER H-15275
SERVICE TEE: MUELLER H-15386

NOTE: DOUBLE METER SETTINGS ARE ONLY PERMITTED WHEN SERVING TWO 5/8" X 3/4" METERS FROM A ONE INCH SERVICE LINE, UNLESS OTHERWISE APPROVED BY THE ENGINEER.

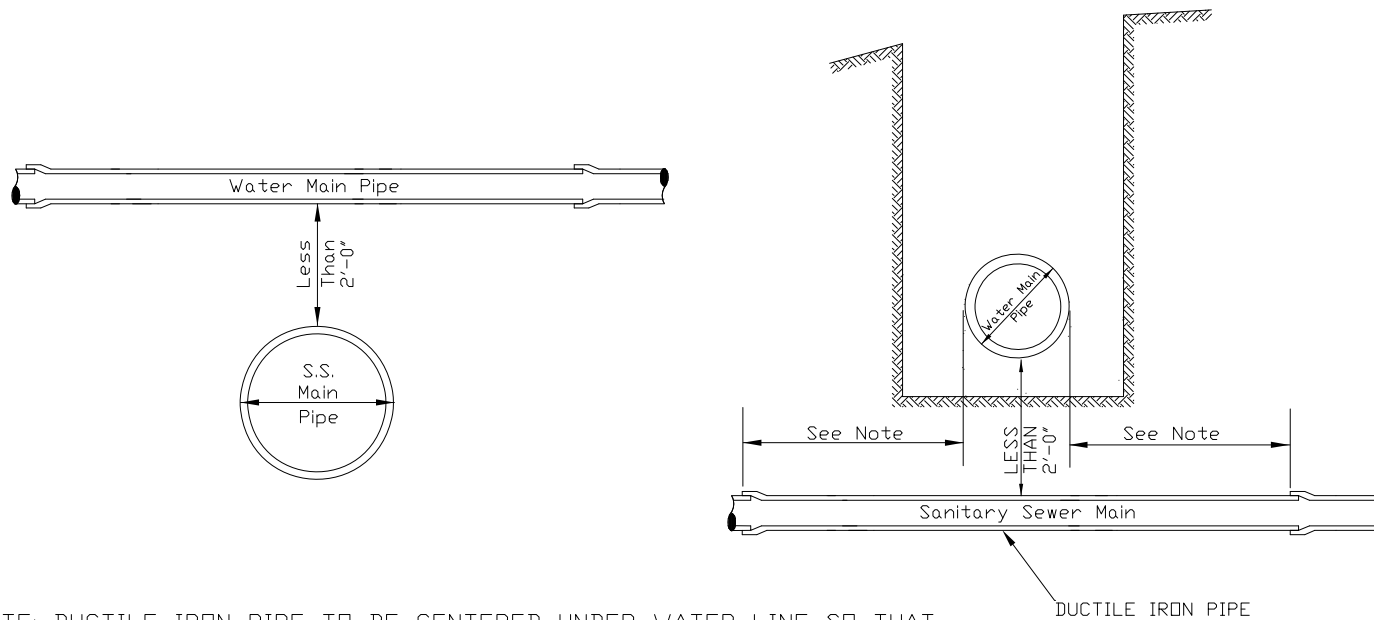
PREPARED BY: CHISHOLM TRAIL CONSULTING, LLC 2124 SCOTT LANE DUNCAN, OKLAHOMA 73533 CA 0K7771 RANDALL SCOTT VAUGHN, P.E. 15194		CITY OF CHICKASHA, OKLAHOMA STANDARD DRAWINGS	
APPROVED AND ADOPTED BY THE CITY COUNCIL THIS ____ DAY OF ____ 202__		MAYOR _____ ATTEST: CITY CLERK _____	
DIGITALLY SIGNED 12/1/2022		WATER MAIN DETAILS DO NOT SCALE	



NOTE: CONCRETE ENCASEMENT IS TO EXTEND 4-INCHES PAST THE NEAREST JOINT AT OR BEYOND THE 10-FOOT MINIMUM SHOWN. REINFORCEMENT STEEL TO HAVE TWO INCHES OF CONCRETE COVER. THE ENGINEER MAY APPROVE OTHER MEANS OF STRUCTURAL SUPPORT OF THE SANITARY SEWER MAIN.

*NOTE: IF CLEARANCE BETWEEN WATER MAIN AND SS MAIN IS LESS THAN 2 FEET DUCTILE IRON PIPE TO BE CENTERED OVER WATER LINE SO THAT JOINTS ARE PLACED EQUAL DISTANCE FROM CROSSING AS SHOWN.

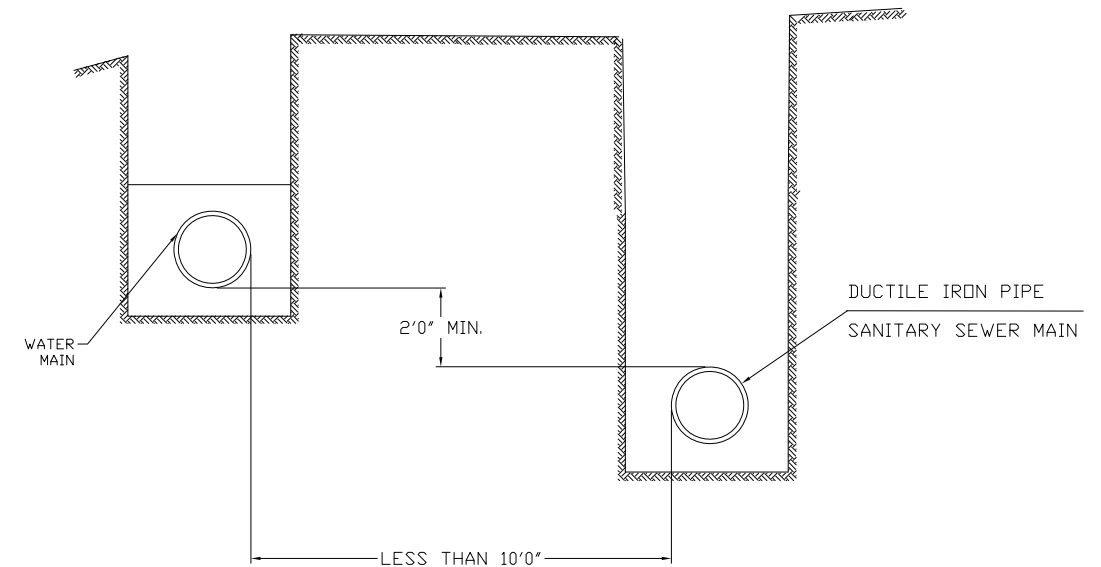
TYPICAL SECTIONS FOR WATER MAIN BELOW SEWER MAIN



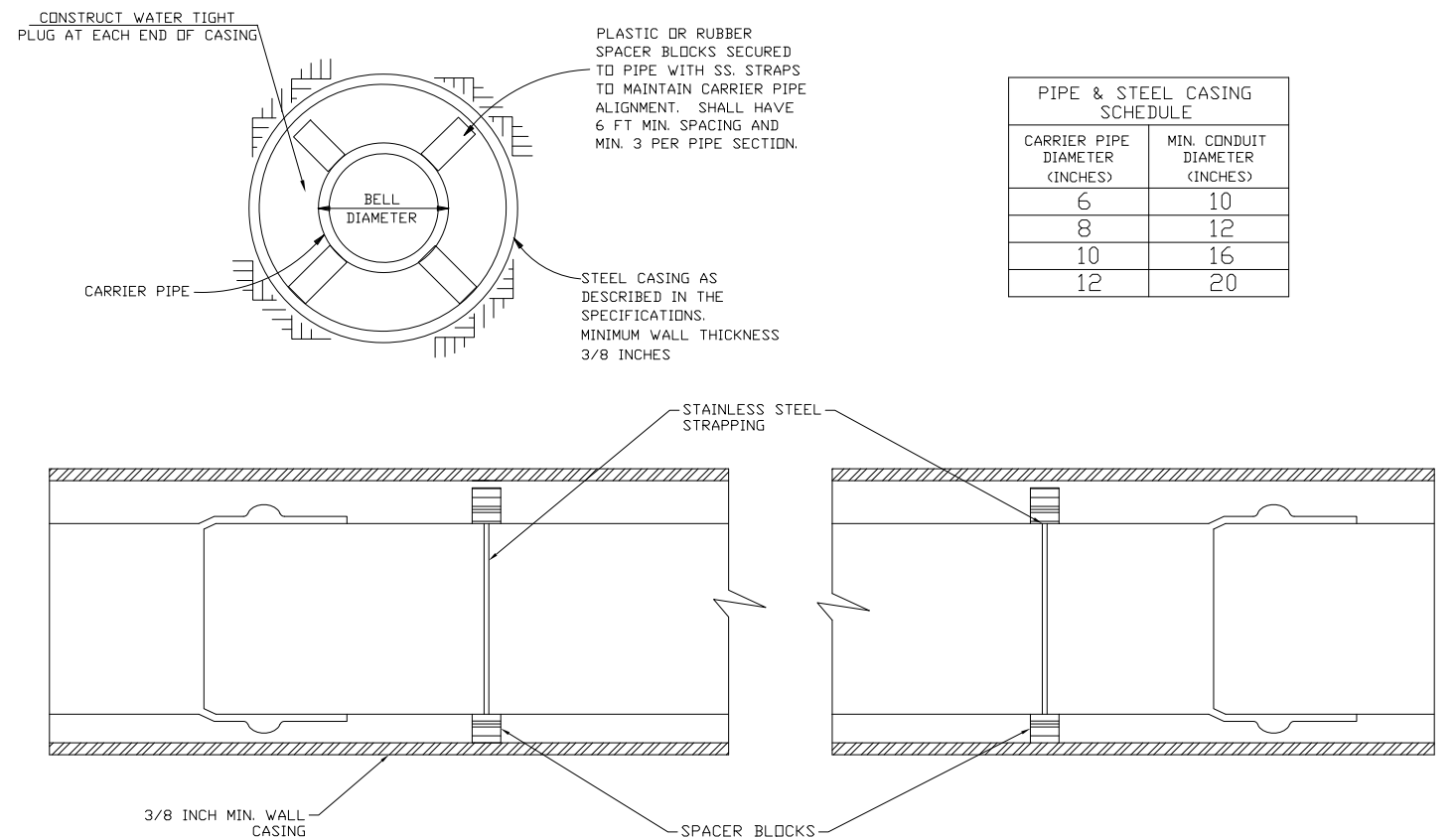
NOTE: DUCTILE IRON PIPE TO BE CENTERED UNDER WATER LINE SO THAT JOINTS ARE PLACED EQUAL DISTANCE FROM CROSSING AS SHOWN.

TYPICAL SECTIONS FOR WATER MAIN LESS THAN 2-FOOT ABOVE SEWER MAIN

WATER LINE AND SEWER CROSSINGS



WATER AND SEWER LINES WITH HORIZONTAL CLEARANCE OF LESS THAN TEN FEET



BORING AND CASING

PIPE & STEEL CASING SCHEDULE	
CARRIER PIPE DIAMETER (INCHES)	MIN. CONDUIT DIAMETER (INCHES)
6	10
8	12
10	16
12	20

PREPARED BY:
CHISHOLM TRAIL CONSULTING, LLC
2124 SCOTT LANE
DUNCAN, OKLAHOMA 73533
CA 0K7771
RANDALL SCOTT VAUGHN, P.E. 15194

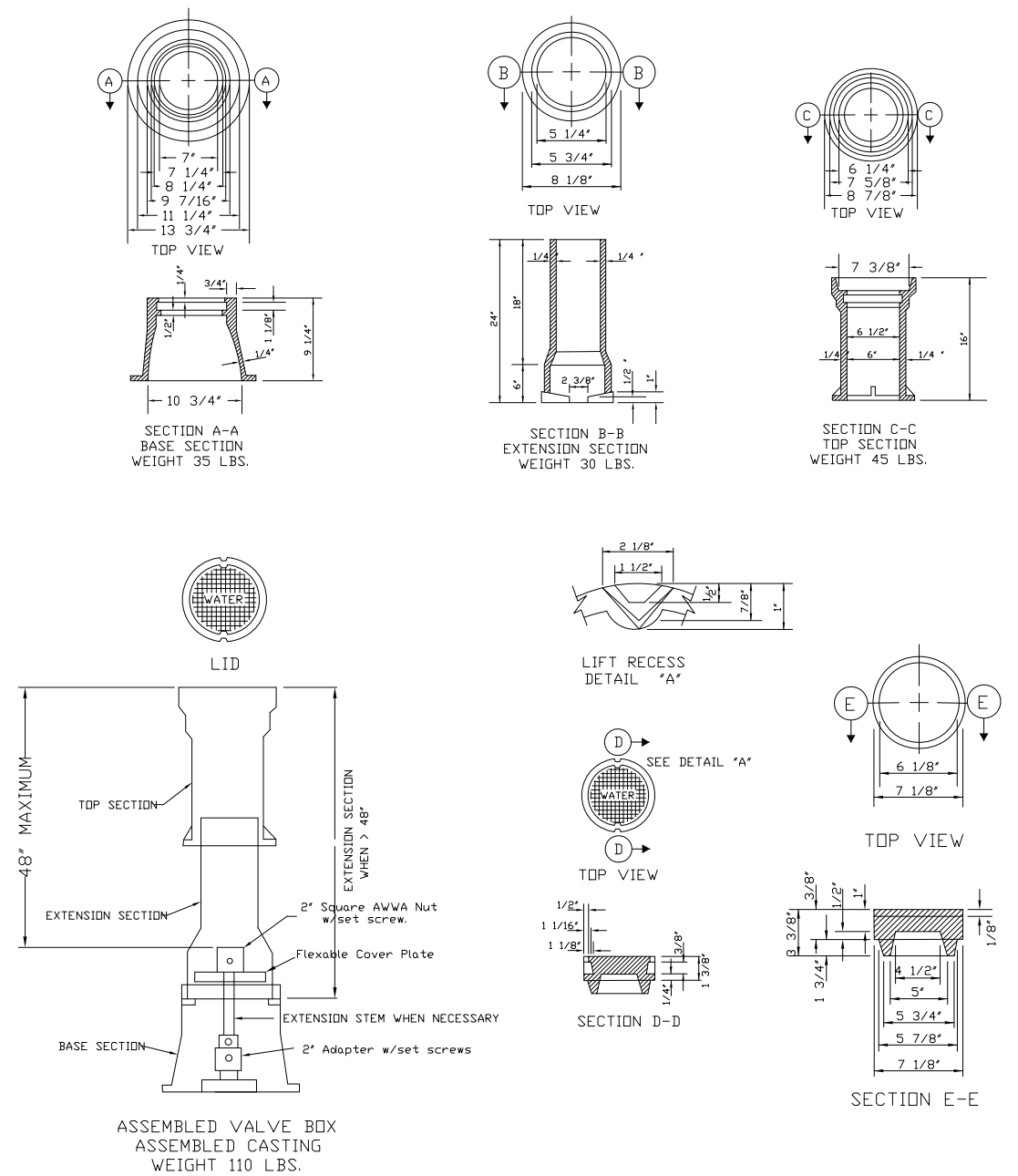
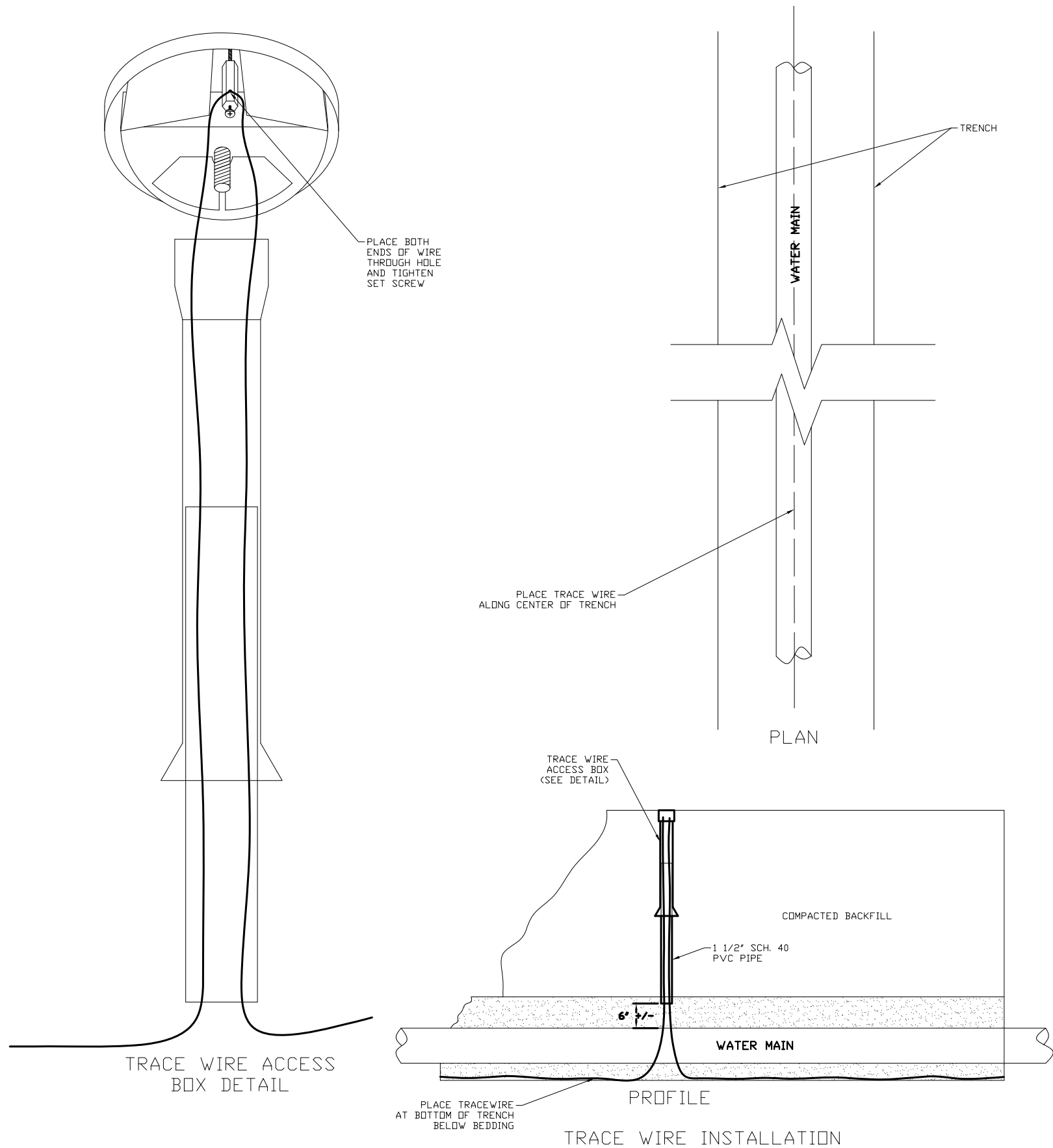
CITY OF CHICKASHA, OKLAHOMA
STANDARD DRAWINGS

APPROVED AND ADOPTED BY THE CITY COUNCIL
THIS ____ DAY OF ____ 202__.

MAYOR _____ ATTEST: CITY CLERK _____

WATER MAIN DETAILS
DO NOT SCALE

DIGITALLY SIGNED 12/1/2022



NOTES:

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CAST IRON VALVE BOX AND LID

PREPARED BY: CHISHOLM TRAIL CONSULTING, LLC 2124 SCOTT LANE DUNCAN, OKLAHOMA 73533 CA 0K7771 RANDALL SCOTT VAUGHN, P.E. 15194	CITY OF CHICKASHA, OKLAHOMA STANDARD DRAWINGS APPROVED AND ADOPTED BY THE CITY COUNCIL THIS ____ DAY OF ____ 202___.
DIGITALLY SIGNED 	MAYOR _____ ATTEST: CITY CLERK _____ WATER MAIN DETAILS DO NOT SCALE

CHICKASHA



**Meeting Type: Special Council Meeting and Work
Session 10-28-2024**

Meeting Date: 10/28/2024

Department: City Clerk

Agenda Item No. 4.a.

AGENDA ITEM: Discussion, consideration, and possible action to enter into Executive Session pursuant to 25 O.S. Section 307(B)(1) to discuss the hiring of a City Manager (Interview of candidate Jim Crosby).

I. BACKGROUND/DESCRIPTION:

II. RECOMMENDED ACTION:

III. FISCAL INFORMATION -

IV. FUND INFORMATION:

Dept. Director: NAME, TITLE	Fund	Account	Amount
	(To)		
	FUND	ACCOUNT	AMOUNT
Meeting Date: October 28, 2024	(From)		

V. ATTACHMENTS:

CHICKASHA

**Meeting Type: Special Council Meeting and Work
Session 10-28-2024**

Meeting Date: 10/28/2024

Department: City Clerk

Agenda Item No. 4.b.

AGENDA ITEM: Discussion, consideration, and possible action to reconvene open session and take action on any matter discussed in the Executive Session.

I. BACKGROUND/DESCRIPTION:

II. RECOMMENDED ACTION:

III. FISCAL INFORMATION -

IV. FUND INFORMATION:

Dept. Director: NAME, TITLE	Fund	Account	Amount
	(To)		
	FUND	ACCOUNT	AMOUNT
Meeting Date: October 28, 2024	(From)		

V. ATTACHMENTS: