CITY OF

SEDALIA, MISSOURI

NOTICE TO CONTRACTORS

PROPOSAL, CONTRACT, BOND, AND SPECIFICATIONS

FOR

CAMBRIDGE DRIVE WATER MAIN IMPROVEMENT

CITY PROJECT NO. 2022-020

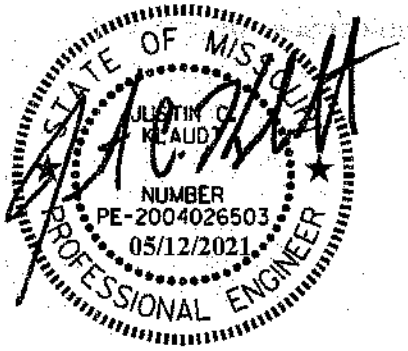
February 16, 2022

BIDDER: B & P Excavating LLC

ADDRESS: 23670 Sacajawea Rd Sedalia MO

TELEPHONE NUMBER: 660-827-1385

DATE: 3-09-2022



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INSTRUCTIONS TO BIDDERS

1. PROPOSALS

Sealed Bids will be received by the City of Sedalia at the Office of the City Clerk in the Municipal Building, 200 S. Osage Ave., Sedalia, MO, 65301 until 2:00 P.M. Wednesday, March 9, 2022, for the **CAMBRIDGE DRIVE WATER MAIN IMPROVEMENT** project, and will be publicly opened and read aloud in the second floor Conference Room. All Bidders are required to submit their proposal on the forms provided and the entire Project Manual must be bound and submitted. Three (3) originals of all signed documents and forms shall be included with the submission.

2. DESCRIPTION OF WORK

The work consists of the installment of approximately 30 feet of encased 10" water main directionally drilled and approximately 34 feet of 10" water main installed with open excavation, erosion control, and all incidental and/or related work as necessary to provide a complete project.

3. PLANS AND SPECIFICATION

Electronic Copies of Plans, Specifications, and Contract Documents for bidding purposes may be obtained from Jeremy Stone at jestone@cityofsedalia.com. A twenty-dollar ($20.00) non-refundable deposit is required. Include a copy of your check in the email.

4. PROPOSAL GUARANTEE

A Bidder's Bond for not less than five percent (5%) of the total amount of the bid must be submitted with the bid as a guarantee that the bidder will enter into a contract with the City if awarded the contract by the Sedalia City Council.

5. REJECTION OF BIDS

The City of Sedalia, Missouri reserves the right to reject any or all bids and waive defects in bids. No bid may be withdrawn for a period of sixty (60) days after the time set for opening of bids.

6. EXAMINATION OF PROJECT SITE

It is each bidder's responsibility to familiarize themselves with existing conditions at the project site. All bidders must examine for themselves the location and the nature of the proposed work and are requested to be present at the time the bids are opened.

7. QUALIFICATION OF BIDDERS

Before the City enters into a contract on the basis of any bid presented, the bidder must satisfy the Mayor and the City Council of the said City as to his competence to construct such work.

8. COMPLIANCE WITH THE CONSTRUCTION SAFETY TRAINING ACT

The Contractor shall perform all necessary duties to ensure compliance with Section 292.675 RSMo, known as the Construction Safety Training Act, including the Occupational Safety and Health Administration (OSHA) 10-hour training required for all on-site employees of the Contractor and any of his subcontractors.

The City of Sedalia requires all personnel on work site be OSHA 10 certified.

9. BONDS

The successful bidder will be required to give a performance-payment bond equal to one hundred percent (100%) of the amount of the bid and **a one (1) year maintenance guarantee**. The foregoing bonds to be with a surety and guaranty company authorized to do business in the State of Missouri and acceptable to the City as surety. The required bonds and insurance certificates shall be delivered to the City Clerk within 10 days after receipt of the Notice of Award Contract.

10. CITY OF SEDALIA CONTRACTOR'S LICENSE

The successful bidder will be required to obtain a City of Sedalia Contractor's License from the office of the City Collector.

11. PAYMENT

Monthly payments will be made to the Contractor on this project for completed work in place based upon unit prices in this proposal minus 5% for retainage. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens, and evidence that the materials and equipment are covered by appropriate property insurance, a warehouse bond, or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

12. BOUND COPY OF CONTRACT DOCUMENTS

None of the instructions to bidders, bonds, proposal, contract, or specifications shall be detached from the bound copy before filing the bid with the City Clerk.

13. SUB-CONTRACTORS

The prime contractor must perform with his own organization contract work amounting to not less than 30% of the total original contract price. No second-tier sub-contracting will be permitted.

14. AS-BUILT DRAWINGS

The Contractor shall provide a set of marked-up or "red-line" plans to the City at project completion for preparation of as-built drawings. These plans shall clearly indicate all constructed deviations from the design plans, including sewer flow line elevations, relocation of utilities, unknown utilities or other structures, etc. The marked-up plans shall be delivered prior to request for final payment.

15. SALES TAX EXEMPTION

Missouri State Sales Tax Law, Section 14.062, paragraph 2, states in part, "When any exempt entity contracts for the purpose of constructing, repairing or remodeling facilities and purchases of tangible personal property and materials to be incorporated into or consumed in the construction of the project are to be made on a tax-exempt basis." THE CONTRACTOR SHALL INCLUDE THE PROVISIONS OF THIS EXEMPTION STATUS IN THEIR BID.

The City will furnish to the Contractor an exemption certificate authorizing such purchases for the construction, repair or remodeling project. The Contractor shall furnish the exemption certificate to all subcontractors and any contractor purchasing materials shall present such certificate to all material suppliers as authorization to purchase, on behalf to the City, all tangible personal property, and materials to be incorporated into or consumed in the construction of that project and no other on a tax-exempt basis. Such suppliers shall execute to the purchasing contractor invoices bearing the name of the exempt entity and the project identification number. The project exemption certificate does not allow the purchase of any construction machinery, equipment, or tools used in construction, repairing or remodeling facilities for the City. All invoices for all personal property and materials purchased under a project exemption certificate shall be retained by the purchasing contractor for a period of five years and shall be subject to audit by the director of revenue.

Any excess resalable tangible personal property or materials which were purchased for the project by a contractor under a project exemption certificate but which were not incorporated into or consumed in the construction of the project shall either be returned to the supplier for credit or the appropriate sales or use tax on such excess property or materials shall be reported on a return and paid by such contractor not later than the due date of the contractor Missouri sales or use tax return following the month in which it was determined that the materials were not to be used in the project.

SPECIAL CONDITIONS

1. The Contractor shall develop a construction schedule and detailed plan that describes the sequencing of demolition and construction. The schedule shall be updated weekly to reflect progress and/or changes. The Contractor is expected to pursue his/her work keeping the best interests of the general public in mind and shall advise those residents and/or businesses that might be directly affected by this project of any interruption in service, ingress, egress, etc.; 24 hours advanced notice shall be given for scheduled interruptions. The Contractor shall notify police department, sheriff's office, fire department, ambulance service and school district 48 hours prior to closing any roads.

2. All streets, sidewalks and other public areas shall be kept clear of mud, gravel, and other construction materials and debris during construction.

3. The Contractor shall be responsible for developing a traffic control plan for this project and for installation and maintenance of all traffic control devices. Traffic control measures shall meet the requirements of the Manual on Uniform Traffic Control Devices, 2009, and current revisions.

4. All manufactured goods or commodities used or supplied in the performance of this contract shall be manufactured or produced in the United States per Section 34.353 RSMo.

DOCUMENTS TO BE EXECUTED
AND SUBMITTED WITH PROPOSAL

PROPOSAL

TO THE CITY OF SEDALIA, MISSOURI:
Pursuant to and in compliance with the Notice to Contractors and having examined the plans and specifications with related documents and the site(s) of the proposed work, the undersigned bidder proposes and agrees, if this proposal is accepted, to furnish all labor, materials, tools, supplies, equipment and supervision and to do all other work necessary for the **CAMBRIDGE DRIVE WATER MAIN IMPROVEMENT** project, as noted in these contract documents for the following price(s):

BASE BID

Item No.	Description	UNIT	Estimated Quantity	Unit Cost	Amount
1	Mobilization	LS	1	$2,000.00	$2,000.00
2	10" C900 PVC Waterline w/Excavation & Backfill	LF	34	$122.31	$4,158.56
3	10" C900 PVC Waterline Directionally Bored	LF	30	$269.65	$8,089.59
4	16" Steel Casing Pipe	LF	30	$113.67	$3,410.01
5	10" Cap	EA	1	$759.40	$759.40
6	Install 10" Gate Valve (Valve provided by City)	EA	1	$781.92	$781.92
7	Thrust Collar	EA	2	$750	$1500.00
8	Traffic Control	LS	1	$500.00	$500.00
9	Erosion Control	LS	1	$500.00	$500.00
10	Seeding & Mulching	LS	1	$500.00	$500.00

TOTAL AMOUNT OF BASE BID: $ 22,499.48

B&P Excavating LLC will not be responsible for the relocation of existing electrical primary if it interferes with the connection to existing valve.

Bidder acknowledges receipt of the following addenda, which has been considered in the preparation of this bid:

Addendum No. 1 Received ~~Dated~~: 3-04-2022
Addendum No. _____ Dated: _____
Addendum No. _____ Dated: _____

The undersigned agrees, if this proposal is accepted, to complete the work within **a period of 14 calendar days** from the date of the Notice to Proceed.

NAME OF BIDDER: B&P Excavating
BY: Mike Brown
TITLE: OWNER
ADDRESS: 23670 Sacajawea Rd Sedalia mo
DATE: 3/9/22

ANTI-COLLUSION STATEMENT

STATE OF MISSOURI
CITY OF SEDALIA

Mike Brown

_____ being first duly sworn, deposes and says that he is

Owner

Title of Person Signing

of B & P Excavating

23670 Sacajawea Road Sedalia, MO 65301

Name of Bidder

that all statements made and facts set out in the proposal for the above project are true and correct; and the bidder (The person, firm, association, or corporation making said bid) has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with said bid or any contract which may result from its acceptance.

Affiant further certifies the bidder is not financially interested ~~in~~, or financially affiliated with, any other bidder for the above project.

BY Mike Brown

BY _____

BY _____

SWORN to before me this 9th day of March 2022.

Murica L Howard

Notary Public

My Commission Expires 4-2-2024

MURICA L. HOWARD
Notary Public, Notary Seal
State of Missouri
Pettis County
Commission # 20143365
My Commission Expires 04-02-2024

BID BOND

AIA® Document A310™ – 2010

Bid Bond

CONTRACTOR:
(Name, legal status and address)
B & P Excavating, LLC
23670 Sacajawea Road
Sedalia, MO 65301

SURETY:
(Name, legal status and principal place of business)
The Ohio Casualty Insurance Company
136 N Third Street
Hamilton, OH 45025

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

OWNER:
(Name, legal status and address)
City of Sedalia
200 S. Osage Avenue
Sedalia, MO 65301

BOND AMOUNT:
Five Percent of the Amount Bid (5%)

PROJECT:
(Name, location or address, and Project number, if any)
Cambridge Drive Water Line Extension
Cambridge Drive
Sedalia, MO 65301

Project Number, if any: 2022-020

The Contractor and Surety are bound to the Owner in the amount set forth above, for the payment of which the Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein. The conditions of this Bond are such that if the Owner accepts the bid of the Contractor within the time specified in the bid documents, or within such time period as may be agreed to by the Owner and Contractor, and the Contractor either (1) enters into a contract with the Owner in accordance with the terms of such bid, and gives such bond or bonds as may be specified in the bidding or Contract Documents, with a surety admitted in the jurisdiction of the Project and otherwise acceptable to the Owner, for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof; or (2) pays to the Owner the difference, not to exceed the amount of this Bond, between the amount specified in said bid and such larger amount for which the Owner may in good faith contract with another party to perform the work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect. The Surety hereby waives any notice of an agreement between the Owner and Contractor to extend the time in which the Owner may accept the bid. Waiver of notice by the Surety shall not apply to any extension exceeding sixty (60) days in the aggregate beyond the time for acceptance of bids specified in the bid documents, and the Owner and Contractor shall obtain the Surety's consent for an extension beyond sixty (60) days.

If this Bond is issued in connection with a subcontractor's bid to a Contractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

When this Bond has been furnished to comply with a statutory or other legal requirement in the location of the Project, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

Signed and sealed this 4th day of March, 2022

(Witness)	B & P Excavating, LLC *(Principal)* *(Seal)*
	(Title)
(Witness)	The Ohio Casualty Insurance Company *(Surety)* *(Seal)*
	(Title) Nicole M. Johnson, Attorney-In-Fact

Init.
/

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

Certificate No: 8206831-984427

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That The Ohio Casualty Insurance Company is a corporation duly organized under the laws of the State of New Hampshire, that Liberty Mutual Insurance Company is a corporation duly organized under the laws of the State of Massachusetts, and West American Insurance Company is a corporation duly organized under the laws of the State of Indiana (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Eric Dedovesh; Nathan Paddock; Nicole M. Johnson; Rodney W. Paddock

all of the city of Lees Summit state of MO each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 18th day of November, 2021.

Liberty Mutual Insurance Company
The Ohio Casualty Insurance Company
West American Insurance Company

By: _____
David M. Carey, Assistant Secretary

State of PENNSYLVANIA
County of MONTGOMERY ss

On this 18th day of November, 2021 before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of Liberty Mutual Insurance Company, The Ohio Casualty Company, and West American Insurance Company, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at King of Prussia, Pennsylvania, on the day and year first above written.

Commonwealth of Pennsylvania - Notary Seal
Teresa Pastella, Notary Public
Montgomery County
My commission expires March 28, 2025
Commission number 1126044
Member, Pennsylvania Association of Notaries

By: _____
Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-laws and Authorizations of The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company which resolutions are now in full force and effect reading as follows:

ARTICLE IV – OFFICERS: Section 12. Power of Attorney.
Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and execution of any such instruments and to attach thereto the seal of the Corporation. When so executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

ARTICLE XIII – Execution of Contracts: Section 5. Surety Bonds and Undertakings.
Any officer of the Company authorized for that purpose in writing by the chairman or the president, and subject to such limitations as the chairman or the president may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Company by their signature and execution of any such instruments and to attach thereto the seal of the Company. When so executed such instruments shall be as binding as if signed by the president and attested by the secretary.

Certificate of Designation – The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization – By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Renee C. Llewellyn, the undersigned, Assistant Secretary, The Ohio Casualty Insurance Company, Liberty Mutual Insurance Company, and West American Insurance Company do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 4th day of March, 2022.

By: _____
Renee C. Llewellyn, Assistant Secretary

Not valid for mortgage, note, loan, letter of credit, currency rate, interest rate or residual value guarantees.

For bond and/or Power of Attorney (POA) verification inquiries, please call 610-832-8240 or email HOSUR@libertymutual.com.

DOCUMENTS TO BE EXECUTED
AFTER AWARD OF CONTRACT

PROJECT EXEMPTION CERTIFICATE FOR EXEMPT ENTITY CONSTRUCTION

NAME OF EXEMPT ENTITY: CITY OF SEDALIA, MISSOURI
ADDRESS: 200 S. OSAGE
CITY: SEDALIA STATE: MISSOURI ZIP: 65301

TAX IDENTIFICATION NUMBER: 12493333

PROJECT IDENTIFICATION NUMBER: 2022-020

PROJECT LOCATION AND A BRIEF DESCRIPTION: **CAMBRIDGE DRIVE WATER MAIN IMPROVEMENT**.

CONTRACT DATE: _____

ESTIMATED PROJECT COMPLETION DATE: _____

CERTIFICATE EXPIRATION DATE: _____

The work consists of the installment of approximately 30 feet of encased 10" water main directionally drilled and approximately 34 feet of 10" water main installed with open excavation, erosion control, and all incidental and/or related work as necessary to provide a complete project.

Contractors are required to provide a copy of the project exemption certificate with the exempt entity's exemption letter. This project exemption certificate does not allow contractors to purchase machinery, equipment, or tools, used in fulfilling this contract, tax-exempt. Suppliers accepting this project exemption certificate are required to render to the contractor invoices bearing the name of the exempt entity and the project identification number. An exempt entity that fails to revise the expiration date on this certificate as necessary to complete any work required by the contract will be liable for any sales tax determined due as a result of an audit of the Contractor.

SIGNATURE OF AUTHORIZED AGENT: _____
Kelvin Shaw, City Administrator

SEAL

ATTEST: _____
City Clerk

PERFORMANCE-PAYMENT BOND

THE STATE OF MISSOURI
COUNTY OF PETTIS

BOND NO.: _____

KNOW ALL MEN BY THESE PRESENTS: That we (1) _____ (2) _____ of _____ hereinafter called Principal and (3) _____ of _____, State of _____, hereinafter called the Surety are held and firmly bound unto the City of Sedalia, Missouri, hereinafter called the City, and unto all persons, firms, and corporations who may furnish materials for, or perform labor upon the building or improvements hereinafter referred to in the penal sum of ($_____) in lawful money of the United States, to be paid in Pettis County, Missouri, for the payment of which sum will and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal enters into a certain agreement with the City of Sedalia, Missouri, the City, dated the **_____ day of _____, 2022** a copy of which is hereto attached and made a part here for the performance of work of the **CAMBRIDGE DRIVE WATER MAIN IMPROVEMENT**, Herein sometimes called the "Project".

NOW, THEREFORE, if the said Principal shall well and truly perform and complete said project in strict accordance with said Agreement, Information for Bidders, Proposal, Plans and Specifications and related documents, shall pay as they become due all just claims for work or labor performed and materials furnished in connection with said Agreement including all amounts due for materials, lubricants, oil, gasoline, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such work and all insurance premiums, both compensation and all other kinds of insurance on said work, and for all labor, performed in such work whether by subcontractors or otherwise, and shall defend, indemnify and save harmless said owner against any and all liens, encumbrances, damages, claims, demands, expenses, costs, and charges of every kind, including patent infringement claims except as otherwise provided in said specifications and other contract documents arising out of or in relation to the performance of said work and the provisions of said Agreement, including the general guarantee for the specified period of time following final acceptance of the work, then these presents shall be void; otherwise they shall remain in full force and effect. This obligation is made for the use of said City and also for the use and benefit of all persons who may perform any work or labor or furnish any material in the execution of said Agreement and may be sued on thereby in the name of said City. The Contractor's bond shall include such provisions as will guarantee the faithful performance of the prevailing hourly wage clause as provided by the Contract.

PROVIDED FURTHER, that if any legal action be filed upon this bond, venue shall lie in Pettis County, State of Missouri and that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the work to be performed hereunder or the specifications accompanying the same shall in any wise affect its obligation on this bond, and it does hereby waive notice of any such change extension of time, alteration or addition to the terms of the contract or to the work or to the specifications.

PROVIDED FURTHER, that no final settlement between the City and the Contractor shall abridge the right of any beneficiary hereunder whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in four counterparts, each one of which shall be deemed an original, **this the _____day of _____, 2022**.

ATTEST:

_____
Principal Secretary

_____
Principal

_____
Witness as to Principal

By: _____

_____
(Address)

_____
(Address)

ATTEST:

_____
Surety

_____
Surety Secretary

By: _____
Attorney-in-fact

SEAL

_____
Address

_____
Witness as to Surety

_____
Address

(1) Correct Name of Contractor
(2) A Corporation, a Partnership, or an Individual, as case may be
(3) Correct name of Surety
If Contractor is Partnership, all partners should execute bond.

MAINTENANCE GUARANTEE

THE STATE OF MISSOURI
COUNTY OF PETTIS

BOND NO. _____

THIS CONTRACT, made and entered into this _____ day of _____, 2022 by and between _____ party of the first part, hereinafter called the **Contractor** and _____ party of the second part, hereinafter called the **Surety** and the City of Sedalia, Missouri, party of the third part, hereinafter called the **City**.

WHEREAS, the above **Contractor** has entered into a contract for the **CAMBRIDGE DRIVE WATER MAIN IMPROVEMENT**., as described in the Contract Documents, Specifications, and Plans:

NOW THEREFORE, the said **Contractor** does hereby agree and bind himself, his heirs, executors and assigns to furnish all material, labor, equipment and do all work necessary to perform the work mentioned above, in accordance with the Contract Documents, Specifications and Plans, a copy of which is hereto attached and made a part hereof, and to maintain the same in a state of perfect repair **for the period of one year** from and after its completion and the final acceptance of the same by the party of the third part, less allowance for normal wear and tear, without further compensation than that provided for in the Contract for the first cost of said work.

NOW THEREFORE ALSO, if for whatever reason the **Contractor** should fail to perform as agreed above, the said **Surety** does hereby agree and bind himself, his heirs, executors and assigns to perform such necessary duties and/or to compensate the **City** for its performance to provide for such work as would have been required of the **Contractor,** without further compensation.

IN TESTIMONY WHEREOF, the said parties to this contract have hereunto set their hand and seal on this _____ day of _____, 2022.

_____ (Contractor)

By: _____

_____ (Surety)

By: _____

:

City of Sedalia, Missouri

By: _____

CONTRACT AGREEMENT

STATE OF MISSOURI
COUNTY OF PETTIS

THIS AGREEMENT AND INDENTURE MADE AND ENTERED INTO THIS, the _____ **day of** _____, **2022** by and between the CITY OF SEDALIA, MISSOURI.

Party of the first part, termed in this agreement and the Contract Documents as the "CITY", and _____ Party of the second part, termed in this agreement and the Contract Documents as the "CONTRACTOR".

WITNESSETH:

THAT, WHEREAS, the City has heretofore caused to be prepared certain contract documents for furnishing material, personnel and performing work therein fully described, and the Contractor did, on **the_____day of_____, 2022** file with the City a copy of said contract documents together with his offer and proposal to furnish said material and perform said work at the terms therein fully stated and set forth; and,

WHEREAS, the said contract documents accurately and fully described the terms and conditions upon which the contractor is willing to furnish the materials, personnel and perform the work called for by the said contract documents and in the manner and time of furnishing and performing same,

IT IS, THEREFORE, AGREED:

1. That a copy of said contract documents filed as aforesaid be attached hereto and that the same do in all particulars become the agreement and contract between the parties hereto in all matters and things set forth therein and described; and further, that both parties hereby accept and agree to the terms and conditions of said contract documents so filed for the **CAMBRIDGE DRIVE WATER MAIN IMPROVEMENT**,

2. The Contract Documents hereto annexed are made a part of this agreement and contract as fully and absolutely as if herein set out.

3. That the wages paid under this contract shall be not less than the prevailing rate of wages as determined by the Missouri State Division of Labor Standards.

4. This contract is executed in four (4) copies.

IN WITNESS WHEREOF, the parties hereto have executed this contract on the day and year in this agreement first above written.

ATTEST:

_____
City Clerk

CITY OF SEDALIA, MISSOURI
(Party of the first part)

BY: _____
Kelvin Shaw
City Administrator

SEAL

(If a corporation)

ATTEST: _____
Secretary

SIGNATURE OF CONTRACTOR
(Party of the second part)

CONTRACTOR:

(CORPORATE SEAL)

BY: _____

(Name & Title)

(If an individual or partnership)

CONTRACTOR: _____

BY: _____
(Name & Title)

STATE OF _____

COUNTY OF _____

On this _____ day of _____, 2022 before me personally appeared _____to me known to be the person described in and who executed the foregoing instrument and acknowledged that he/she executed the same as his/her free act and deed.

In Testimony Whereof, I have hereunto set my hand and affixed my official seal at my office in _____, the day and year first above written.

_____
Notary Public

My Commission Expires:

_____

AFFIDAVIT

COMPLIANCE WITH THE WORK AUTHORIZATION LAW
(as required by Section 285.530, Revised Statutes of Missouri)

As used in this Affidavit, the following terms shall have the following meanings:

EMPLOYEE:

Any person performing work or service of any kind or character for hire within the State of Missouri.

FEDERAL WORK AUTHORIZATION PROGRAM:

Any of the electronic verification of work authorization programs operated by the United States Department of Homeland Security or an equivalent federal work authorization program operated by the United States Department of Homeland Security to verify information of newly hired employee, under the Immigration Reform and Control Act of 1986 (IRCA), P.L. 99-603.

KNOWINGLY:

A person acts knowingly or with knowledge,

(a) with respect to the person's conduct or to attendant circumstances when the person is aware of the nature of the person's conduct or that those circumstances exist; or

(b) with respect to a result of the person's conduct when the person is aware that the person's conduct is practically certain to cause that result.

UNAUTHORIZED ALIEN:

An alien who does not have the legal right or authorization under federal law to work in the United States, as defined in 8 U.S.C. 1324a(h)(3).

Before me, the undersigned Notary Public, in and for the County of _____, State of _____, personally came and appeared _____
(Name)

_____, of the _____,
(Position) (Name of the Company)

(a corporation) (a partnership) (a proprietorship) and after being duly sworn did depose and say that all provisions and requirements set out in Chapter 285.530 (2) Missouri Revised Statutes, have been fully satisfied and there has been no exception to the full and complete compliance with said provisions and requirements.

Contractor is enrolled in and participates in a federal work authorization program with respect to the employees working in connection with the following services contracted between Contractor and _____.

Contractor does not knowingly employ any person who is an unauthorized alien in connection with the contracted services set forth above.

Attached hereto is documentation affirming Contractor's enrollment and participation in a federal work authorization program with respect to the employees working in connection with the contracted services.

CAMBRIDGE DRIVE WATER MAIN IMPROVEMENT located at in Sedalia, Pettis County, Missouri, and completed on the _____ day of _____, 2022.

_____
(Signature)

Subscribed and sworn to me this _____ day of _____, 2022.

My Commission expires: _____

_____
Notary Public

PLEASE NOTE:
Acceptable enrollment and participation documentation consists of the following 2 pages of the E-Verify Memorandum of Understanding:

(1) A valid, completed copy of the first page identifying the Contractor; and
(2) A valid copy of the signature page completed and signed by the Contractor, the Social Security Administration, and the Department of Homeland Security – Verification Division.

WAGE RATE STIPULATIONS: Prevailing Wage, If Applicable (Projects over $75,000): If the bid submitted for this project is over $75,000, notice is hereby given:

A. The BID, CONTRACT, and BONDS shall be based upon the required payment by the Contractor and his subcontractors of not less than the prevailing hourly rate of wages, including the prevailing rate for legal holidays and overtime work, for each craft or type of workman required to execute the contract, as determined now or hereafter by the Missouri Division of Labor Standards on behalf of the Department of Labor and Industrial Relations.

B. The Contractor and each subcontractor shall comply with all requirements of the prevailing wage law of the State of Missouri, Sections 290.210 through 290.340 RSMo 1959, as amended 1987.

C. The Contractor and each subcontractor shall keep an accurate record showing the names and occupations of all workmen employed, together with actual wages paid to each workman. At all reasonable hours, such records shall be open to inspection by representatives of the City of Sedalia and the Missouri Division of Labor Standards.

D. The Contractor shall forfeit as a penalty to the City, ten dollars for each workman employed, for each calendar day, or portion thereof, such workman is paid less than the said stipulated rates for any work done under this contract, by him or any subcontractor under him.

E. A facsimile of Form PW 1000 of the Missouri Division of Labor Standards is included in the LABOR-RELATED REGULATIONS.

WAGE RATE DETERMINATIONS:

The State of Missouri wage rate determinations are published hereafter.

AFFIDAVIT

COMPLIANCE WITH THE PREVAILING WAGE LAW

Before me, the undersigned Notary Public, in and for the County of _____, State of _____, personally came and appeared _____ (Name)

_____ (Position), of the _____ (Name of the Company),

(a corporation) (a partnership) (a proprietorship) and after being duly sworn did depose and say that all provisions and requirements set out in Chapter 290, Section 290.210 through and including 290.340, Missouri Revised Statutes, pertaining to the payment of wages to workmen employed on public works projects have been fully satisfied and there has been no exception to the full and complete compliance with said provisions and requirements and with Wage Determination No. 27 issued by the Division of Labor Standards on the ***10th day of March, 2021***, in carrying out the contract and work in connection with

_____ (Name of Project) located at _____ (Name of Institution) in

_____ County, Missouri, and completed on the _____ day of _____, 2022.

_____
(Signature)

Subscribed and sworn to me this _____ day of _____, 2022.

My Commission expires: _____

_____
Notary Public

Missouri

Division of Labor Standards

WAGE AND HOUR SECTION

MICHAEL L. PARSON, Governor

Annual Wage Order No. 28

Section 080

PETTIS COUNTY

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by
Taylor Burks, Director
Division of Labor Standards

Filed With Secretary of State: **March 10, 2021**

Last Date Objections May Be Filed: **April 8, 2021**

Prepared by Missouri Department of Labor and Industrial Relations

OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Asbestos Worker	*$22.34
Boilermaker	*$22.34
Bricklayer	$51.26
Carpenter	$44.67
Lather	
Linoleum Layer	
Millwright	
Pile Driver	
Cement Mason	*$22.34
Plasterer	
Communications Technician	*$22.34
Electrician (Inside Wireman)	$65.70
Electrician Outside Lineman	*$22.34
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Elevator Constructor	*$22.34
Glazier	*$22.34
Ironworker	$64.85
Laborer	$37.59
General Laborer	
First Semi-Skilled	
Second Semi-Skilled	
Mason	*$22.34
Marble Mason	
Marble Finisher	
Terrazzo Worker	
Terrazzo Finisher	
Tile Setter	
Tile Finisher	
Operating Engineer	*$22.34
Group I	
Group II	
Group III	
Group III-A	
Group IV	
Group V	
Painter	$36.86
Plumber	$46.23
Pipe Fitter	
Roofer	$56.51
Sheet Metal Worker	$62.70
Sprinkler Fitter	$58.56
Truck Driver	*$22.34
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

*The Division of Labor Standards received less than 1,000 reportable hours for this occupational title. Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.

**The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title.

Heavy Construction Rates for
PETTIS County

Section 080

OCCUPATIONAL TITLE	**Prevailing Hourly Rate
Carpenter	$49.85
Millwright	
Pile Driver	
Electrician (Outside Lineman)	*$22.34
Lineman Operator	
Lineman - Tree Trimmer	
Groundman	
Groundman - Tree Trimmer	
Laborer	$40.71
General Laborer	
Skilled Laborer	
Operating Engineer	$53.56
Group I	
Group II	
Group III	
Group IV	
Truck Driver	*$22.34
Truck Control Service Driver	
Group I	
Group II	
Group III	
Group IV	

Use Heavy Construction Rates on Highway and Heavy construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(3).

Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).

If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet, use the rate for that occupational title as shown on the Building Construction Rate Sheet.

*The Division of Labor Standards received less than 1,000 reportable hours for this occupational title. Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.

**The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title.

OVERTIME
and
HOLIDAYS

OVERTIME

For all work performed on a Sunday or a holiday, not less than twice (2x) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work.

For all overtime work performed, not less than one and one-half (1½) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work or contractual obligation. For purposes of this subdivision, **"overtime work"** shall include work that exceeds ten hours in one day and work in excess of forty hours in one calendar week; and

A thirty-minute lunch period on each calendar day shall be allowed for each worker on a public works project, provided that such time shall not be considered as time worked.

HOLIDAYS

January first;
The last Monday in May;
July fourth;
The first Monday in September;
November eleventh;
The fourth Thursday in November; and
December twenty-fifth;

If any holiday falls on a Sunday, the following Monday shall be considered a holiday.

GENERAL CONDITIONS

C-1 CONTRACT DOCUMENTS

It is expressly understood and agreed that the Notice to Bidders, Instructions to Bidders, Proposal, Contract, Bond, Regulations of the Contract, Detailed Specifications, Plans and all Addenda thereto issued prior to the time of opening bids for the work, all of which are hereto attached, and other drawings, specifications and engineering data which may be furnished by the Contractor and approved by the City, together with such additional drawings which may be furnished by the Engineer from time to time as are necessary to make clear, and to define in and all component parts to the agreement governing the work to be done and the materials and equipment to be furnished. All of these documents are hereby defined as the Contract Documents.

The Contract Documents are complimentary, and what is called for by anyone shall be as binding as if called for by all. The intention of the Documents is to include the furnishing of all materials, labor, tools, equipment and supplies necessary for constructing complete the work specified. Materials or work described in words which have a well known technical or trade meaning shall be held to refer to such recognized standards.

Four counterpart copies of the proposal, bond and contract agreement shall be prepared, each containing an exact copy of the Contractor's proposal as submitted, the bond properly executed and contract agreements signed by both parties thereto. These executed counterparts of the contract documents shall be filed with The City and the Contractor. The successful bidder shall prepare not less than four (4) conformed copies of the contract documents, after execution thereof, for distribution to, and use by, the City and the Contractor.

C-2 BOND

Coincident with the execution of the contract, the Contractor shall furnish a good and sufficient surety bond in the full amount of the contract sum, guaranteeing the faithful performance of all the covenants, stipulations and agreements of the contract, the payment of all bills and obligations arising from the execution of the contract, which bills or obligations might or will in any manner become a claim against the City and guaranteeing the work included in this Contract against faulty materials or poor workmanship. All provisions of the bond shall be complete and in full accordance with Statutory requirements. The contract shall be executed with the proper sureties through a company licensed and qualified to operate in the state and approved by the City. Bond shall be signed by an agent resident in the state and date of bond shall be the date of execution of the contract. If at any time during the continuance of the Contract the surety on the Contractor's bond becomes irresponsible, the City shall have the right to require additional and sufficient sureties which the contractor shall furnish to the satisfaction of the City within ten (10) days after notice to do so. In default thereof, the contract may be suspended, all payments or money due the Contractor withheld.

C-3 LICENSES

Before starting work on the project, the Contractor shall have a valid CITY OF SEDALIA CONTRACTOR'S LICENSE.

C-4 NOTICE TO UTILITIES AND THE CITY OF SEDALIA

The Contractor shall notify Missouri One Call (1-800-344-7843) before starting work on this project. The Contractor shall notify all utilities 2 days before starting excavation work so that the utilities can mark the location of their underground lines.

The Contractor shall notify the City of Sedalia Public Works Director before closing streets to traffic. The Public Works Director shall be notified by Thursday the week before any streets are planned to be closed.

C-5 BARRICADES

The Contractor shall barricade the project site and the streets or portions of the streets during construction of the improvements. If a street requires closing the Contractor shall place a "street closed" sign at the intersections one block in each direction. All traffic control devices shall conform to the Manual on Uniform Traffic Control Devices (MUTCD) Latest Edition and its most current revisions.

C-6 INSURANCE

A. GENERAL

1. Contractor shall purchase and maintain at his expense insurance of such types and in such amounts as are specified herein to protect Contractor and the interests of the City and others from claims which may arise out of or result from Contractor's operations by Contractor or by any subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be legally liable.

2. Such insurance shall cover claims for damages because of Bodily Injury or death to Contractor's employees including claims brought under:

a. Workmen's Compensation Laws
b. Disability Benefit Laws
c. Occupational sickness or disease laws
d. Other similar employee benefit laws

3. Such insurance shall also cover claims for damage because of Personal Injury, Bodily Injury, Sickness or Decease or Death of any person or persons other than Contractor's employees and claims from injury to or destruction of tangible property including loss of use thereof.

4. Contractor shall also purchase and maintain at his expense all property insurance, of such types and in such amounts as are specified herein to protect Contractor and

the interests of the City and others from loss arising from damage to the work and materials and equipment to be incorporated in the work.

5. Failure of Contractor to maintain proper insurance coverage shall not relieve him or any contractual responsibility or obligation.

6. If part of the work is to be subcontracted, Contractor shall either cover any and all subcontractors in his insurance policies or require each subcontractor not so covered to obtain insurance which will protect the sub-contractor against all applicable hazards or risks of loss designated herein.

7. Copies of the policies or certificates of insurance evidencing coverage on the forms or for the limits required shall be filed with the other contract documents. Such policies or certificates shall state that **thirty (30)** days written notice will be given to the City prior to any material change or cancellation of insurance coverage.

8. Any insured loss under the policies or property insurance is to be adjusted with the City and made payable to the City as trustee for the insured, as their interests may appear, subject to the requirements of any applicable mortgage and of paragraph A.10 hereof.

9. The City and Contractor waive all rights against each other for damages arising out of an insured loss under policies of property insurance. Contractor shall require similar waivers by subcontractors.

10. The City as trustee will have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within five days after the occurrence of loss to the City's exercise of this power, and if such objection be made, arbitrators shall be chosen. The City as trustee will, in that case, make settlement with the insurers in accordance with the directions of such arbitrators.

B. Forms of Coverage and Limits of Coverage Required:

1. Workmen's Compensation and Employer's Liability Insurance:

a. This insurance shall protect Contractor against any and all claims brought under the Workmen's Compensation Law for the state or states involved in the work. It shall also protect Contractor against claims for injury to, disease, or death of workmen engaged in the work which, for any reason, may not fall within the provisions of the Workmen's Compensation Act. This policy shall include "All States" endorsement.

b. Limits of coverage shall not be less than the following:

(1) Workmen's Compensation - Statutory

(2) Employer's Liability - $500,000 each person

2. Comprehensive Automobile Insurance:

a. Contractor shall carry Comprehensive Automobile Insurance covering all vehicles owned, hired, rented or non-owned, licensed or not licensed, used in the operations and work under this contract.

b. Liability limits shall be not less than the following:

B.I. and P.D. - $1,000,000 CSL

The City shall be named additional insured on this insurance in regard to all claims arising out of the operations and work under this contract.

3. Comprehensive General Liability Insurance:

a. This insurance, to be on comprehensive form, shall protect Contractor against any and all claims in connection with or resulting from Contractor's operations under the Contract Documents for injuries to or death of any person other than his employees, and damage to property of others, including loss of use resulting therefrom, arising in whole or in part out of any act of omission of Contractor, his agents or Subcontractors, or anyone directly or indirectly employed by any of them or for whose acts any of them may be legally liable.

b. In addition, this general liability insurance policy shall be endorsed to provide blanket contractual liability insurance.

c. the property damage liability coverage under this policy shall contain no exclusion (commonly referred to as XC&U exclusion) relative to damage to underground property.

d. Liability limits shall be not less than the following:

General aggregate limit (other than products - completed operations) **- $2,000,000**
Products- completed operations aggregate limit - **$2,000,000**
Each occurrence limit - $1,000,000
Fire damage limit - $50,000
Medical expense limit - $5,000

e. The City shall be named additional insured on this insurance.

f. This policy shall include products and completed operations coverage for limits as specified above.

g. This policy shall include personal injury liability insurance for limits of not less than **$1,000,000 each claim and $2,000,000 annual aggregate.**

h. This policy shall provide "Broad Form Property Damage" Insurance.

5. Owner's Protective Liability Insurance:

a. This insurance shall name the City as the named insured, and the insurance shall be maintained in force for the duration of the Contract and shall be purchased by the Contractor at his expense.

b. Policy shall be for the same limits of liability as the Comprehensive General Liability Insurance and shall protect the City against any and all claims, and liabilities for injury to or death of persons, or damage to property caused in whole or in part by the negligent acts or omissions of Contractor, his agents, employees, or subcontractors, in connection with or resulting from the operations performed under the terms of the Agreement.

C-7 CHANGES IN PLANS (Additions, deductions or changes in work)

A. Changes in the work:

1. The Contract may only be adjusted by a Change Order. The Contract unit prices for completed quantities of unit price items constitutes the total compensation payable to Contractor for performing the work All duties, responsibilities and obligations assigned to or under taken by Contractor in accomplishing the work shall be at his expense.

2. Renewal of labor contracts at higher wage rates will not be grounds for adjustment to the Contract Unit Price.

3. Adjustments to the Contract for extra work or changes ordered by the City shall be determined by one or more of the following methods as agreed upon prior to starting the additional or changed work.

a. By unit prices as listed in bid proposal.
b. By a lump sum price, if not covered by unit prices in proposal.
c. By Contractor's cost plus a fixed fee, if not covered by unit prices in proposal.
d. By Contractor's cost plus a percentage, if not covered by unit prices in proposal.

4. The "Contractor's Cost" is hereby defined for purposes of this Article to be and shall include the amounts required to pay Subcontractors plus the costs of his own work as follows:

a. Labor Costs:

1. The payroll cost for all workmen such as foremen, mechanics, craftsmen and laborers.

2. All incidental labor expenses incurred as a direct result of the performance of the work including payroll taxes, workmen's compensation, pension and retirement allowances, and social insurance, or other regular payroll charges on same.

b. Material and Equipment Costs:

1. The cost of all materials and equipment required, delivered to the construction site, which are not furnished by the City or others.

2. Sales and use taxes applicable to such materials and equipment.

c. Supplemental Costs:

1. Rental for all power-driven equipment at agreed upon rates shall be charged against additional or changed work only for the actual time which the equipment is used specifically therefor.

2. Transportation charges necessarily incurred in connection with such equipment which is not already on site.

3. Cost of power, fuel, lubricants and water required for such equipment (may be included in agree upon rate).

4. Additional cost for surety bonds, liability and property damage, and other insurance required, where cost is necessarily increased by coverage of the additional or change work.

d. The above definitions and requirements apply equally to work done by Subcontractors, suppliers and manufacturers under methods 3.c or 3.d.

e. The percentage which shall be added to the several items of Contractor's cost under method 3.d. are as follows:

1. Amounts paid to Subcontractors - Five percent
2. Labor Costs - Ten percent
3. Material and Equipment Costs - Ten percent
4. Supplemental Costs - None

f. Under method 3.c. or 3.d., compensation or adjustment to Subcontractors, suppliers and manufacturers for work done by them shall be determined in accordance with any of the three methods set forth in Article B.3 as agreed.

g. The above percentages shall be understood to include all other costs and full compensation for profit, overhead, superintendence, field office expense and all other elements of costs not included in the "Contractor's Cost" as herein defined.

h. Contractor shall keep and present in an acceptable form an accurate account with vouchers of the several items of cost, including those of Subcontractors, on changed or extra work done under methods 3.c. or 3.d.

5. Change work shall be adjusted considering separately the parts of work added and the parts omitted. Amount of adjustment for parts omitted shall be estimated at the time of omission is authorized, and the agreed adjustment will be deducted from subsequent Engineer's Pay Estimates.

6. Statements for additional or changed work shall be rendered by Contractor no later than ten days after completion of each assignment of additional or changed work provided for in a Change Order, and if found correct will be accepted by Engineer and submitted for payment with the next Engineer's Pay Estimate.

7. The City reserves the right to obtain any or all extra work from persons or firms other than Contractor.

8. Contractor shall be entitled to no claim for damages for anticipated profits on any portion of the work that may be omitted.

9. If Contractor claims compensation for additional work not ordered as aforesaid or for damages sustained, he shall make a written statement of claims for compensation or damages to the City.

10. Statement shall be in the hands of the City within such time as will allow a full consideration of the basis for the claim, and in no case later than ten days after the work has been completed or damages sustained. All claims for adjustments to the Contract Price shall be determined by Engineer if the City and Contractor otherwise agree on the amount involved. Any change to the Contract Price arising from any claim shall be incorporated in a Change Order.

B. Changes to the Contract Time:

1. The Contract Time may only be adjusted by a Change Order. To complete the work within the allowed Contract Time, the City has taken into consideration and made allowances for all of the ordinary delays and hindrances incident to such work.

2. Adjustments to the Contract Time may be made for delays in completion of the work from causes beyond Contractor's control, including the following:

a. Federal embargoes, priority orders, or other restrictions imposed by the United States Government.
b. Unusual delay in fabrication or shipment of orders.
c. Abandonment of the work by the men engaged thereon through no fault of the Contractor.
d. Delays caused by court proceedings.
e. Change Orders
f. Neglect, delay or default of any other contractor employed by the City.
g. Abnormal weather conditions, other than normal seasonal changes.
h. Conflicts, errors of discrepancies in the Contract Documents reported to the Engineer as provided in these General Conditions.

3. Contractor shall have no claims for damages for any such causes of delay, but he shall in all cases be entitled to such extension of the Contract Time as the City shall award in writing on account of such cases of delay, provided that adequate evidence is presented to enable the Engineer to determine with exactness the extent and duration of delay for each item involved.

4. No extension to the Contract Time will be granted for delays involving only portions of the work, or which do not directly affect the time required for completion of the entire work.

5. Any claim for an extension to the Contract Time shall be in writing delivered to the City within ten days of the occurrence of the event giving rise to the claim. Any change to the Contract Time resulting from any such claim shall be incorporated in a Change Order.

C-8 ACCEPTANCE OF THE WORK

A. Warranty and Guarantee:

1. Contractor warrants and guarantees to the City that materials and equipment will be new and that all work will be of good quality and free from defects and accordance with the Contract Documents and of any inspections, tests, or approval provided for in the Contract Documents.

2. Contractor guarantees to remedy promptly, and without cost to the City, any defective materials, equipment or workmanship which appear within **one year** after the date of Substantial Completion or, if earlier, the date the City commences continuous use of the facilities and in accordance with any special guarantees

provided for in the Contract Documents. **A Maintenance Guarantee / Bond contract form is included in these contract documents for execution by the Contractor and his Surety and acceptance by the City of Sedalia.**

B. Access to the Work: The Engineer and his representatives shall at all times have access to the work. The Contractor shall provide proper facilities for such access and observation of the work and also for any inspection or testing thereof by the Engineer.

C. Defective Work:

1. The term "defective" is used in these documents to describe work that is unsatisfactory, faulty, not in conformance with the requirements of the Contract Documents, or not meeting the requirements of any inspection, test, approval or acceptance required by law or the Contract Documents.

2. Any defective work nay be disapproved or rejected by the Engineer at any time before final acceptance even though it may have been overlooked and included in a previous Engineer's Pay Estimate.

3. Contractor shall furnish samples of questionable materials from completed work for estimating purposes when required by the Engineer. All costs in connection with the testing of materials or equipment proven to be defective shall be paid by the Contractor. If such tests prove the materials or equipment to be acceptable, their cost will be paid by the City.

4. Prompt notice will be given by the Engineer to the Contractor of all defects as they become evident.

D. Stopping Defective Work in Progress: If the work is defective, or Contractor fails to supply sufficient skilled workmen or suitable materials or equipment, the City may, if so recommended by the Engineer, order the Contractor to stop the work, or any portion thereof, until the cause for such order has been eliminated, however, this right of the City to stop the work shall not obligate the City to exercise this right for the benefit of the Contractor.

E. Removal and Replacement of Rejected Defective Work:

1. All rejected defective work, whether or not completed, shall be removed from the site and replaced with acceptable work.

2. If the Contractor does not remove and replace such rejected work within a reasonable time, all as specified in a written notice from the Engineer, the City may, as provided in these General Conditions:

a. Withhold payment
b. Stop the work
c. Remove and replace the rejected work. All direct and indirect costs of such removal replacement, including compensation for additional professional services, shall be paid by the Contractor. The Contractor shall also bear the

expenses of making good all work of others destroyed or damaged by the removal and replacement of his defective work. Rejected materials shall be removed from the site by the Contractor if so directed by the City within ten days of written notice. Materials not removed within such time may be sold by the City and the net proceeds therefrom deducted from the expense of removal and replacement chargeable to the Contractor. An appropriate deductive Change Order will be issued to cover all costs incurred by the City in connection with the removal and replacement of defective work.

F. Correction of Repair of Defective Work:

1. If required by the Engineer, the Contractor shall promptly correct or repair any defective work, whether or not completed.

2. If the Contractor does not correct or repair such defective work within a reasonable time, all as specified in a written notice from the Engineer, it may be rejected as specified in the preceding paragraph or the City may have the deficiency corrected by others. All direct and indirect costs of such correction or repair, including compensation for additional professional services shall be paid by the Contractor. The Contractor shall also bear the expenses of making good all work of others destroyed or damaged by correction or repair of his defective work.

G. Acceptance of Defective Work: If instead of requiring correction, repair, or removal and replacement of defective work, the City deems it expedient to accept it, it may do so. In such case, if acceptance occurs prior to approval of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents, including an appropriate reduction in the Contract Price or if the acceptance occurs after approval of final payment, an appropriate amount shall be paid by the Contractor to the City.

H. Correction of Defective Work During the Guarantee Period:

1. If, during the guarantee period, any work is found to be defective, the Contractor shall promptly, without cost to the City and in accordance with the City's written instructions, either correct such defective work or if it has been rejected by the City, remove it from the site and replace it with acceptable work.

2. If the Contractor does not promptly comply with the terms of such instructions, the City may have the defective work corrected or the rejected work removed and replaced and all direct and indirect costs of such correction or removal and replacement, including compensation for additional professional services, shall be paid by the Contractor.

3. The Contractor shall also bear the expenses of making good all other work destroyed or damaged by the correction or removal and replacement of the defective work.

4. The City will give notice of observed defects with reasonable promptness.

5. Under emergency conditions, the City may remedy defective work without waiting for action by the Contractor. The City will notify the Contractor immediately of the circumstances and actions taken and the Contractor shall pay all reasonable substantial costs of such actions.

C-9 MONTHLY PARTIAL PAYMENTS

A. Seven (7) calendar days prior to the first City Council Meeting of each month, the Contractor shall submit to the Public Works Director an itemized application for partial payment, supported with such evidence of Contractor's right to payment as the Public Works Director may prescribe. The City Council meets on the first and third Mondays of each month.

B. Upon receipt of each Contractor's application for partial payment, The Public Works Director will make a Monthly Partial Pay Estimate equal to the value of all work accomplished prior to the date of the Contractor's application, based upon the unit prices listed in the Bid Proposal. Each Monthly Pay Estimate shall be signed by the Contractor or be accompanied by his application for payment to indicate Contractor's concurrence with the amount due. When Monthly Pay Estimate has been delivered to the City by the Public Works Director, the City will pay the Contractor within 20 days after receipt thereof. Monthly payment estimates will be made only for satisfactorily completed items of work. Monthly payments will not be made for materials stored on site or at the Contractor's shop (warehouse).

C. Partial Payments will be in the amount of ninety five percent (95%) of the amount of the Monthly Pay Estimate less the sum of all previous payments. Five percent (5%) retainage will be withheld until final acceptance.

C-10 ACCEPTANCE AND FINAL PAYMENT

As soon as the work has been substantially and satisfactorily completed the Public Works Director will make a final estimate stating that the work provided under this contract has been completed and is accepted by him under the terms and condition thereof, with qualifications, if any, as stated and the balance found to be due the Contractor according to the terms of payment shall be paid by the City. Prior to filing of estimate, the Contractor shall file with the City Clerk an affidavit stating that all bills for materials and equipment used in the work have been paid. If all bills have not been paid the affidavit shall include a complete list of all unpaid bills. The Contractor shall file with the City Clerk a statement of consent of the surety to final payment.

The final payment shall be based upon the actual completed quantities of each item of work as measured by the Public Works Director. The final measured quantities may be more or less than the quantities shown on the Plans and in the Bid Proposal. No Change Order will be required when final measured quantities vary from the estimated quantities shown on the Plans and the Bid Proposal.

The making and acceptance of the final payment shall constitute a waiver of all claims by the City, other than those arising from unsettled liens, form faulty work or materials appearing

after final payment, or from requirement of the specifications, and of all claims by the Contractor, except those previously made by the Contractor against the City in writing and still unsettled.

C-11 LIQUIDATED DAMAGES

A. It is mutually understood and agreed by and between the parties to this contract, in the execution of the same that time is of the essence of the contract. In the event that the Contractor shall fail to complete the work to be performed under this contract by and at the completion time bid in the Proposal, the Contractor shall pay unto the City as and for the liquidated damages, such as City's increased overheads, and cost of additional engineering supervision, and delay and inconvenience to the City, and not as a penalty, the sum of $200.00 (determined per project) for each and every calendar day that the Contractor shall be in default.

B. Liquidated damages shall be waived for and during the extent of any delay caused by the inability of the Contractor to obtain materials or equipment by reason of Federal embargoes, priority orders, or other restrictions imposed by the United States Government, provided that adequate evidence is presented by the Contractor to prove such delay and to enable the City to determine with exactness the extent and duration of such delay for each item of material and equipment involved. Liquidated damages shall be waived during any delay caused by the City or delays due to underground utilities leaks or excavation made in the street by utilities.

C. The City shall have the right to deduct liquidated damages from any monies in its hands, otherwise due, or to become due to the Contractor, or to sue for, and recover, compensation for damages for nonperformance of this contract at the time stipulated herein.

C-12 PENALTY FOR PAYMENT OF LESS THAN STIPULATED WAGE RATES

The Contractor shall forfeit as a penalty to the City of Sedalia Ten dollars (10.00) for each workman employed, for each calendar day, or portion thereof, such workman is paid less than the said stipulated wage rates as determined for this project by the Industrial Commission of Missouri and the Missouri Department of Labor and Industrial Relations, and the United States Department of Labor, for any work done under this contract, by the Contractor or any subcontractor under said contractor. Section 290.250 RSMo. A copy of said wage rate determination is included in this set of Contract Documents.

C-13 RELEASE OF LIABILITY

The acceptance by the Contractor of the last payment shall operate as, and shall be, a release to the City and every officer and agent thereof, from all claims and liability to the Contractor for anything done of, furnished for, or relating to the work, or for any act or neglect of the City or of any person relating to or affecting the work.

C-14 RIGHT TO TERMINATE CONTRACT

If the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should persistently or repeatedly refuse or should fail except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he should fail to make prompt payment to subcontractors for materials or labor, or persistently disregard laws, ordinances or the instruction of the Public Works Director, or otherwise be guilty of a substantial violation of any provision of the Contract, then the City, upon the certificate of the Public Works Director that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor seven (7) days written notice, terminate the employment of the Contractor and take possession of the premises and of all materials, tools, and appliances thereon and finish the work by whatever method the Public Works Director may deem expedient. In such case, the Contractor shall not be entitled to receive any further payment until the work is finished. If the unpaid balance of the contract price shall exceed the expense of finishing the work, including compensation for additional managerial and administrative services, such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor shall pay the difference to the City has herein provided, and the damage incurred through the Contractor's default, shall be certified by the Public Works Director.

Pending arbitration or settlement of dispute on any point of controversy the Public Works Director may suspend action on all or any part of the work. The Contractor shall not be entitled to any claim for loss or damage by reason of such delay nor shall he be entitled to extensions of time although such extension of time may be granted by the Public Works Director if he deems it in the interest of the work.

C-15 GENERAL PROVISIONS

The quality and acceptability of materials furnished and work performed shall be in accordance with the 2004 Missouri Standard Specifications for Highway Construction unless otherwise noted.

The contractor shall take no advantage of any apparent error or omission in the plans or specifications. If the contractor discovers such an error or omission, he shall immediately notify the Public Works Director. The Public Works Director will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the plans and specifications.

During construction, in special cases driveways and street access shall be maintained for emergency vehicles and local traffic. The Fire and Police Departments shall be notified prior to any street closing.

The contractor shall provide adequate manpower, materials, tools and equipment to insure that the work will proceed continuously without delay through the succeeding operations to its completion with the least possible interference and inconvenience to the City.

It shall be the contractor's responsibility to verify locations and depths of utilities prior to and during construction.

It shall be the Contractors responsibility to regrade and realign existing ditches and the site as required to drain.

The Contractor shall protect from damage or injury all existing improvements and structures whether they be private or publicly owned. Any such item inadvertently damaged shall be repaired or replaced at the Contractor's expense. If the Contractor needs to temporarily remove any existing improvements or structures in order to proceed with the work then the Contractor shall do so and then replace all of the existing improvements or structures to original location and condition at the Contractor's expense. The Contractor shall have on the work at all times, as his agent, a competent superintendent capable of reading and thoroughly understanding the plans and specifications and thoroughly experienced in the type of work being performed, who shall receive instructions from the Public Works Director. The superintendent shall have full authority to execute orders or directions of the Public Works Director without delay, and to promptly supply such materials, equipment, tools, labor, and incidentals as may be required. Such superintendence shall be furnished regardless of the quantity of work sublet.

Photographic documentation shall be made of existing improvements and structures whether they are private or publicly owned in order to verify existing conditions, prior to construction. No extra payment will be allowed for the photographic documentation.

NO ASBESTOS CONTAINING MATERIALS SHALL BE USED OR INSTALLED ON THIS PROJECT.

The Contractor shall remove from all public and private property at his own expense all temporary structures, rubbish and waste materials resulting from his operation and as nearly as possible, leave the site in as good condition as it was before construction was started. Sod, shrubbery, trees, fences, culverts, mail boxes, street signs, street and driveway surfacing, curbs, sidewalks, gutters, pavement and all other Items disturbed during construction shall be restored or replaced with like items to the satisfaction of the Public Works Director.

All spoilage, rubbish, excess earth and surplus waste materials shall be removed from the site of the project to authorized dumps where it shall be disposed of and left as a neatly graded fill, unless other disposal is authorized by the Public Works Director. Burning within the City Limits is not permitted.

Where necessary to trim trees to allow room for construction of improvements, the limbs shall be sawed off in a vertical plane and the cut areas painted. Shrubbery and hedges shall be trimmed in a neat and orderly manner, using hedge shears or a saw where necessary to do trimming work to provide sufficient clearance for trenching.

C-16 CERTIFICATION REGARDING OMNIBUS TRANSPORTATION EMPLOYEE TESTING ACT

All Contractors of the City of Sedalia, Missouri shall be required to comply with the provisions of the Omnibus Transportation Employee Testing Act and its implementing regulations while engaged in services for the City of Sedalia, or in activity while on the City of Sedalia's property as a condition of the award of any such contracts for services or work and the continuation of same.

The bidder, under penalty of perjury certifies by signing and submitting this bid or proposal that they will comply with the Omnibus Transportation Employee Testing Act and its implementing regulations, including but not limited to persons who are required to possess a CDL license for the operation of a commercial vehicle.

SPECIAL PROVISIONS

These Special Provisions describe the work and set forth requirements and modifications to the Standard Technical Specifications that are unique to this project. Should the requirements of these Special Provisions conflict with the Standard Technical Specifications, the requirements of these Special Provisions shall apply.

SP-1 Manual on Uniform Traffic Control Devices (MUTCD)
All references to the Manual on Uniform Traffic Control Devices (MUTCD) shall be revised to "Latest Edition and its most current revisions."

SP-2 Utility Relocation Coordination
All utility relocation coordination shall be the responsibility of the Contractor.

SP-3 Measurement and Payment
Payment for this project shall be as specified below. All work shown in the contract drawings, or specified herein, shall be included in the items named in the proposal. All materials, labor, equipment and overhead costs required for completion of this project, in accordance with the plans and specifications, shall be included in the total construction costs, which is a summation of the extensions of the items in the Proposal. All costs in connection with the work, including mobilization, bonds, insurance and taxes, supplies and appurtenances, all construction plant, and the performance of all labor to complete the work, shall be included in the items listed in the proposal. Should the Contractor find that the quantity of any item will exceed that which is shown in the Proposal, he must notify the Engineer immediately so that it may be determined if a change order will be required.

Bid Item **Mobilization** **(Lump Sum)**
Payment shall be at the lump sum bid price. The payment shall include full compensation for all labor, material and equipment needed to complete the work items shall include, but not be limited to, all necessary clearing and grubbing (including tree removals), removal of all existing storm sewer system and structures, pavement, curb and gutter, driveways, and all other associated demolition to prepare the site for the improvements, as indicated on the Drawings. All disposed materials will be the property of the Contractor.

Bid Item **C900 PVC Water Main** **(Linear Feet)**
Measured quantities will be used for the final payment of each size of water main based in the installation method indicated in the contract documents. Measurement will be made to the nearest linear foot for actual length of pipe used. Payment will be made at the contract unit bid price per linear foot for each pipe material, size, and installation method included in the Proposal; which price shall include the cost of trenching, bedding, furnishing and installation of pipe, backfilling, compaction, testing and all other items required to complete the installation of the water main.

Bid Item **16" Steel Casing** **(Linear Feet)**
Measured quantities will be used for the final payment based in the installation method indicated in the contract document. Measurement will be made to the nearest linear foot for actual length of pipe used. Payment will be made at the contract unit bid price.

Bid Item **Cap** **(Each)**

Measured quantities of each size of cap that is installed will be used for final payment. Payment will be made at the contract unit price bid per each as shown in the Proposal. Payment shall include the cost of furnishing all labor, equipment, tools, materials, excavation, and all other items required to complete the installation of each cap.

Bid Item **Gate Valve** **(Each)**

Measured quantities of each size of gate valve that is installed will be used for final payment. Payment will be made at the contract unit price bid per each as shown in the Proposal. Payment shall include the cost of furnishing all labor, equipment, tools, materials, excavation, and all other items required to complete the installation of each gate valve. Valve will be provided by the City.

Bid Item **Thrust Collar** **(Each)**

Measured quantities of each thrust collar installed will be used for final payment. Payment will be made at the contract unit price bid per each as shown in the Proposal. Payment shall include the cost of furnishing all labor, equipment, tools, materials, excavation, incidental concrete work, and all other items required to complete the installation of each thrust collar.

Bid Item **Seeding** **(Lump Sum)**

The payment shall include full compensation for all labor, material, tools, and equipment needed to complete the work. All areas disturbed during construction of the project that are not planned to receive an alternative surface treatment shall be permanently seeded, fertilized, and mulched. Seeding shall be in accordance with the Standard Technical Specifications. This item shall be paid on a lump sum basis based on the bid form quantity of expected disturbance area.

Bid Item **Erosion Control** **(Lump Sum)**

The payment shall include full compensation for all labor, material and equipment needed to complete the work; including preparation, submittal, approval and implementation of the erosion control plan. Payment will be on a lump sum basis and shall include installation, inspection, and maintenance of erosion control measures indicated on the plans. The Contractor shall maintain all required Erosion Control devices throughout the length of the project until all construction activities associated with project are complete and final stabilization has been achieved. Erosion Control BMP's may need to be modified during the project to provide sufficient Erosion Control. Any modifications will be considered incidental to the Erosion Control bid item and will not receive additional payment.

Bid Item **Traffic Control** **(Lump Sum)**

Payment shall be at the lump sum bid price. The payment shall include furnishing all materials, labor, and equipment to perform all traffic control necessary for the project in accordance with the plans, standard details, Standard Technical Specification Section S-5, and the latest edition of the MUTCD. The cost of traffic control and all incidental items necessary for the design, installation, and maintenance of all components of the traffic control necessary for the completion of the project are included in this bid item.

TECHNICAL SPECIFICATIONS

For

WATER LINE CONSTRUCTION

For

City of Sedalia
200 South Osage
Sedalia, MO 65301

Phone: (660) 827-3000

PREPARED BY:
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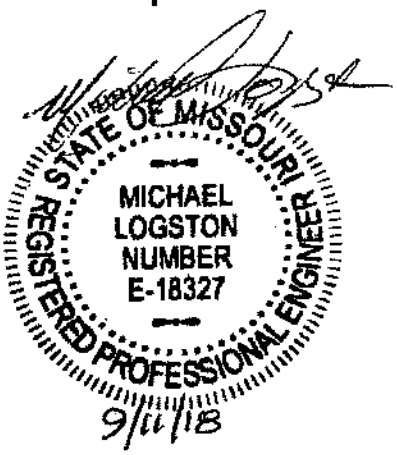
September 2018



CITY OF SEDALIA
STANDARD CONSTRUCTION SPECIFICATIONS

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SECTION 02305

TEMPORARY EROSION AND SEDIMENT CONTROLS

1.01 GENERAL

This section covers the implementation and maintenance of erosion and sediment controls for the project.

1.02 TEMPORARY EROSION AND SEDIMENT CONTROLS

Contractor shall provide erosion and sediment controls (ESC) throughout the length of the contract. Contractor shall prevent excessive sediment from entering adjacent properties or drainage courses. Contractor may use any acceptable ESC device provided it stops silt from entering the adjacent properties and drainage courses.

Contractor shall maintain all ESC devices by periodically removing sediment behind silt fence or in silt traps. Contractor must respond to any deficient or ineffective controls within 48 hours of notification.

Contractor shall restore the site according to Section 02950. Cut slopes shall be permanently seeded and mulched to the extent considered desirable and practical.

END OF SECTION

SECTION 02512

WATER DISTRIBUTION PIPING

1.01 GENERAL

A. The section is to be used for all water distribution system construction includes piping, fittings and installation pertaining to water distribution system construction.

1.02 GOVERNING SPECIFICATIONS

A. Missouri Department of Natural Resources "Minimum Design Standards for Missouri Community Water Systems", December 10, 2013, Publication 2489.

1.03 QUALITY ASSURANCE

A. Shop Drawings and Material List

B. Before the Contractor begins work, two copies of shop drawings, parts diagrams material specification sheets, outline dimension prints and equipment performance characteristics for all items proposed to be used shall be submitted to the Owner for approval for use on the project. Accompanying this submittal shall be the names and location of the manufacturer and the closest stocking supplier. Products shall not be utilized until written approval is given by the Owner, who shall be the sole determinant of acceptability between similar items as made by different manufactures. The Contractor shall furnish products which are in complete compliance with the contract requirements; and approval of shop drawings and/or material lists shall not be construed as authorizing any deviations from the contract plans or specifications.

C. Before pipe may be installed on the job, the pipe supplier shall submit a Certificate of Conformance regarding the type and quality of the pipe to be supplied on the job. The Certificate of Conformance shall in effect state the material meets the requirements of the ASTM number or latest revision thereof.

D. If it is the intent of the Contractor to provide products which deviate from the contract plans or specifications, such intent shall be made in writing accompanying the submittal of products for approval by the Owner. The Contractor shall indicate those characteristics of the product which are in non-conformance, give reasons for said non-conformance and receive written approval of the Owner for deviating from the requirements before utilizing the product in the work.

1.04 DUCTILE IRON PIPE AND FITTINGS

A. General

1. Pipes and fittings shall conform to the latest edition of the ANSI, AWWA, ASTM, Plastic Pipe Institute (PPI), or UniBell Plastic Pipe Association standards or recommendations. All pipes, fittings, valves, and fire hydrants shall conform to the latest standards issued by the AWWA and, where applicable, shall be certified by NSF or Underwriters Laboratories for use in drinking water.
2. Pipes, fittings, and appurtenances containing more than 0.25 percent lead calculated by weighted average shall not be used.

B. Ductile Iron Pipe

1. Metal thickness class, net weight of pipe without lining, length of pipe and name of manufacturer shall be clearly marked on each pipe.
2. Shall meet ANSI/AWWA C150/A21.50; C151/A21.51; C115/A21.15 Class 50, except where otherwise specified. The pipe shall be cement lined and sealed ANSI/AWWA C104/A21.4.
3. Standard pipe coating outside.

C. Ductile Iron Fittings

1. Fittings shall be ANSI/AWWA C110/A21.10, except shorter laying lengths will be acceptable ANSI/AWWA C153/A 21.53. Fittings to be 350 psi rated. All fittings to be cement lined and sealed, ANSI/AWWA C104/A21.4.

2. Standard pipe coating outside.

D. Flanged Joints

1. Flanges: Shall be ANSI/AWWA C110/A21.10, C115/A21.15, ANSI B16.1, B16.5; or for steel C207 or U.S. Pipe "Flange-Tyte".

2. Bolts: Shall be ASTM A307, chamfered or rounded ends projecting ¼ to ½ inch beyond outer face of nut.

3. Nuts: Shall be ASTM A307, hexagonal, ANSI B18.2, heavy semi-finished pattern.

4. Gaskets: Shall be ANSI/AWWA C111/A 21.11 and ASTM D1330, Grade I, red rubber, ring type, 1/8 inch thick; or U.S. Pipe "Flange-Tyte" 1/8 inch thick.

E. Mechanical Joints - Shall be ANSI/AWWA C111/A21.11.

F. Push-on Joints - Shall be ANSI/AWWA C111/A21.11, except gaskets shall be neoprene or other synthetic rubber.

G. Couplings

1. DI to DI - Mechanical Joint Solid sleeve

2. DI to Steel or Galvanized - Mechanical Joint Solid sleeve with sleeve size changed to accommodate pipe OD.

3. DI to PVC - Mechanical Joint Solid sleeve with PVC adaptor with OD built up to correspond to DI pipe size or flanged.

4. Ductile iron bolted compression couplings may be used in lieu of the above. On 2 inch and under line sizes a ductile iron threaded compression coupling may be used.

5. Adaptor Couplings: To insure that slight misalignment will not create distortions in solid pipe runs, a Ford flanged adaptor will be required at locations as indicated on the plans.

6. On smaller lines (2 inches and under) a Dresser style 90 super service fitting with armored style gasket may be called out in lieu of other adaptor couplings.

7. Tiebacks will be required whenever the continuity of restraint has been made discontinuous by use of a coupling. When equipment is mounted on prefabricated skids, connection of piping to skids may be used in lieu of tie backs. Minimum tie back to be two 3/4 inch dia. all thread rod, bolt both sides of all flanges. Use more or larger tie backs if so indicated on plans.

8. When piping run is connected to a pump a vibration suppression attachment is required such as the adaptor couplings above. When pump end is in water an anti-electrolysis kit shall be included to bolt the pump to the piping.

H. Tapping Saddles

1. Tapping saddles shall be ductile iron with galvanized steel straps and rubber sealing gasket, 250 psi pressure rating.

2. Tapping saddles shall be poly wrapped with 3 layers of polyethylene adhesive tape around pipe and then tap through tape and poly film. Repair any damage to wrap with tape and extra film as per ANSI/AWWA C105/A21.5.

3. After tap has been made, wrap and tape service line to 3 feet from main line and encase saddle with wrap and tape to 1 foot each side of saddle on main line. Protect saddle and Service line in this fashion irrespective of whether main line has been encased with polywrap. Use sintered teflon pipe dope or TFE tape on all screw threads.

I. Pipe Ends

1. Pipe ends shall be clean and smooth. Pipe ends shall be such that a space is left between pipe ends of not less than ¼ inch or more than 1 inch. When cutting pipe, cut at right angles to pipe axis with a mechanical cutters. Dress cuts with a file to remove roughness and to taper end to slip into coupling. Oxyacetylene cuts are not permitted.

1.05 PLASTIC PIPE

A. General

1. Plastic pipe and fittings as furnished by the Contractor shall be installed in accordance with the manufacturer's recommendations and these specifications.

2. Pipe shall be Polyvinyl Chloride (PVC) as manufactured from virgin National Sanitation Foundation (NSF) approved ASTM Type I - Grade 1 impact improved resin and as approved by NSF for use in handling potable water. Pipe shall contain from one to two percent titanium dioxide.

3. Samples of pipe shall be submitted to the Engineer for his approval. Physical and chemical data sheets shall also be submitted to the Engineer and pipe shall conform to ASTM Specification D1784-60 T. Pipe shall be tested for sustained pressure in accordance with ASTM Specification D1598-63 T and for quick burst in accordance with ASTM Specification D1599-62 T.

4. All pipe as delivered shall conform to commercial standard CS256-63. Lack of "Marking and Declaration of Compliance" as contained in Sec. 8 thereof shall automatically cause rejection of pipe.

5. Pressure rated (PR) pipe shall have a maximum design stress of 200 psi and conform to SDR 21 as given in CS256-63.

6. ASTM C900 PVC pipe shall have a maximum design stress of 235 psi and conform to DR 18.

7. All fittings, couplings and adaptors shall be manufactured out of materials conforming to the same standards as the pipe and having a design strength equal to or better than adjacent pipe. Reducers shall have smooth transition. Bushings reducers will not be allowed unless specifically called out.

8. All plastic fittings shall be NSF approved and marked.

B. Pipe Coupling

1. Couplings shall conform to ASTM Spec D3139 and Uni Bell B-12. The (coupling-joint system) shall have been tested and approved by NSF and certification of said approval shall be submitted.

2. Use mechanical joint ductile iron fittings for 2 inches and above unless shown otherwise. Use PVC couplings for pipe sizes below 2 inches. Service pipe shall be connected by a ford brass pack joint.

3. Pipe shall have a ring painted around the spigot end in such a manner as to allow field checking of setting depth of pipe in socket.

4. If manufacturer's design is such that excessive homing of pipe is detrimental, then two rings shall be provided to indicate tolerances required and contractor shall back pipe up to maintain position required.

C. Pipe Joint

1. The push-on joint shall be a single rubber gasket joint designed to be assembled by the positioning of a continuous, molded, rubber ring gasket in an annular recess in the pipe or fitting socket and the forcing of the plain end of the entering pipe into the socket, thereby compressing the gasket radially to the pipe to form a positive seal. The gasket and the annular recess shall be so designed and shaped that the gasket is locked in place against displacement as the joint is assembled. Details of the joint design and assembly shall be in accordance with the joint manufacturer's standard practice.

2. Pipe may be furnished with a socket as an integral part of each piece of pipe or a coupling type socket with rubber gasket on each side may be provided. Ends of pipe intended to be inserted into a socket shall be factory beveled.

3. The manufacturer shall furnish drawings of the joint and gasket. The coupling system shall be pressure rated equivalent to the pipe or better. The rubber O-ring joints for plastic pressure pipe shall conform to the

requirements of ASTM D3139. The joints shall have been tested and approved by the National Sanitation Foundation and certification of said approval shall be submitted.

4. The dimensions of the bell, socket, and plain end shall be in accordance with the manufacturer's standard design dimensions and tolerances. Such dimensions shall be gauged at sufficiently frequent intervals to assure dimensional control and satisfactory joint assembly. The trade name or trademark, size, mold number, gasket manufacturer's mark, and year of manufacture shall be molded in the rubber.

5. Gaskets shall be vulcanized natural or vulcanized synthetic rubber. No reclaimed rubber shall be used. Gasket shall be free of porous areas, foreign material, and visible defects.

D. Pipe Lubricant

1. Lubrication shall be water soluble, non-toxic, be non-objectionable in taste and odor imparted to the fluid, be non-supporting of bacteria growth, and have no deterioration effect on the PVC or rubber gaskets. Lubricant containers shall be labeled with the trade name or trademark of lubricant manufacturer or pipe manufacturer.

1.06 RESTRAINED JOINT PVC PIPE

A. Restrained joint pipe will confirm to standards of ordinary PVC pipe with the following additions and/or differences. (Where difference is noted, this will govern.) ASTM D2241, NSF NO14 certification, ASTM F477 Gasket, ASTM D1784 with cell classification 12454-B (PVC 1120). The restrained joint shall be made by machining matching grooves in the pipe and coupling and inserting a nylon spline into the groove to provide restraint. Pipe to be Certainteed Yelomine or equal. Couplings shall conform to pipe and be Certa-Lok by Certainteed.

1.07 COPPER PIPE

A. All copper water pipe shall conform to ASTM Specifications B88 "Type K". When a service line to the meter is copper, the size shall be 3/4 inch unless otherwise specified.

B. Joining of copper pipe shall be accomplished by use of pack joint coupling. Contractor to use maximum length pipe obtainable to minimize the number of joints under paved surfaces.

C. Pack joint couplings shall be used to join copper pipes together, and plastic pipe to copper pipe. For lead or polyethylene pipe use pack joint coupling with stainless steel insert. For PVC pipe use a schedule 80 PVC Nipple 12 inches long which is inserted into the pack joint and the other end is coupled to pipe line pipe with a standard PVC rubber ring coupling. Connecting copper pipe to brass fittings use a pack joint compression fitting. Pack joint coupling shall be Ford or approved equal.

1.08 POLYETHYLENE PIPE FOR SERVICE LINES

A. High Density Polyethylene Piping (HDPE) in sizes from ¾ inches to 3 inches shall conform to the latest revision of ANSI/AWWA C901. HDPE shall be made from material having standard PE code designation PE4710 and intended for use in potable water. Pipe shall be factory colored blue. Unless otherwise noted on design drawings, pipe shall be SDR11 PC200.

B. Pipe shall be continuously imprinted with manufacturer's brand name, pipe size, Commercial Standard notation, identification of the National Sanitation Foundation approval, recommended working pressure and production code. Pipe shall have the following nominal dimensions:

Nominal Size	OD	Min Wall
1"	1.315	0.120
1½"	1.900	0.173
2"	2.375	0.216

C. Pipe shall have working pressure of 200 psi at 73.4°F. Pipe surfaces shall be mirror smooth and shall be free from bumps and irregularities. Workmanship shall be of the highest level compatible with current commercial practice. Material must be completely homogenous and uniform in appearance.

D. Pipe shall be packaged for protection against dirt and damage during shipment, handling and storage. Pipe package shall be fully labeled with brand name and manufacturer, NSF seal, size, coil length and part number.

E. Pipe shall be covered by a 50-year guarantee against rot, rust and electrolytic corrosion, and a 25-year cost-of-replacement warranty.

F. All pack-joint or compression type connections to HDPE piping shall require a stainless steel stiffener.

1.09 CORPORATION STOP

A. Corporation stop shall conform to AWWA Specification C800-55. Corporation stop shall be as manufactured by Ford Meter Box Co. or approved equal.

1.10 BRASS PIPE

A. Brass pipe shall conform to ASTM Specifications B43 for red brass pipe.

1.11 STEEL ENCASEMENT PIPE

A. When steel encasement is required, the pipe shall have a minimum wall thickness per shown on the plans or as required by the permitting agency. Encasement shall be new, unused steel pipe with yield strength of 35,000 psi conforming to ASTM A53-B. Casing diameter to be as shown in table unless specifically bid differently in bid proposal. Contractor may use larger casing size if he desires, but shall be responsible for any job variations encountered by this choice.

B. While quality of work is required, this job is set up with the boring done first as previously stipulated to take advantage of a relaxed specification for casing alignment and grade that is possible within the confinements of the overall project layout. Casing shall be installed as boring equipment removes material from hole.

C. Random lengths of steel casing may be used; but all ends must be V grooved-butt welded to adjacent casing pipe around the complete perimeter of the pipe. Welds to be watertight and shall be equal to or stronger than adjacent pipe. Casing joining procedures must be such that concentricity of the entire completed casing will be maintained.

1.12 MISCELLANEOUS APPURTANANCES

A. Poly Wrap

1. Encase ductile iron pipe, fittings, valves, valve boxes and appurtenances in 8-mil thick polyethylene encasement installed according to ANSI/AWWA C105/A21.5.

2. All lumps of clay, mud, cinders, or other materials that might be on the pipe surface should be removed prior to installation of the polyethylene encasement. Care should be taken to prevent soil or bedding material from becoming trapped between the pipe and the polyethylene. The polyethylene film should be fitted to the contour of the pipe to effect a snug, but not tight, encasement with minimum space between the polyethylene and the pipe. Sufficient slack should be provided in contouring to prevent stretching the polyethylene when bridging irregular surfaces, such as bell/spigot interfaces, bolted joints, or fittings, and to prevent damage to the polyethylene during backfilling operations. Overlaps and ends should be secured with polyethylene-compatible adhesive tape, tape at least every 4 feet.

3. For installation below the water table or in areas subject to tidal actions, it is required that both ends of the polyethylene tube be sealed as thoroughly as possible by wrapping circumferentially with adhesive tape or strapping at each joint overlap.

4. As with all protection methods, proper installation is vital to the success of polyethylene encasement. The actual installation sequence, however, is less important than the quality and care taken during installation.

1.13 LOCATOR WIRE

A. Locator wire shall be #12 gauge solid copper wire with PE-45 solid blue insulation as manufactured by Kris-Tech Wire Company or an approved equal. Locator wire shall be 1,500' (Ft.) rolls and be installed in such a manner to keep splices to an absolute minimum. Rolls of 500' (Ft.) are only acceptable on jobs of less than 500' (Ft.) in length. All connections or splices shall be made with a Splice Kit equal to 3M-DBR. Wire to be taped to top of pipe. See detail in plans. Wire to be installed along all lines and outside all valve boxes to extend 48" above ground. Locator wire installation, including signal loss, shall be warranted under the 1-year pipe and workmanship warranty.

B. Contractor must prove continuity of locator wire after installation is complete.

1.14 POLY WRAP

A. Encase ductile iron pipe, fittings, valves, valve boxes and appurtenances in 8-mil thick polyethylene encasement installed according to ANSI/AWWA C105/A21.5.

B. Although the polyethylene encasement should prevent contact between the pipe and surrounding backfill and bedding material, it is not intended to be completely airtight or watertight. All lumps of clay, mud, cinders, or other materials that might be on the pipe surface should be removed prior to installation of the polyethylene encasement. Care should be taken to prevent soil or bedding material from becoming trapped between the pipe and the polyethylene.

C. The polyethylene film should be fitted to the contour of the pipe to effect a snug, but not tight, encasement with minimum space between the polyethylene and the pipe. Sufficient slack should be provided in contouring to prevent stretching the polyethylene when bridging irregular surfaces, such as bell spigot interfaces, bolted joints, or fittings, and to prevent damage to the polyethylene during backfilling operations. Overlaps and ends should be secured with polyethylene-compatible adhesive tape, tape at least every 4 feet.

D. For installation below the water table or in areas subject to tidal actions, it is required that both ends of the polyethylene tube be sealed as thoroughly as possible by wrapping circumferentially with adhesive tape or strapping at each joint overlap.

1.15 GATE VALVES

A. Gate Valves

1. Gate valves shall conform to AWWA Specification C509 or AWWA Specification C515. Gate valves shall have: Fully Encapsulated Wedge non-rising stainless steel stem; double "0" Ring Seal; 2 inches square operating nut and the direction of rotation to open the valve shall be to the right **(clockwise)**; Mechanical joint 250 psi design working pressure; 304 Stainless Steel nuts and bolts; C550 epoxy coated inside and out; wall thickness exceeding Cl53. Valve shall be set vertical and in true alignment.

2. All valves to have concrete thrust block placed underneath valve of same face area as shown in restraint chart for tee of similar pipe size; or pipe restraint method may be used in lieu thereof.

B. Valves on 1½ Inch and Smaller Lines and Boxes

1. Valves shall have: full round opening flow way, 2 piece cast brass or bronze body with a closed bottom (no opening), top and port O ring seals, T head with removable plug for in line repair, top anti friction washer and bottom low friction plastic bearing insert with screwed ends, Mueller Oriseal III; or a ball valve with bronze body and T head, double O ring stem seals, molded Bura N rubber port seals and ball seats, full round opening ball with screwed ends, Ford B11.

C. Valve Boxes

1. Valve box in grass settings shall be 6 inch SDR 21 PVC with cast iron ring and lid. Valve boxes shall be set plumb at or above the ground surface. Valve cover and ring shall be Clay & Bailey No. 2194 or approved equal with cover marked "WATER".

1.16 AIR RELEASE VALVE AND/OR WATER SAMPLING STATION

A. Air Release Valve

1. Air release valves shall be APCO 3/4 inch No. 65 connected to the top of the main line with a 3/4 inch corporation stop. The vent pipe shall be as shown on the details with a No. 18 mesh copper or stainless steel screen.

B. Water Sampling Station

1. Water Sampling Station shall be constructed according the details.

1.17 FIRE HYDRANT

A. Fire hydrants shall be manufactured in accordance with AWWA Specification C 502. Hydrants shall have: Compression shutoff valve; 4 inches minimum (or line size) mechanical joint inlet; One 4-inch and two 2½ inch hose nozzles; 5 feet bury; National standard threads, Painted red; bronze pentagon operating nut; dry-top center stem construction with O-ring sealed lubrication reservoir. Hydrant shall open clockwise, shall be a traffic model with safety flanges and steel stem coupling. Hydrants shall be set vertical and on true alignment. All hydrants shall rest on a stone or concrete bearing pad of at least 300 square inches surface area and 4 inches minimum thickness. The concrete thrust block shall not interfere with the drain opening. Seven cubic feet of large aggregate shall be placed around the hydrant base. Fire hydrants shall not be installed on waterlines less than six inches in diameter.

1.18 CLEANOUTS

A. Cleanouts shall be constructed as shown in details on the plans.

1.19 METER PIT

A. Meter pits (Complete) shall be installed by the Owner and shall be 18"x 36" heavy plastic meter pit.

B. Meter setter shall be Ford VBHH72-15W-44-33NL.

C. Each service connection shall be individually metered with a 5/8" radio-read residential meter compatible to CUSI billing system.

1.20 THRUST BLOCKING

A. Thrust blocking shall be built using redi-mix concrete (3,000 psi) or by using premix sacks which are field mixed with water in a portable mixer or other container such as a mud box or wheel-barrow before it is placed in the Trench. Specifically unacceptable is placing bags of premix in the trench in a bag.

B. Face dimensions (The face against unexcavated earth) shall be as given in "CHART FOR THRUST BLOCKING shown on the details. The centerline of the face dimensions shall be located at the centerline of the pipe and ½ of vertical concrete shall be above and below the centerline. Horizontal centerline shall likewise split the distance.

C. This table for concrete thrust blocks all pipe types. Block valves with area required for Tee. Height of block no greater than ½ total trench depth. Width (1 to 2) x height for vertical compression bends (down thrust) use same values in this table.

D. For valves on cast iron or concrete pipe, optional restraint is acceptable. Place concrete pad under valve so weight is not borne by adjacent pipe and lay pipes with restrained joints for pipe distances in restrained joint table and no thrust blocking will then be required.

1.21 TIEBACK RODS

A. Tiebacks shall be used to hold assemblies together such as at a tee which has a valve located on one or various sides and at other places where some type of restraint is required to prohibit movement and thus create a leak. Concrete reaction backing, discussed elsewhere, is required to transmit thrust to undisturbed earth and each specific item such as a tee or bend or valve has a specific concrete thrust block requirement for that individual item. When these items have been aggregated and made continuous by use of tiebacks some of the concrete reaction blocking may be eliminated. In these cases, the entire aggregated system may be treated as one for the purpose of concrete thrust blocking and the contractor may submit a system, approvable by the Owner, that will do the job with less concrete than would have been required if each item were separate.

B. Tiebacks shall consist of 3/4 inch diameter all-thread stainless steel rods with nuts on both sides of all fittings, bolt holes, etc. which are a part of the aggregated system. The rods shall be run through the bolt holes in fittings, valves, etc. and slightly bowed to traverse around the body of these or devices may be added which hook into said holes so that rods may remain straight or anchor straps, socket clamp assemblies, etc. may be used as suits the contractor's normal procedures. When the assembly has been completed a bitumastic coating (25 mils min. thickness) shall be applied to cover all of the rods, nuts, washers, etc. used in the assembly.

C. Number of Tieback Rods

Pipe Size	No. of Tieback Rods
< 4"	2
4" through 8"	6
10" through 14"	8

1.22 SITE PREPARATION AND UTILITY LOCATES

A. SITE PREPARATION

1. Contractor shall remove trees, bushes, tree stumps, roots, debris, and other vegetation, as required for installations.
2. Contractor shall remove pavement, road surfacing, junk and structures.
3. Contractor shall mark adjacent property, fences, trees, and structures that are to be protected.
4. All salvageable materials as determined by the Owner shall be set aside for Owner pickup. All non-salvageable materials shall be removed from the site and properly disposed by Contractor.

B. UNDERGOUND UTILITY LOCATIONS

1. The Contractor shall comply with Sec. 319.015 - 319.050 RS MO and shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures, both known and unknown, may be determined, and he shall be held responsible for the repair of such structures when broken or otherwise damaged because of carelessness on his part. The actual location of existing utilities is the sole responsibility of the Contractor. Those shown on the plans are given to call particular attention to areas of special concern. Contractor shall contact one call (1-800-DIG-RITE), as well as individual utilities as necessary to insure all utilities are located in the field prior to construction.

1.23 SEPARATION OF WATER MAINS, SANITARY SEWERS AND STORM SEWERS

A. General

1. The following factors should be considered in providing adequate separation prior to trench excavation as required by Missouri Department of Natural Resources:

(1) Materials and type of joints for water and sewer pipes.

(2) Soil conditions.

(3) Service and branch connections to the water main and sewer line.

(4) Compensating variations in the horizontal and vertical separations.

(5) Space for repair and alterations of water and sewer pipes.

(6) Off-setting of pipes around manholes.

B. Parallel Installation

1. The water main shall be located at least ten feet horizontally from any existing or proposed line carrying non-potable fluids such as, but not limited to drains, storm sewers, sanitary sewers, combined sewers, sewer service connections, and process waste or product lines. The distance shall be measured edge to edge.

2. In cases where it is not practical to maintain a ten-foot separation, the department may allow deviation on a case by case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a non-potable fluid line, provided the water main is laid in a separate trench located as far away from the non-potable line as feasible and meets other specific construction requirements. Locating a water main on an undisturbed earth shelf located on one side of the non-potable line is not recommended and requires justification by the engineer and approved by Department of Natural Resources. In either case, an elevation shall be maintained such that the bottom of the water main is at least 18 inches above the top of the non-potable line while meeting minimum cover requirements.

3. In areas where the recommended separations cannot be obtained, either the waterline or the non-potable line shall be constructed of mechanical or manufactured restrained joint pipe, fusion welded pipe, or cased in a continuous casing. Casing pipe must be a material that is approved for use as water main. Conventional poured concrete is not an acceptable encasement.

C. Crossings

1. Water mains crossing sewers, or any other lines carrying non-potable fluids shall be laid to provide a minimum vertical clear distance of 18 inches between the outside of the water main and the outside of the non-potable pipeline. This shall be the case where the water main is either above or below the non-potable pipeline. 18-inch separation is a structural protection measure to prevent the sewer or water main from settling and breaking the other pipe. At crossings, the full length of water pipe shall be located so both joints will be as far from the non-potable pipeline as possible but in no case less than ten feet or centered on a 20-foot pipe. In areas where the recommended separations cannot be obtained, either the waterline or the non-potable pipeline shall be constructed of mechanical or manufactured restrained joint pipe, fusion welded pipe, or cased in a continuous casing that extends no less than ten feet on both sides of the crossing. Special structural support for the water and sewer pipes may be required. Casing pipe must be a material that is approved for use as water main. Conventional poured concrete is not an acceptable encasement

D. Exception

1. The Department of Natural Resources must specifically approve any variance from the requirements of this Section, Subsections B and C, above, when it is impossible to obtain the specified separation distances.

E. Force Mains

1. There shall be at least a ten-foot horizontal separation between water mains and sanitary sewer force mains or other force mains carrying non-potable fluids and they shall be in separate trenches. In areas where the recommended separations cannot be obtained, either the waterline or the non-potable line shall be constructed of mechanical joint pipe or cased in a continuous casing, be constructed of mechanical joint pipe, or be jointless or fusion welded pipe. Where possible, the waterline shall also be at such an elevation that the bottom of the water main is at least 18 inches above the top of the non-potable line. Casing pipe must be a material that is approved for use as water main. Conventional poured concrete is not an acceptable encasement.

F. Sewer Manholes

1. No waterline shall be located closer than 10 feet to any part of a sanitary or combined sewer manhole. Where the separation cannot be obtained, the waterline shall be constructed of mechanical or manufactured restrained joint pipe, fusion welded pipe, or cased in a continuous casing. Casing pipe must be a material that is approved for use as water main. The full length of water pipe shall be located so both joints will be as far from the manhole as possible, but in no case less than ten feet or centered on a 20-foot pipe. No water pipe shall pass through or come into contact with any part of a sanitary or combined sewer manhole.

G. Disposal Facilities

1. No waterline shall be located closer than 25 feet to any wastewater disposal facility, agricultural waste disposal facility, or landfill. Water mains shall be separated by a minimum of 25 feet from septic tanks and wastewater disposal areas such as cesspools, subsurface disposal fields, pit privies, land application fields, and seepage beds.

1.24 PIPE TRENCH EXCAVATION

A. Excavation Method

1. The Contractor shall use a backhoe or excavator to dig the trench. A trencher type excavation machine may be used as approved by the Owner. In yards with sod or turf type surfaces, the operator shall take special care and remove excavated materials without removing additional turf beyond the trench.

B. Depth of Pipe

1. Minimum depth of cover over pipe shall be forty-two inches (42") as measured from the final ground level to the nearest surface of the pipe. Greater depths will be required to make smooth transitions at points of abrupt changes in the ground surface. Extra depths may be required under highways, railroads, and streams. These extra depth conditions will conform to the requirements as shown on the drawings, and as required by other agencies involved.

C. Trench Width

1. The width of the trench shall be ample to permit the pipe to be laid and jointed properly, and the backfill to be placed and compacted as specified. Trenches shall be of such extra width, when required, as will permit the convenient placing of timber supports, sheeting and bracing and handling of fittings. Minimum trench widths are shown on the plans.

D. Shoring

1. Open cut trenches shall be sheeted and braced as required by any governing federal or state law, municipal ordinances, and as may be necessary to protect life, property, or the work. Where sheeting and bracing are used, the trench width shall be increased accordingly. Trenches shall be kept free from water and pipe shall not be laid in water or on soggy material.

2. Temporary support, adequate protection, and maintenance of all underground and surface structures, drains, sewers, and other obstructions encountered in the progress of the work shall be furnished by the Contractor

at his expense and under the direction of his Engineer. Any structures that have been disturbed shall be restored upon completion of the work

E. Removal of Pavement

1. The Contractor shall remove pavement and road surfaces as a part of the trench excavation, and the amount removed shall depend upon the width of trench specified for the installation of the pipe and the width and length of the pavement area required to be removed for the installation of valves, specials, manholes, or other structures. The width of pavement removed along the normal trench for the installation of the pipe shall not exceed the width of the trench specified by more than 6" on each side of the trench. The width and lengths of the area of pavement removed for the installation of appurtenances shall be equivalent to those for the associated pipeline or 6" wider than the appurtenance (whichever is greater). Wherever, in the opinion of the Owner, existing conditions make it necessary or advisable to remove additional pavement, the Contractor shall remove it as directed by the Owner and shall receive extra compensation therefore, provided such additional work is not shown in the drawings or specified. The Contractor shall use such methods, such as drilling, chipping, or sawing as will assure the breaking of the pavement along straight lines. The face of the remaining pavement shall be approximately vertical.

F. Protection of Property

1. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the work is completed. Roadway gutters shall be kept clear or other satisfactory provisions made for street drainage. Natural watercourses shall not be obstructed.

2. Trees, shrubbery, fences, poles, and all other property and surface structures shall be protected unless their removal is shown on the drawings or authorized by the Owner. When it is necessary to cut roots and tree branches, such cutting shall be done under the supervision and direction of the Owner.

G. Field Inspection

1. Joints may be cut out of the pipeline for inspection and testing. This does not imply that indiscriminate cutting of joints will be allowed. The Engineer may perform various tests at times that he deems necessary or desirable, including pressure tests with his own equipment. Pipe may be cut at such times to facilitate such tests and the Contractor shall perform such cuts and repairs as requested.

H. Stream Crossing

1. Special detail drawings shall be submitted that are scaled and dimensioned to show the approximate bottom of the stream, the approximate elevation of the low and high-water levels, and other topographic features. Mechanical, restrained, or fusion welded joint pipe shall be required in waterways and wet weather streams.

2. Above-water crossings will not be permitted.

3. Underwater Crossings

(1) Flowing streams and water body crossings five hundred feet or less in length shall have a minimum cover of four feet over the pipe. When crossing water courses greater than 15 feet in width, the following shall be provided:

(2) The pipe shall be of special construction, having flexible watertight joints. Steel or ductile iron ball-joint river pipe shall be used for open cut crossings. Mechanical or restrained joint or fusion welded pipe may be used for open cut crossings, provided it is encased in a welded steel casing. Mechanical or restrained joint or fusion weld pipe shall be used for bored crossings.

(3) Adequate support and anchorage shall be provided on both sides of the stream.

(4) Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair; the valves shall be easily accessible and should not be subject to flooding.

(5) The valve closest to the supply source shall be in an accessible location and installed in a vault, manhole, or meter pit sized to allow the installation of leak detection equipment.

(6) Permanent taps shall be provided on each side of the valve within the manhole, vault, or meter pit to allow insertion of a small meter to determine leakage and for sampling purposes.

(7) Bank erosion is a major cause of stream crossing failures, and erosion protection measures such as rip rap have limited success. Stream movement and the history of bank erosion must be considered when choosing the length that the crossing pipe or casing shall extend beyond the upper edge of the stream channel. The stream crossing pipe or casing shall extend at least 15 feet beyond the upper edge of the stream channel on each side of the stream.

4. For lake, water body, and flood plain crossings greater than 500 feet in length, the design shall consider the ability to access and repair or replace the pipe in these crossings. Consideration shall also be given to the ability to continue service to areas served by the crossing in the event of a submerged leak or pipe break.

(1) Submerged portions of pipe crossing proposed lakes shall not be buried when the submerged pipe is greater than 500 feet in length except for the transition from water to land.

(2) Steel or ductile iron ball-joint river pipe or fusion welded pipe shall be used under water during normal flow conditions. Mechanical, restrained joint, or fusion welded pipe shall be used in flood plains.

(3) Underwater installations shall be tested for leaks prior to installation. Valves above the high water level shall be provided at both ends of water crossings so that the section can be isolated for testing or repair.

(4) The valve closest to the supply source shall be in an accessible location and installed in a vault, manhole, or meter pit sized to allow the installation of leak detection equipment.

(5) Permanent taps shall be provided on each side of the valve within the manhole, vault, or meter pit to allow insertion of a small meter to determine leakage and for sampling purposes.

5. Intermittent Flowing Streams

(1) Restrained joint or thermal welded pipe shall be used for all stream crossings.

(2) The pipe shall extend at least 15 feet beyond the upper edge of the stream channel on each side of the stream.

(3) Adequate support and anchorage shall be provided on both sides of the waterway.

I. Backflow Prevention.

1. The water system must be protected from introduction of contaminants by backflow in accordance with 10 CSR 60-11.010 Prevention of Backflow.

J. Barricades, Guards, & Safety Provisions

1. To protect persons from injury and to avoid property damage, adequate barricades, construction signs, torches, red lanterns, and guards, as required shall be placed and maintained during the progress of the construction work and until it is safe for traffic to use the highway. All material piles, equipment, and pipe that may serve as obstructions to traffic shall be enclosed by fences or barricades and shall be protected by proper lights when the visibility is poor. Safety rules and regulations of local authorities shall be observed.

K. Maintenance of Traffic & Closing of Streets

1. The Contractor shall carry on the work in a manner that will cause the least interruption in traffic and may close to through travel not more than two consecutive blocks, including the cross street intersected. The Contractor shall provide suitable bridging over the trench where traffic must cross open trenches.

2. The Contractor shall post suitable signs indicating that a street is closed and necessary detour signs for the proper maintenance of traffic. All signage will meet the Manual of Uniform Traffic Control Devices (MUTCD). Adequate signage will be required in the Work Zone.

1.25 PIPE PLACEMENT AND BEDDING

A. Pipe Placement

1. All water mains shall be covered with at least 42 inches of earth or other insulation to prevent freezing.
2. Pipe deflection at joints shall not exceed 80% of the manufacturer's recommendations.

B. Trench Construction

1. Bedding is the portion of the trench beneath the pipe and supporting the pipe to its spring line. Embedment is the material placed around the pipe to at least six inches above the top of the pipe. Backfill is the material placed into the trench above the embedment.
2. Continuous, firm, stable, and uniform bedding shall be provided in the trench for all buried pipe. The bedding design shall insure that there is full support in the haunches of the pipe and be smooth and free of ridges, hollows, and lumps.
3. Bell holes should be excavated so that only the barrel of the pipe receives bearing from the trench bottom.
4. The weight of metallic fittings shall not be supported by the pipe. Metallic fittings shall be provided with proper support, such as crushed stone, concrete pads or a well compacted trench bottom.
5. Rocks and hard objects larger than one inch diameter found in the trench shall be removed at least four inches below and on each side of the pipe and the trench bottom should be filled with 4 to 6 inches of tamped bedding material.
6. When an unstable sub-grade condition which will provide inadequate pipe support is encountered, an alternative foundation shall be provided such as over digging and backfilling with tamped granular material.
7. The trench shall be kept free from water during pipe installation until the pipe has been installed, embedded and backfilled.
8. If the trench passes over another pipe or previous excavation, the trench bottom shall be filled with granular material and compacted.
9. Blocks shall not be used to change pipe grade or to intermittently support pipes across excavated sections.
10. All bedding and embedment material shall be free from cinders, ashes, refuse, vegetable or organic material, boulders, rocks or stones.
11. Embedment material should be tamped in layers around the pipe, and to a sufficient height above the pipe that the pipe is adequately supported, stabilized, and protected. Shaped beddings perform essentially as well as full-contact embedment with select granular soil and are considered equal to full contact bedding.
12. Bedding normally consists of free flowing material such as gravel, sand, silty sand, or clayey sand. If this material is not used, a chipper should be used on the trencher to prepare the soil removed from the trench as embedment and backfill.
13. Embedment material diameter for plastic pipe shall be no greater than ½ inch for 4-inch diameter pipe, ¾ inch for 6 and 8-inch diameter pipes, and 1-inch for pipe diameters from 10 inches and greater.
14. Sand or other non-acidic granular material shall be used for pipe bedding, embedment and backfill in high traffic areas and under paved roads.
15. Backfill may consist of the excavated material, provided it is free from unsuitable matter such as large lumps of clay, frozen soil, organic material, boulders, or stones larger than 8 inches, or construction debris.
16. Width of trenches shall be at least four inches larger than the pipe's diameter. The minimum clear width of a trench should be the pipe outside diameter plus twelve inches to be wide enough to accommodate the compaction equipment.

1.26 BACKFILLING

A. General

1. Backfill material shall be placed above the pipe bedding to the top of the trench with excavated material. The backfill shall be neatly rounded over the trench to a sufficient height to allow for settlement to grade after consolidation to make the earth surface conform as nearly as possible to the original condition. Backfilling material shall be deposited in the trench for its full width on each side of the pipe, fittings, and appurtenances simultaneously. Backfilling by machine methods will be allowed, if overseen by laborers to watch for rock, improper backfill material, and damage to pipe.

2. The replacement of backfill material into the trench shall be accomplished by running equipment parallel to the trench. The process of running equipment perpendicular to the trench to push backfill into the trench is prohibited.

3. Laborers following behind the backfill operation shall be using a shovel to remove remaining small amounts of earth from turf so that the work areas (not the trench area) will be restored to their original condition the day the excavation occurs.

4. The Contractor may backfill with excavated material where backfill material is not indicated on the drawings or specified. If excavated material is unsuitable for backfill as determined by the Owner, the Contractor shall provide approved material to backfill the trench.

5. If the excavated material consists of sand or loam or clay which has been excavated in a manner to eliminate lumps or clods (e.g. excavation by a trenching machine), the trench may be backfilled by means of a road grader or similar device, which will gently roll the material into the trench by multiple passes parallel to the trench.

6. Where additional trench settlement occurs, refilling shall be required to bring the surface to conform to the adjacent ground.

B. Backfill under Permanent Pavement

1. Where the excavation is made through permanent pavements, curbs, driveways, or sidewalks, or where such pavements are undercut, the entire trench shall be backfilled to the subgrade of the pavement with sand or granular backfill material. Backfill shall be compacted to 90% of the maximum Standard Proctor (AASHTO T-99) for the material. Backfill in trench shall not exceed 8" lifts.

C. Backfill under Private Gravel Drives

1. Walks and driveways consisting of broken stone, gravel, slag, or cinders shall be backfilled and compacted with suitable excavated material. If excavated material is not suitable or as directed by the Owner, the trench shall be backfilled and compacted with 1" surface rock. The top 12" of backfill shall match the existing aggregate.

D. Backfilling around Structures

1. Compacted backfill will be required around valve boxes, fire hydrants and other items, which project to ground, surface to insure continuity of proper alignment.

E. Backfilling in Freezing Weather

1. Backfilling will not be allowed in freezing weather except as approved by the Owner. No fill shall be made where the material already in the trench is frozen, and in no instances shall frozen material be used in the backfill.

F. Excess Excavated Material

1. Excess excavated materials from trenches located in open fields shall be uniformly distributed within the construction limits. Excess excavated materials within streets, driveways, parkways, highways and roads not required for backfilling or grading shall be removed from the site.

1.27 DIRECTIONAL BORING

A. Directional bores shall be made so that line and grade of water line may be carried continuously through encasement. Boring encasement, if required, shall comply with the size and type shown on the plans.

B. The directional boring machine shall be supplied with an output signal to allow the Contractor to track the location of the drill head at all times. Size of drilling equipment shall be adequate for the job, but not grossly oversized such that an undue amount of thrust or torque is placed on the product pipe. Drilling fluids shall be selected for the site-specific soil and ground water conditions. Confine free flowing (escaping) slurry or drilling fluids at the ground surface during pullback or drilling to prevent damage or hazardous conditions in surrounding areas. Remove all residual slurry from the surface and restore the site to pre-construction conditions.

C. All pipelines provided in the restrained joint area shall be installed to a minimum depth of 4 feet for creek crossings and 10 feet for river crossings, unless shown otherwise on the Plans.

D. All work associated with installing restrained joint pipe in the designated areas and, if crossing wetlands, creeks, rivers, streams or other waterways, shall conform to all permit requirements and to state and federal regulations. The restrained joint areas depicted on the drawings are not to be considered exact and represent the generalized location of the restrained joint pipe. The actual location, length, and size of the restrained joint area will be determined in the field by the Owner's Representative and may differ from that shown on the drawings. The actual field location, length and size may differ due to, but not limited to, staking the pipelines alignment to avoid or minimize disturbance to surface obstructions, re-routes due to pipeline easement changes, re-routes authorized by the Owner or Owner's Representative based on actual field conditions, and or any other reasons deemed necessary by Owner or Owner's Representative.

E. A pilot hole shall be bored first, with an angle of entry not to exceed 20°, and proceed under the obstacle being crossed while maintaining the required soil. The pilot hole shall extend to the point of exit, on the other side of the obstacle, maintaining an angle of exit not to exceed 15°. The product pipe shall be restrained joint PVC pipe, as specified in this manual, unless stated otherwise on the plans.

F. The product pipe shall be assembled on the exit side of the bore, and installed by back-reaming in the reverse direction. Deviations from this method shall be approved by the Engineer. The pull section shall be adequately supported during pullback. Do not drag pipe on the ground. Above-ground pipe assembly shall be checked for suitability of installation before pullback. The borehole shall be reamed to approximately 1.5 times the outside diameter of the product pipe. Use sufficient drilling fluids and monitor pullback pressure to detect any problems before heaving of the bore path surface occurs. Product pipe may be deflected no greater than 80% of the manufacturer's maximum recommended deflection. Maintain the minimum cover required at each restrained joint area. Provide a written statement from the pipe manufacturer as to the minimum pipe bending radius and/or deflection allowed and as to the acceptance/requirements of using their pipe in the Directional Drilling method. Provide this information during the submittal phase of the project.

G. Use a swivel when back-reaming to prevent rotational torque (torsion) on the product pipe. Cap product pipe as necessary to prevent drilling fluids from entering.

H. Trace bore path by interpretation of electronic signals sent by a monitoring device. Submit to the Engineer a print out of the bore path with respect to the obstacle crossed for the development of as-built drawings and to exhibit that sufficient cover was achieved during the bore. The bore path print-out must be submitted prior to final pay request.

I. Repair all bore/relief pits constructed, including vacuuming drilling fluids, and compact all disturbed earth.

J. Installation Alignment Report

1. The Contractor shall keep a record of the location after each rod push. Data shall include the following, as appropriate:

Rod	number
Length	foot
Depth	inch
Offset (L/R)	foot
Pitch	%

1.28 PVC CARRIER PIPE INSTALLATION IN CASINGS

A. All carrier pipes shall have restrained joints. However, it will be unnecessary to use restrained joint pipe if the casing is shorter than the carrier pipe. The pipe may be laid directly on the casing without the use of spacers.

B. Pipe may be installed by using drawn cable or jacking. The force used to install the pipe must spread over the pipe end on which it bears, by use of a flat piece of wood or other similar force sustaining material.

C. Bores under roadways and creeks where encased or not shall have two separate strands of locator wire attached to the waterline that runs from isolation valves on either side of the bore as terminal points for the extra wire.

D. On 4" and larger pipes, a ductile iron MJ sleeve, a fitting or valve shall be installed one pipe past either end of the casing. On pipes smaller than 4", a PVC repair style coupling may be installed on either side of the casing, in lieu of a ductile iron sleeve.

1.29 CASING AND SPACER DATA

A. Skids shall be totally non-metallic constructed of preformed sections of high-density polyethylene. Spacers shall be ISO 9002 certified for strength and quality.

B. Skids shall have a toothed male strap on one segment with female strap on other so multiple segments can be banded together.

C. Skid thickness to be sufficient to raise pipe bell off of casing so no weight rests on bell.

D. Use flux soap or drilling mud to lubricate skids.

E. The Contractor shall submit shop drawings for the casing pipe and spacers. The spacer shall be sized to ensure that the bell of the carrier pipe does not touch the casing. The casing shall have at least a 1-1/2" clearance at the top. Contractor's supplier shall show compatibility of casing size with spacer design.

F. Below is a table of pipe sizes and maximum skid support spacing for PVC. In addition to tabular spacing, split skid spacing dimensions so that a skid is located at least one foot from each end of casing. Use at least 3 skids per pipe irrespective of chart values.

SPACER DATA		
Pipe Size	Max. Skid Spacing	Spacer Width
(inch)	(feet)	(inch)
4	4½	6
6	6	6
8	7	8
10	8½	8
12	9½	8

The ends of casing shall be sealed with 1/8" synthetic rubber wrap around end seal with stainless steel banding straps.

1.30 TESTING OF PIPELINE

A. Field Inspection

The Engineer may perform various tests at times that he deems necessary, including pressure tests with his own equipment. Joints may be cut out of the pipeline for inspection and testing. This does not imply that indiscriminate cutting of joints will be allowed. Pipe may be cut at such times to facilitate such tests and the Contractor shall perform such cuts and repairs as requested.

Pipes, fittings, valves, hydrants, and accessories shall be inspected for defects prior to placement into the trench. Any defective, damaged, or unsound material shall be repaired or shall be removed from the site.

B. Line Cleaning

To insure that lines are clean prior to disinfection, a polyethylene pig swabbing device shall be run through the line. The pig shall be sized for the specific size of the pipe, and shall be provided by the Contractor. The Contractor may do the line cleaning in segments as suits his construction methodology. The pipe segments shall be subdivided to facilitate practical lengths of line cleaning, or as directed by the Owner.

Contractor shall install and remove all temporary connections and devices required to insert the pig, provide adequate water for flushing, and removal of the pig upon completion.

The cleaning of some lines may be waived if the Owner Inspector feels that the pipe installed is clean and free of foreign matter.

1.31 DISINFECTING NEW WATER MAINS

Disinfection of Water Mains shall be in accordance with the latest edition of AWWA C651.

A. Flushing Requirements

The main shall be flushed with potable water prior to disinfection until discolored water, mud, and debris are eliminated. The flushing velocity should be at least 3.0 ft/sec. The rate of flow required to produce this velocity in various diameters is shown in the table below. No site for flushing should be selected unless it has adequate drainage.

Pipe Size	Flow Required to Produce 3.0 fps Velocity
(Inch)	(gpm)
4	120
6	260
8	470
10	730
12	1060

B. Forms of Chlorine for Disinfection

1. Liquid Chlorine
   Inject with a solution feed chlorinator and a water booster pump. Use an experienced operator and follow the instructions of the chlorinator manufacturer.
2. Calcium Hypochlorite (Dry)
   Dissolve in water to a known concentration in a drum and pump into the pipeline at a metered rate.
3. Sodium Hypochlorite (Solution)
   Dilute in water to desired concentration and pump into the pipeline at a metered rate.

C. Disinfection by Continuous Feed Method of Chlorine Application

This method is suitable for general application. Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the pipeline. The water shall receive a dose of chlorine, fed at a constant, measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 50 mg/L available chlorine.

To assure that a proper concentration is maintained, the chlorine residual should be measured at regular intervals in accordance with the procedures described in the current edition of "Standard Methods and AWWA M12-Simplified Procedures for Water Examination".

The amount of chlorine residual required for each 100 ft of pipe of various diameters is shown on the table below. Solutions of 1 per cent chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately 1 lb of calcium hypochlorite in 8.5 gal of water.

Chlorine Required to Produce 50 mg/L
Concentration in 100 ft of Pipe

Pipe Size	100 percent Chlorine	1 percent Chlorine Solutions
(Inch)	(Lbs)	(Gal)
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88

During the application of the chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying the water. Chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least 24 hr, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the appurtenances. At the end of this 24 hr period, the treated water shall contain no less than 25 mg/L chlorine throughout the length of the main.

D. Final Flushing

After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 mg/L. Chlorine residual determination shall be made to ascertain that the heavily chlorinated water has been removed from the pipeline. De-chlorination of heavily chlorinated water shall be completed in accordance with AWWA C651 with de-chlorinating chemicals.

E. Bacteriologic Testing

At least twenty-four (24) hours after final flushing, bacteriologic sample(s) shall be collected from the end of the line, or other points as required by the Owner Inspector, and tested for bacteriologic quality and shall show the absence of coliform organisms. The samples collected shall be delivered by Contractor to a certified laboratory within 24 hours of obtaining the samples.

If the number and frequency of samples is not prescribed by the public health authority having jurisdiction, at least one sample shall be collected from chlorinated supplies where chlorine residual is maintained throughout the new main. In the case of mains exceeding 3000 ft, it is desirable that samples be collected midway along the length of the line as well as at its end. If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained. When the samples are satisfactory, the main may be placed in service.

Two consecutive passing tests are required to demonstrate successful disinfection. The Contractor shall re-chlorinate the pipeline segment that is being tested after three bacteriological tests have failed.

1.32 DISINFECTION AFTER CONNECTION/REPAIR TO EXISTING WATERLINES

The procedures outlined in this section apply primarily when mains are wholly or partially dewatered. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure present little danger of contamination and require no disinfection.

A. Trench Chlorination

When an old line is opened, either by accident or by design, the excavation will likely be wet and badly contaminated from nearby sewers. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from contamination.

B. Swabbing with Hypochlorite Solution

The interior of all pipe and fittings used in making the repair (particularly couplings and tapping sleeves) shall be swabbed with a 5 percent hypochlorite solution before they are installed.

C. Slug Method for Chlorination

In addition to the procedures above, a section of main in which the break is located shall be isolated, all service connections shut off, and the section flushed. The pipeline will be chlorinated with a highly concentrated dosage as high as 500 mg/L with the contact time reduced to at least 30 minutes.

D. Flushing

Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated. The line shall be flushed from both directions, as directed by the Owner Inspector.

E. Bacteriological Testing

Bacteriologic samples shall be taken at the end of the line in the direction of flow. If the direction of flow is unknown, samples shall be taken on each side of the main break.

1.33 LEAKAGE TESTING

A. Preparation of Waterline

Contractor shall perform a hydrostatic test of the new waterline. Prior to the test, Contractor shall verify that test section is fully isolated, and that all air has been expelled from the pipeline to the satisfaction of the Owner Inspector. This may be accomplished by means of air relief valves, blow-off valves, hydrants or other means. If required, taps shall be made at high points where air relief valves are not called for on the plans. Such taps shall be plugged after testing is complete. Corporation stops should be installed before this test, if possible.

B. Equipment

Contractor shall provide all necessary water, piping, pumps, gauges (face divisions of 2 psi or less) and fittings for testing.

C. Testing Pressure

Generally, the test pressures for PR 200 PVC and PR 250 PVC are 160 psi and 200 psi, respectively. The Inspector will verify the highest and lowest elevations within the section of piping to be tested and determine the test pressure and the testing location. Apply a test pressure of not less than 1.25 times the working pressure of the pipeline at the highest elevation and not less than 1.5 times the working pressure of the pipeline at the lowest point of the test section. After the specified pressure has been reached, the pump shall be stopped and all pipe, fittings, valves, hydrants, joints, and appurtenances examined for leaks. The test pressure for this application shall be 100 psi.

Any visible leaks shall be repaired. After visible leaks are repaired, the pipeline shall be refilled with water and re-pressurized to the design pressure of the pipeline. This pressure shall be maintained for a period of four hours. The test pressure shall not vary by more than ± 5 psi for the duration of the test.

D. Allowable Leakage

A container of water shall be attached to the distribution line in a manner to allow the water in the container to flow into the pressurized lines. Water loss in the container shall be measured after the test and acceptability of the line shall be based on the following formula for a leakage allowance of 10.5 gallons per inch diameter per mile per day:

$$L = \frac{NxDx\sqrt{P}}{74{,}000}$$

Where: L = Allowable Leakage in gallons per hour
N = Number of joints in line being tested

D = Nominal pipe diameter in inches
P = Average test pressure in psi

Allowable Leakage per 1000 ft in gal per hr				
Test Pressure (psi)	Pipe Size (inch)			
	4	6	8	12
150	0.34	0.50	0.65	0.95
160	0.35	0.51	0.67	0.99
170	0.36	0.53	0.69	1.02
180	0.37	0.54	0.71	1.05
200	0.39	0.57	0.75	1.10
220	0.41	0.60	0.78	1.16

END OF SECTION

SECTION 02515

WATER DISTRIBUTION VALVES AND APPURTENANCES

1 GENERAL

1.1 Scope

The section includes valves and appurtenances pertaining to water distribution system construction. Contractor shall furnish all material, equipment and labor to complete the work.

1.2 Water Distribution Specifications

Specification sections beginning with "Water Distribution" are specifically for the materials and construction of water distribution system piping and appurtenances. These specifications section are to be used for all water distribution system construction and supersede any conflicts with other specifications in this project manual when pertaining to water distribution system construction.

1.3 License, Permits, Certificates, Laws and Ordinances

Licenses, permits and certificates as required by law or other regulatory agencies shall be procured and purchased when necessary by the Contractor. The Contractor shall comply with all applicable laws, ordinances, safety provisions, rules and regulations relating to the work. Work done inside the right-of-way of state highways shall be located in the six foot (6') utility corridor.

1.4 Trespass

The Contractor shall inform affected property owners, even though easements have been obtained, before construction occurs on their property. Should the property contain farm crops, at least three days notice shall be given to allow for harvesting. Crops damaged without notice so given shall be paid for by the Contractor at current market value.

The Contractor shall obtain permission, in writing, before cutting fences and repair same to original condition or better. Fences shall be completely repaired the day they are taken apart. Fences left unrepaired may be fixed by the owner and costs deducted from monies due to the Contractor. If a controversy arises over fence cutting and Contractor does not have written permission, damages may be assessed against Contractor to return fence to original condition. Contractor shall use existing openings, insofar as practical to maneuver equipment.

1.5 Project Quantities

Project quantities shall be measured as the work progresses by the Contractor and Owner's representative. Contractor and Owner's representative shall keep daily logs and compare quantities at the end of the work week. Quantity discrepancies should be worked out between Contractor and Owner's representative. Log sheets signed by the Contractor and Owner's representative shall be provided to the Engineer for payment purposes.

1.6 Shop Drawings and Material List

Before the Contractor begins work, six copies of shop drawings, parts diagrams material specification sheets, outline dimension prints and equipment performance characteristics for all items proposed to be used shall be submitted to the Engineer for approval for use on the project. Accompanying this submittal shall be the names and location of the manufacturer and the closest stocking supplier. Products shall not be utilized until written approval is given by the Engineer, who shall be the sole determinant of acceptability between similar items as made by different

manufacturers. The Contractor shall furnish products which are in complete compliance with the contract requirements; and approval of shop drawings and/or material lists shall not be construed as authorizing any deviations from the contract plans or specifications.

If it is the intent of the Contractor to provide products which deviate from the contract plans or specifications, such intent shall be made in writing accompanying the submittal of products for approval by the Engineer. The Contractor shall indicate those characteristics of the product which are in non-conformance, give reasons for said non-conformance and receive written approval of the Engineer for deviating from the requirements before utilizing the product in the work.

If subsequent investigation reveals a product was installed which deviated from the requirements without specific written approval for the deviation, then the Contractor at the request of the Engineer may be required to remove and replace such product at his expense. If the Contractor fails to act then the Engineer may require the change to be made by others and charged against the Contractor. If available, funds withheld from the Contractor may be used to pay necessary removals/replacements.

If the Contractor desires to receive payment for materials stored on the job, he shall submit invoices for the products upon which payment is requested. These invoices shall be on the supplying company's forms and shall show all unit prices, allowable discounts and proposed rebates; all as necessary for the Engineer to determine the actual price the Contractor will ultimately pay for the materials.

1.7 Bidding Provisions for Fittings

A Job with No Bid Item for Fittings

Fittings will not be indicated or bid as a separate bid item. It will be the Contractor's choice as to how to install the pipe as per the angular change so long as the pipe remains in the right of way or easement. The Contractor may install a fitting such as a 22½°, 45° bend, etc. with reaction backing as per normal installation of such a fitting (all without a specific bid item compensation) or the Contractor may adjust trench depths or angular alignment to keep joint angular alignment in conformance with above stipulated while still maintaining a 42 inch cover. This procedure will be acceptable up to and including a depth of cover over the pipe of 8 feet. The Contractor will be required to install a fitting (without added compensation) to maintain cover depth within said tolerance.

In certain instances fittings will be required by the nature of the job i.e. tee, 90° bend, etc. and these will be required as shown on the plans, but extra payment will not be made and the Contractor shall include these costs in the pipe line unit prices.

B Job with Bid Item for Fittings

Some jobs will be bid with prices taken for different fittings. Fittings used on this type of job will be paid for at the prices indicated on the bid proposal.

2 RELATED SECTIONS

2.1 Section 02325 – Water Distribution – Trenching, Excavating and Backfilling

2.2 Section 02512 – Water Distribution Piping

2.3 Section 02516 – Water Distribution Testing and Disinfection

3 QUALITY ASSURANCE

If, during the processes involved in the completion of this work, some event happens which would indicate improper workmanship or inadequate materials have been incorporated into the work, then the Owner shall have the right to have tests conducted to determine the adequacy of the products or workmanship and also determine the cause of failures. If inadequacies are detected, the Owner shall deduct costs of said investigations from money due to the Contractor.

4 VALVES

Valves shall be installed at locations field determined by Owner.

4.1 Butterfly Valves

Valve shall conform to AWWA C504 Rubber-Seated Butterfly Valves and have protective epoxy interior coating according to AWWA C550. Valve to have slip or MJ end, horizontal hex shaft, underground operator with 2 inches nut. Closure turns similar to like size gate valve. M & H style 450 and 4500 or approved equal.

4.2 Gate Valves

Gate valves shall conform to AWWA Specification C509 or AWWA Specification C515. Gate valves shall have: Fully Encapsulated Wedge non-rising stem; double O-ring seal; 2 inches square operating nut **opening clockwise**; Mechanical joint or slip end; 250 psi design working pressure; 304 Stainless Steel nuts and bolts; C550 epoxy coated inside and out; wall thickness exceeding C153. Valves shall be set in concrete pad. Valve shall be set vertical and in true alignment.

All valves to have concrete thrust block placed underneath valve of same face area as shown in restraint chart for tee of similar pipe size; or pipe restraint method may be used in lieu thereof.

4.3 Gate Valves with Bevel Gearing, 16" -20"

Gate valves shall conform to AWWA Specification C509 or AWWA Specification C515. Gear ratio shall not be less than 2:1. Gate valves shall have: Fully Encapsulated Wedge non-rising stem; double O-ring seal; 2 inches square operating nut **opening clockwise** (open right/close left); Mechanical joint or slip end; 250 psi design working pressure; 304 Stainless Steel nuts and bolts; C550 epoxy coated inside and out; wall thickness exceeding C153. Valves shall be set in concrete pad. Valve shall be set horizontal and in true alignment. Valve operating nut shall be positioned faced vertical and true and centered in line with the valve box.

4.4 Valves on 1½ Inch and Smaller Lines and Boxes

Valves shall have: full round opening flow way, 2 piece cast brass or bronze body with a closed bottom (no opening), top and port O-ring seals, tee head with removable plug for in-line repair, top anti-friction washer and bottom low friction plastic bearing insert with screwed ends, Mueller Oriseal III; or a ball valve with bronze body and tee head, double O-ring stem seals, molded Buna N rubber port seals and ball seats, full round opening ball with screwed ends, Ford B11. Valve box shall be same as previous.

4.5 Air Release Valves and Water Test Pit

A Air Release Valve

Air release valves shall be Apco 3/4 inch No. 65 or approved equal, connected to the top of the main line with a 3/4 inch corporation stop. The vent pipe shall be galvanized pipe as shown on the details with a copper screen soldered over the opening. Valve to be located as shown on the plans or as directed by the Engineer.

B Pit

For air release use 18 inch PVC pipe with minimum 3/8 inch wall. For water test pit use 30-inch PVC. Cover for 18 inches pit to be 4 inches deep cast iron with 11 inches diameter recessed lid, including positive means to prevent sidewise movement of both ring and lid, lid weight 11 pounds, ring 25 pounds. Cover for 30 inches pit to be cast iron, Ford No. 30 Monitor cover, 20 inches lid, 7½ inches deep, weight 131 pounds.

C Water Test Pit

Assembly shall be a 3/4 inch water source on either side of a line size valve. The line size valve price shall not be included in the bid for the test pit. All other items shall be included in this bid. 3/4 inch water source shall consist of a tap (Saddle) onto the main line with a 3/4 inch corp stop, a short piece of 3/4 inch type K copper pipe to bring the water near the top of the pit and a ball valve shut off there at.

D Tapping Pipe

(i) PVC: Use saddle for all PVC pipe, Ford pack joint or approved equal for sizes including 8 inches. For 10 inches and above use Ford or approved equal.

(ii) Ductile: Tap corp stop directly into pipe or use Ford Ductile Iron Saddle F202. Any saddle placed on Ductile Iron shall be poly wrapped and taped to 1 foot each side of saddle.

If tapping saddles are installed on pipe with polywrap, first place 3 wraps of polyethylene adhesive tape around pipe and then tap through tape and poly film. Repair any damage to wrap with tape and extra film as per ANSI/AWWA C105/A21.5. After tap has been made wrap and tape saddle as above.

(iii) Corp Stop: Use 3/4 inch Ford Ball Corp, or approved equal, with Buna N rubber seats with pack joint on outlet.

Use sintered teflon pipe dope or TFE tape on all screw threads from main line.

4.6 Valve Boxes

Valve box in grass settings shall be 6 inch CL200 PVC with cast iron ring and lid. Valve boxes shall be set plumb, flush with the ground surface. Valve cover and ring shall be cast iron as per Clay & Bailey No. 2194 or approved equal.

Valve boxes in roadways and other paved areas shall be two piece, screwed type with a 5¼ inch shaft and 8 1/2 inch bell. Box shall be cast iron with cast iron lid. Valve boxes shall be set plumb, flush with the road or paved surface. Valve cover and ring shall be cast iron as per Clay & Bailey No. 2194 or approved equal.

The Contractor shall be prepared to install either type box at the same bid price and to furnish 2 keys - one for the normal setting and one with the extended 3 foot length.

5 METERS

5.1 Meter Setter

Meter yokes shall be copper or red brass with a 15 inches riser. The yoke shall be placed so the meter dials will be approximately 12 inches below the top of the meter well. Consumer end of yoke shall be of such length to be outside of meter box and allow hooking up without opening box. End of extended leg shall measure 15 inches from center line of yoke. End shall have a temporary cap.

Immediately adjacent to meter the inlet side of yoke shall be equipped with a padlock wing with incorporated shut off and discharge side of yoke shall incorporate a dual spring loaded check valve with full open waterway and be capable of inline repair. Check valve shall be angle type and be Ford HA31-323 or approved equal. Setter shall be Ford V92-15 with added features as above, also include bracing eye. Insert 12 inches piece of ½ inch Sch. 80 PVC pipe through setter eye for stability. Inlet and outlet end connection shall normally be pack joint for PE pipe. When copper service line is required, inlet end shall conform to copper pipe.

5.2 Meters

Service meters shall conform to AWWA Specification C700 and C710. Meters shall have: bronze case with frost proof construction: 5/8 inch x 3/4 inch openings; straight reading register in U.S. gallons; magnetic drive; hermetically sealed register. Meters shall be Sensus SR II with plastic bottom. Provide the tag device for each meter service to lock meter until Water District allows water user to start using water.

5.3 Meter Wells and Cover

Meter wells for meters under 1" shall be 18 inches inside diameter and 36 inches in depth. Meter wells for 1-inch through 2-inch meters shall be 30 inches diameter and 36 inches in depth. In rural and grass settings, 30-inch diameter meter wells shall have a 30-inch by 18-inch reducing ring and a standard cover and lid. Meter wells for double setters shall be 24 inches in diameter. Meter wells shall be heavy duty corrugated tile by Midwest Distributors – Model A2000 or equal.

Meter wells shall be made of PVC and shall be tested in accordance with ASTM D2444 to assure high impact damage resistance. Meter wells shall be Ultra-Rib meter pipe by Uponor ETI Company, or approved equal.

Standard meter covers shall be cast iron 4 inches deep with an 11 inches diameter recessed lid. It shall be provided with a positive means for preventing sidewise movement of both ring and lid. Weight of lid shall be 11 pounds. Weight of ring shall be 25 pounds. The meter cover ring size shall be in accordance with the meter well. Clay-Bailey 2210.

Meter covers for non-grass settings (i.e. concrete, asphalt, etc.) shall be a heavy duty manhole frame and cover with a minimum 24" diameter lid and minimum 22" internal access diameter. Manhole frame and cover material shall be in compliance with ASTM 48 CL 35B and shall be Catalog Number SM 2276 by GCI Castings, or approved equal.

6 HYDRANTS

6.1 Fire Hydrants

Fire hydrants shall be manufactured in accordance with AWWA Specification C 502. Hydrants shall have: Compression shutoff valve; 4 inches minimum (or line size) mechanical joint inlet; two 2½-inch hose nozzles with one 4½-inch pumper nozzle; 3.5' – 6' bury with use of S-type gradelok (by Assured Flow Sales); national standard threads, painted red; bronze pentagon operating nut; safety coupled stem and barrel; and o-ring sealed lubrication reservoir. **Hydrant shall be Mueller Super Centurion 200 with 4-inch minimum and 6-inch maximum shoe**, or approved

equal. Include tamper-proof valve stem. Hydrant shall be a traffic model with safety flanges and steel stem coupling. Hydrants shall be set vertical and on true alignment. All hydrants shall rest on a stone or concrete bearing pad of at least 300 square inches surface area and 4 inches minimum thickness. The concrete thrust block shall not interfere with the drain opening. Seven cubic feet of large aggregate shall be placed around the hydrant base. Fire hydrants shall not be installed on waterlines less than six inches in diameter.

All fire hydrants installed within the Sedalia Water Department system shall open right (clockwise) and be painted yellow with a red bonnet.

6.2 Post Hydrants

Post hydrants shall have: Compression shut off valve; 2" mechanical joint inlet, One 2½" hose nozzle; 4½' bury or equal to adjacent pipe; National standard threads; Open left; Painted red; 1½" pentagon operating nut; Reaction backing and drainage (Same as in Fire Hydrant). Hydrant shall be the Eclipse Model No. 2 as manufactured by the Kupferle Foundry Company, Mueller Co. #A24058, or approved equal.

6.3 Yard Hydrants

Yard hydrants shall be of frost proof construction. Size shall being equal to adjacent pipe. Hydrant shall be capable of being locked.

7 CLEANOUTS

Cleanouts (both End Cleanouts and In-line Cleanouts) shall be constructed as shown in details on the plans. Cleanouts, piping, and fittings shall be ductile iron for 4" and above and Schedule 80 PVC for 3" and below. Locate valves as shown on plans or by Engineer's approval.

8 REGULATORS

8.1 Pressure Regulator Valve

The valve shall maintain a constant downstream pressure regardless of fluctuations in demand. The valve shall be adjustable to vary the outlet pressure from 2-75 psi. It shall have a maximum inlet working pressure of 175 psi. The size shall be as specified on the plans and/or specifications. It shall be a Class 125, flanged, Cla-Val or approved equal.

8.2 Service Line Pressure Regulator

When in the estimation of the Engineer, the line pressure is in excess of that desired for suitable service a pressure regulator may be required. This regulator shall be placed immediately adjacent to the meter as shown on the plans. The regulator will be a 3/4 inch Mueller H 9300 No. 2 or approved equal.

END OF SECTION

SECTION 02750

CONCRETE PAVEMENT, CURB AND WALKWAYS

PART 1 GENERAL

1.01 REQUIREMENT

A. Concrete pavement, driveways, curbs, gutters and sidewalk shall be cut, removed and constructed or replaced to existing or proposed lines and grades and dimensions required for a complete installation as shown on the Drawings and specified herein.

B. The Contractor shall be responsible for the protection from damage from his construction operations of all concrete driveways, sidewalk, and curb and gutter within the work area. If payment items are established in the proposal for the removal and replacement of concrete driveways, sidewalk, and curb and gutter, payment will be made only if such items are encountered within the limits of the trench width plus 2 feet (shoulders). Any concrete driveway, sidewalk, or curb and gutter beyond these limits, damaged as a result of the Contractor's operation, shall be restored in accordance with the applicable requirements of these Specifications, and to the satisfaction of the Engineer, at no additional cost to the Owner. In order to protect himself from being held liable for any existing damaged concrete driveways, sidewalks or curb and gutter, the Contractor is advised to notify in writing the authority having jurisdiction over the street where such damage exists prior to proceeding with any work in the vicinity. A copy of all such notices shall be forwarded to the Engineer.

C. As used herein, "driveway" shall mean concrete driveway, and "curb and gutter" shall mean free-standing curb, gutter, or combination curb and gutter.

1.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Commercial Standards:

AASHTO M 148	Liquid Membrane-Forming Compounds for Curing Concrete
AASHTO M 153	Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.

B. Missouri Standard Specifications for Highway Construction, current edition.

1.03 SUBMITTALS

A. Shop drawings for reinforcing, joint material and mix designs shall be submitted for review in accordance with the section entitled "Submittals".

PART 2 PRODUCTS

2.01 CONCRETE

A. Concrete shall be Class A, (4,000 psi, air entrained) conforming to the section entitled "Cast-in-place Concrete", unless noted or specified otherwise.

2.02 REINFORCING AND WELDED WIRE FABRIC

A. All reinforcing steel shall be free from mud, oil, paint, grease or other organic material that may adversely affect or reduce bond with the concrete. Shop drawings, bar lists and splicing details shall be furnished by the Contractor when required.

B. Reinforcing bars shall conform to the requirements of ASTM A 615, Grade 40 or Grade 60 as specified on the Drawings.

C. Welded steel wire fabric shall conform to the requirements of ASTM A 185.

D. Tie bars shall be Grade 40 deformed steel bars, which conform to the requirements for reinforcing bars.

2.03 JOINT SEALANTS

A. Joint sealer shall be a one or two part polysulfide base self leveling sealant for horizontal surfaces that has been developed for foot and vehicular traffic. The sealant shall conform to the requirements of the section entitled "Sealants and Caulking".

B. Hot-type joint sealants intended for use in sealing joints in Portland cement pavements shall meet all the applicable requirements of ASTM D3405. Sealant shall be applied with a pressure applicator.

C. Cold-type joint sealants shall conform to the requirements of ASTM D1850.

D. Acceptance of joint sealant furnished under this Specification shall be in accordance with Section 625.10 of the "Missouri Standard Specifications for Highway Construction," Missouri Department of Transportation, Current Edition.

E. Testing of sealant properties listed above shall be in accordance with Section 625.10, of the "Missouri Standard Specifications for Highway Construction," Missouri Department of Transportation, Current Edition.

2.04 BACKER ROD

A. The material furnished for this purpose shall be resilient closed or open cell polyethylene foam rod as recommended by the manufacturer of the sealant. It shall be compatible with the silicone sealant and no bond or reaction shall occur between the rod and the sealant.

2.05 EXPANSION JOINT FILLER

A. Expansion joint filler material shall be non-extruding and resilient filler which conforms to the requirements of AASHTO M 213 and ASTM D 1751.

PART 3 EXECUTION

3.01 INSTALLATION

A. The Contractor shall provide adequate means to protect each driveway, sidewalk, and curb and gutter installation from damage from vandals, animals, weather or other causes, until the concrete is hard. Should damage occur from such causes, the Contractor shall remove and replace the damaged item at his expense.

B. Replacement driveways, curb, gutter and sidewalks shall match the elevation and alignment of existing driveways, curb, gutter and sidewalk wherever a connection is made.

3.02 CONCRETE DRIVEWAYS

A. Concrete driveways and sidewalks crossing driveways shall be restored in full sections or blocks rather than trench width plus two feet (shoulders), if the original construction was divided into such sections or blocks. The existing driveway (or sidewalk) shall be cut with an abrasive disc saw to trim the edges to straight and true lines, with edges parallel and rectangular in plan. The interior concrete shall then be broken up and removed from the site.

B. Where these curbs and gutters are adjacent to paved sections, the joints shall match those in the pavement. Joints shall be formed by making a ¼ inch groove 1 inch deep while the concrete is still plastic enough to be worked, but hard enough so it will not slump after grooving.

C. Finishing: Exposed surfaces shall be shaped to the section shown on the Drawings by using steel tools and trowels and then brushed lightly. All exposed edges and joint edges shall be rounded with an edging tool having a radius of 3/8 inch.

3.03 SIDEWALKS

A. Sidewalks shall be restored in full section, rather than trench width, plus 2 feet (shoulder).

B. Removal of existing sidewalk, installation of forms, preparation of subgrade, and the final finish shall be performed as specified hereinabove for driveways, except that the minimum thickness of the sidewalk shall be 4 inches thick.

3.04 CURB AND GUTTER

A. Curb and gutter shall be restored in lengths equal to trench width plus 2 feet (shoulders) or joint to joint, whichever is greater, unless otherwise permitted or ordered by the Engineer.

B. Removal of existing curb and gutter, installation of forms, preparation of subgrade, and the final finish shall be performed as specified hereinabove for driveways. The shape and final finish shall match that of the existing curb and gutter.

C. Continuous curbs shall be extruded concrete type unless otherwise shown. Placement shall be continuous for each section noted on the documents. Expansion joints shall be installed in accordance with MODOT specifications.

D. Expansion joints shall be placed at all sidewalk intersections between sidewalk or driveway and pavement curb, between old and new walks where old and damaged walks are being repaired and replaced, and at all other locations called for in the Drawings or at the discretion of the Engineer. Expansion joints shall be sealed with approved joint sealant where sidewalks and drive entrances (commercial and residential) intersect with pavement curb. All expansion joints in pavement and curb shall also be sealed with approved joint sealant.

E. Contraction joints shall be formed at intervals shown on the Drawings or if not shown, the interval shall be equal to the width, but not to exceed 10 feet, (e.g., a 4-foot sidewalk jointed at 4-foot intervals; a 20 foot driveway jointed at 10 foot intervals with a longitudinal joint at the center.) They shall be formed by making a ¼ inch groove 25% of the depth of the slab while the concrete is still plastic enough to be worked, but hard enough so it will not slump after grooving. Contraction joints in driveways may be formed by sawing. Contraction joints formed by "tooling"

will not be sealed with joint compound. All joints formed by sawing will be blown clean and sealed with an approved joint sealant compound.

F. A butt construction joint shall be made at the close of each day's work or when the work is stopped long enough so that the previously placed concrete would have taken its initial set. This joint shall extend completely through the slab and be perpendicular to the finished surface.

3.05 SUBGRADE CONDITION

A. The finished subgrade shall be maintained in a smooth, compact condition and any areas which are disturbed prior to placing of the concrete shall be restored at the Contractor's expense. The subgrade shall be moist at the time the concrete is placed. Water shall be uniformly applied ahead of the paving operations as directed by the Engineer. If the Contractor does not maintain the subgrade in the required moist condition, a vapor barrier sheet will be required between the subgrade and the concrete.

B. The subgrade shall be accurately trimmed to the required elevation with a 1/4-inch tolerance. High areas shall be trimmed to proper elevation. Low areas may be filled with suitable material and compacted to the specified density or filled with concrete integrally with the placing of the pavement.

3.06 SETTING FORMS

A. The forms shall be accurately set to line and grade and such that they rest firmly, throughout their entire length upon the compacted subgrade surface. Forms shall be joined neatly and tightly and braced to test the pressure of the concrete and the finishing operations. The alignment and grade of all forms shall be approved before and immediately prior to the placing of concrete.

3.07 PLACING CONCRETE

A. The concrete shall be distributed on the subgrade to such depth, that, when it is consolidated and finished, the slab thickness required by the Drawings will be obtained at all points and the surface will at no point be below the grade specified for the finished surface, after application of the allowable tolerance. The concrete shall be deposited on the subgrade in a manner that will require as little rehandling as possible.

3.08 STRIKING-OFF, CONSOLIDATING AND FINISHING CONCRETE

A. Immediately after the placing, the concrete shall be struck off, consolidated and finished, to produce a finished pavement conforming to the cross section, width and surface sequence of operations shall be as follows: strike-off; vibratory consolidation; screeding; floating; removal of laitance; straight-edging; and final surface finish.

3.09 STRAIGHT-EDGING AND SURFACE CORRECTIONS

A. After floating has been completed and the excess water removed, but while the concrete is still in a plastic state, the surface of the concrete shall be tested for trueness with an accurate 10-foot straightedge. The "Contractor shall furnish the straightedge. The straightedge shall be held in successive positions parallel to the road centerline, in contact with the surface, and the whole area tested from one side of the slab to the other as necessary. Any depressions shall be immediately filled with freshly mixed concrete and struck-off, consolidated and refinished.

High areas shall be cut down and refinished. Straightedge testing and surface correction shall continue until the entire surface appears to conform to the required grade and cross section.

3.10 FINAL FINISH

A. As soon as the water sheen has disappeared from the surface of the pavement and just before the concrete becomes nonplastic, a light broom finish shall be given to the surface.

3.11 EDGING

A. After the final finish has been applied, but before the concrete has become nonplastic, the edges of the pavement along each side of the strip being placed, on each side of construction joints and along any structure extending into the pavement, shall be carefully rounded to a ¼-inch radius except as otherwise indicated. A well-defined and continuous radius shall be produced and a smoother, dense mortar finish obtained. All concrete shall be completely removed from the top of the joint filler.

B. All joints shall be checked with a straightedge before the concrete has become nonplastic and, if one side of the joint is higher than the other or the entire joint is higher or lower than the adjacent slabs, corrections shall be made as necessary.

3.12 JOINTS

A. Construction joints shall be located as shown on the Drawings, unless otherwise noted.

B. Expansion joints around structures shall be formed by placing premolded expansion joint material about all structures and features projecting through, into or against the pavement. Unless otherwise indicated, such joints shall be ½ inch in width.

C. Open type transverse expansion joints shall be provided at all sidewalk returns and at 50 feet intervals and wherever indicated on the Drawings. Open type joints shall be formed by staking a 1/4 inch thick metal bulkhead in place and placing concrete on both sides. After the concrete has set sufficiently to preserve the width and shape of the joint, the bulkhead shall be removed. After the sidewalk has been finished over the joint, the slot shall be opened and edged with a tool having a 1/2 inch radius. Transverse expansion joints shall be cleaned and filled with joint filler strips 1/4 inch thick conforming to the requirements of AASHTO M-153.

D. Scored joints shall be either formed or sawed at 5-foot intervals and shall extend to a depth of at least one fourth of the sidewalk slab thickness.

3.13 CURING

A. After the finishing operations have been completed and as soon as the concrete has hardened sufficiently that marring of the surface will not occur, the entire surface and the edges of the newly placed concrete shall be covered and cured with membrane curing compound.

B. Curing compound shall be uniformly applied to the surfaces to be cured, in a single coat, continuous film, at the rate of one gallon to not more than 200 square feet, by a mechanical sprayer.

C. Curing compound shall not be applied during periods of rainfall. Curing compound shall not be applied to the inside faces of joints to be sealed. Should the film become damaged from any cause within the required curing period, the damaged portions shall be repaired immediately

with additional compound. Upon removal of side forms the sides of the slabs exposes shall immediately be coated to provide a curing treatment equal to that provided for the surface.

3.14 CURB AND SIDEWALK CONSTRUCTION

A. The concrete curbs and sidewalks shall be constructed on a prepared smooth subgrade of uniform density. Large boulders and other obstructions shall be removed to a minimum depth of 6 inches below the finished subgrade elevation and the space shall be backfilled with sand, base course material or other suitable material that shall be thoroughly compacted by rolling or tamping. The Contractor shall furnish a template and shall thoroughly check the subgrade prior to depositing concrete.

B. Concrete for curbs, and sidewalks shall be formed, mixed, placed and finished in conformance with the requirements of other Sections of Division 3, except as modified herein. Concrete shall be cured with a clear membrane-curing compound that shall be applied at a uniform rate of one gallon per 200 square feet in accordance with the requirements specified herein before under pavement construction. Sidewalks and curbs shall be given a light broom finish.

3.15 CURBS

A. Curbs shall be constructed in uniform sections ten feet in length except where shorter sections are necessary for closures or arcs. The sections shall be separated by sheet metal templates set perpendicular to the face and tip of the curve and not less than 2 inches longer than the depth of the curb. The templates shall be held firmly during the placing of the concrete and shall be allowed to remain in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place.

B. After the concrete has sufficiently set for a minimum of 12 hours, the Contractor shall remove the forms and backfill the spaces on each side. The earth shall be compacted in satisfactory manner with out damage to the concrete work. Minor defects shall be filled with a mortar composed of one part Portland cement and two parts fine aggregate.

END OF SECTION

SECTION 02936

SEEDING

PART 1 GENERAL

1.01 SCOPE

A. This section governs the furnishing of all labor, equipment, tools and materials, and the performance of all work for final landscaping, seeding of lawns and non-maintained vegetation areas disturbed by construction operations, and removal of rocks, debris and other foreign matter not suitable for a seed bed.

B. Refer to SWPPP and Land Disturbance permit for temporary seeding and other erosion control products usage in conjunction with seeding and mulching.

C. Alternative forms of seeding and mulching, such as hydro seeding and hydro mulching, may be submitted for review.

1.02 SUBMITTALS

A. Provide seed mixture showing percentage of seed mix, year of production, net weight, date of packaging, and location of origin.

B. Hydro mulch material, rolled erosion control product (RECP), and other manufactured products.

C. Fertilizer and straw to be inspected in the field prior to application.

D. Topsoil analysis by a qualified soil-testing laboratory stating percentages of organic matter; gradation of sand, silt, and clay content; cation exchange capacity; deleterious material; pH; and mineral and plant-nutrient content.

PART 2 PRODUCTS

2.01 MULCH

A. Oat, rye or wheat straw, that are reasonably free from weeds, foreign matter detrimental to plant life, and in dry condition.

B. Hydromulch shall consist of fiber mulch. Fiber mulch shall be derived from wood chips or recycled paper products. The mulch shall be free of chemicals and growth inhibitors. Mulch shall contain a green dye to assist in metering a uniform application.

C. Tackifier (soil binder) shall be a physllium based, organic compound derived from natural plant sources. Binder shall consist of an active hydrophilic colloid, which will hydrate with water and, upon drying after application, will tack hydrospray mix to soil surface. Binder shall be nontoxic and contain no growth or germination inhibitors

2.02 MANUFACTURED BMP PRODUCTS

A. Rolled Erosion Control Product (RECP) may be used for temporary erosion control to hold seed until the newly seeded area is stabilized. The RECP shall be 100% agricultural straw stitched with degradable thread to a single UV accelerated photodegradable polypropylene netting, similar to North American Green S-75 on embankments and DS-75 in lawn areas.

B. Other forms of RECP may be proposed, such as Bonded Fiber Matrix (BFM) and Turf Reinforcement Mat (TRM).

2.03 FERTILIZER

A. A commercial granular fertilizer, grade 13-13-13 total nitrogen (N), available phosphoric acid ($P_2 0_5$), and soluble potash ($K_2 0$), delivered in sealed bags and bearing the manufacturer's "Guaranteed Statement of Analysis."

2.04 GRASS SEED

A. Deliver to site in original containers showing analysis of seed mixture, percentage of pure live seed (% germination and % purity), year of production, net weight, date of packaging, and location of origin.

2.05 TOPSOIL

A. Topsoil furnished by the CONTRACTOR shall consist of a natural friable surface soil without admixtures of undesirable subsoil, refuse, or foreign materials. It shall be reasonably free from roots, hard clay, and coarse gravel, stones larger than one inch in any dimension, noxious weeds, tall grass, brush, sticks, stubble or other material which would be detrimental to the proper development of vegetative growth.

B. Topsoil shall be a loam, sandy loam, clay loam, silt loam, sandy clay loam, loamy sand, and shall contain less than 5 % by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1 1/2 " in diameter.

C. Topsoil shall contain not less than 3%, or more that 20% organic matter, by weight as determined by loss-on-ignition of oven-dried samples in accordance with ASTM T-6. Organic material shall be decomposed and free of wood.

D. Topsoil consists of loam, sandy loam, silt loam, silty clay loam, or clay loam humus-bearing soils adapted to sustain plant life, and ensure this topsoil is in a pH range of 6.0 to 7.0.

Soil Classification	Minimum	Maximum
Clay	5%	30%
Silt	10%	70%
Sand & Gravel	10%	70%
Organic Matter	3%	20%
pH	6.1	7.8

E. Topsoil shall conform to the following gradation.

Sieve Size	Percentage Passing
1-Inch	100%
1/2 Inch	95% - 100%
No.4	75% - 100%
No.10	60% - 100%
No.200	10% - 60%

PART 3 EXECUTION

3.01 TEMPORARY SEEDING

A. Provide temporary seeding in areas prone to erosion and sediment transport.

B. Install RECP in areas that are steeper than 6 (horiz): 1 (vert) according to manufacturer's recommended method.

C. Temporary Seed Mix
Apply the following temporary grass seed mix at the specified rate per acre.

Spring Planting

Location	Species	Pounds per Acre
Established Lawns	Oat or Rye	60
Non-Lawn Areas	Oat, Rye or Red Clover	60

Fall Planting

Location	Species	Pounds per Acre
Established Lawns	Winter Wheat/Rye	60
Non-Lawn Areas	Winter Wheat/Winter Rye	60

D. Fertilizing

Apply fertilizer at a rate of 150 pounds per acre.

E. Reseeding

Reseed areas within 30 days of initial seeding where no stand of grass has occurred.

3.02 FINAL SEEDING

A. GENERAL

1. Planting Season: August 15 – November 1 and April 1 – June 1.
2. Do not seed areas which cannot be mulched on the same day.
3. Proceed with planting only when existing and forecasted weather conditions permit. Do not sow immediately following rain, when ground is too dry, or during windy periods.
4. Areas to be seeded as a dormant seeding must be protected from erosion over winter by mulching.

B. SURFACE PREPARATION

1. Scarify subsoil to a depth of 6 inches by means of blading, chisel plowing, discing, rock picking, harrowing or any other operation necessary to return the ground surface as nearly as practical to its original condition. Remove foreign materials, plants, roots, stones two inches and larger, and debris from the disturbed area. Add suitable material to areas that settled excessively. Spread two inches of topsoil over the area. Rake until the surface is smooth and level with the surrounding ground.
2. Topsoil shall be placed on the top surface to finished grade The topsoil material used as a medium for establishing and sustaining healthy plant growth and shall meet the following composition:
   a. Topsoil consists of loam, sandy loam, silt loam, silty clay loam, or clay loam humus-bearing soils adapted to sustain plant life.
   b. Topsoil shall contain less than 5% by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1-1/2 " in diameter with a pH range of 6.0 to 7.8.
   c. Topsoil shall meet the following soil classification percentages:

Soil Classification	Minimum	Maximum
Clay	5%	30%
Silt	10%	70%
Sand & Gravel	10	20%

3.03 FERTILIZING

A. Apply fertilizer at a rate of 300 pounds per acre. Work the fertilizer into the topsoil.

B. Apply after smooth raking of topsoil and prior to roller compaction.

C. Mix thoroughly into upper 2 inches of topsoil.

D. Lightly water to aid the dissipation of fertilizer.

E. If seeding with the drilling method, include a fertilizer attachment on the drill which allows the placement of fertilizer in a band on or near the drill row.

F. If seeding by means of a hydraulic seeder, include the required amount of fertilizer to be mixed with the seed, cellulose fiber mulch and water and applied in the seeding operation.

3.04 PERMANENT SEEDING

1. Apply seed evenly in two intersecting directions using mechanical power drills or seeders.
2. Roll seeded area with cultipacker type roller at right angle to slopes not exceeding 112 lbs.
3. Apply the following permanent grass seed mix at the specified rate.

Species	PLS* Pounds/Acre
Western Wheatgrass (Rodan or Rosana)	2
Slender wheatgrass (Revenue or Primar)	1
Green needlegrass (Lodorm)	2
Blue grama (northern seed source)	2
Sideoats grama (Killdeer)	8
Switchgrass (Dakota)	3
Little bluestem (Blaze or Camper)	5
TOTAL	23

*PLS-Pure Live Seed (% germination times % purity)

(1) For sandier sites, add 2 lb PLS per acre prane sandreed, and 3 lb PLS per acre sand bluestem.

(2) For low wet areas and drainage ways, add 4 lb PLS per acre big bluestem.

4. Grass Seed Mix:

Species	% of Mix	PLS per Acre
K-31 Fescue	80	240
Perennial Rye	20	60
Total	100	300

3.05 SEEDING BY DRILLING

A. The specified seed or seed mixture shall be drilled in uniformly using a grass drill equipped with individually mounted adjustable spring loaded, double-disk furrow openers fitted with depth control bands and packer wheels.

B. The depth of control bands shall be of a size to provide final planting of not more than a depth of 1/2 to 3/4 inch.

C. Packer wheels shall have adjustable spring tension and be mounted individually on each furrow opener or be mounted independently with a press wheel situated to follow directly behind each opener

3.06 MULCHING

1. Immediately following seeding and compacting, apply mulch to a thickness of not less than 1/8 inches (approximately 2 tons per acre). Approximately ten (10) percent of the soil surface shall be visible through the mulch blanket prior to mulch tiller (punching) operation. Maintain clearance from shrubs and trees.
2. The mulching material shall be punched into the soil so that it is partially covered. The punching operation shall be performed longitudinally with a mulch tiller consisting of a series of dull, flat disks with notched or

cutout edges. The disks shall be approximately 20 inches in diameter and 1/4-inch thick, shall be spaced approximately 8-inches apart, and shall be fitted with scrapers. The working width of the tiller shall not exceed six (6) feet per member, but may be operated in gangs of not over 3 members each (18 feet total width).

3. Care shall be exercised to obtain a reasonably even distribution of mulch partially incorporated into the soil. It may be necessary to use weights or hydraulic pressure to insure that the mulch is punched into the soil adequately.

4. On slopes too steep for disking, the mulching shall be "patted" with forks as it is placed on the slopes. Soil from the top of slope areas shall be placed by hand methods on the mulching material to reduce loss due to wind. Cloddy soil should be placed over the upper 1/3 of slopes and should average approximately one cubic foot of soil to each 25 square feet of area.

5. When mulch is applied with a straw blower, it may be necessary to remove cutting knives to prevent cutting mulch too short.

6. The Contractor shall arrange his work so that the mulch can be placed and punched immediately after each slope area is seeded. Mulching operations shall not lag behind seeding operations more than 24 hours during clear weather. When rain is threatening, the Contractor shall make every effort to mulch areas the same day as seeded. Mulch shall be replaced before seeds germinate when re-mulching wind or rain damaged areas.

7. Apply water with a fine spray immediately after each area has been mulched

3.07 HYDROSEEDING

A. Contractor may propose hydroseeding upon approval of the Engineer and Owner. Contractor shall submit a hydroseeding plan and product data.

B. The hydrospray shall be applied in the form of a slurry consisting of cellulose fiber, seed, stabilizer additives, tachifier, commercial fertilizer, and water. When hydraulically sprayed on the soil surface, the mix shall form a blotter-like ground cover impregnated uniformly with seed and fertilizer and shall allow moisture to percolate to the underlying soil.

C. Prior to hydrospraying, the site shall be measured and staked to identify the areas to be sprayed by each truckload of mix.

D. Hydraulic equipment used for the application of the slurry shall be a 1500-gallon capacity agitator-mixer. This equipment shall have a built-in agitation system and operating capacity sufficient to agitate, suspend and homogeneously mix a slurry containing not less than 40 pounds of fiber mulch, plus a combined total of 15 pounds of fertilizer solids for each 100 gallons of water.

E. The slurry distribution hose lines shall be large enough to prevent stoppage and shall be equipped with a set of hydraulic spray nozzles which will provide a continuous non-fluctuating discharge. Slurry tank shall be mounted on a traveling unit.

F. Seeding rate to be hydroseeded shall be increased by 50 percent,

G. Hydroseed Slurry Mix

PRODUCT	APPLICATION RATE (pound per acre)
Seed Mix	150% of Grass Seeding Rate
Fiber Mulch	2,000
Slow-Release Fertilizer:	

20-10-5	200
0-18-0 Single Super-Phosphate	150
Agricultural Gypsum	500
Soil Sulfur	100
Soil Binder	00

3.08 HYDROMULCHING

A. Hydromulching application shall be similar to hydroseeding as far as equipment and procedures.

B. Hydromulch slurry mix shall be as follows:

1. Fiber Mulch: 200 lbs/acre.

2. Soil Binder: 50 lbs/acre. Mix soil binder at the rate of 30 pounds of concentrate mixed with 1,500 gallons of water.

3.09 MAINTENANCE

A. Reseed damaged grass areas showing root growth failure, deterioration, bare or thin spots and eroded areas.

B. Contractor shall be responsible for controlling the growth of weeds in areas disturbed during construction until all seeding work has been completed.

C. The Contractor shall re-landscape and properly reseed all areas damaged by their operations. Trenches which have settled within the warranty period, and which were previously seeded, shall be reshaped and reseeded by the Contractor at the Contractor's expense.

END OF SECTION

SECTION 02950

CLEANUP AND SITE RESTORATION

PART 1 GENERAL

1.01 SUMMARY

A. This section includes cleanup during construction and final cleanup on completion of the work, and site restoration.

B. At all times maintain areas covered by the contract and adjacent properties and public access roads free from accumulations of waste, debris, and rubbish caused by construction operations.

C. Conduct cleaning and disposal operations to comply with local ordinances and antipollution laws. Do not burn or bury rubbish or waste materials on project site. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains. Do not dispose of wastes into streams or waterways.

D. Use only cleaning materials recommended by manufacturer of surface to be cleaned.

PART 2 EXECUTION

2.01 CLEANING DURING CONSTRUCTION

A. During execution of work, clean site, adjacent properties, and public access roads and dispose of waste materials, debris, and rubbish to assure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.

B. Wet down dry materials and rubbish to reduce and prevent blowing dust.

C. Cover excavated material leaving and arriving at the site to prevent blowing dust. Clean the public access roads to the site of any material falling from the haul trucks.

D. Provide containers for collection and disposal of waste materials, debris, and rubbish.

E. Remove waste materials, debris and rubbish from site monthly and dispose off-site.

F. Any work performed in a lawn or yard area shall be cleaned up within five calendar days of the completion of such work. All topsoil excavated from a yard area shall be stockpiled and replaced within the total yard area. The Contractor shall clean up all portions of the project and signed releases by the landowner shall not relieve the Contractor of the responsibility of clean-up to an equal or better condition of the site prior to construction.

2.02 FINAL CLEANUP

At the completion of work and immediately prior to final inspection, clean the entire project site as follows.

A. Remove from the site temporary structures and materials, equipment, and appurtenances not required as a part of the completed work.

2.03 RESTORATION DURING CONSTRUCTION

A. Not used

2.04 FINAL RESTORATION

A. Restore the site as nearly as possible to its original condition including the replacement of any facility or landscaping which has been damaged beyond restoration to its original condition or destroyed.

B. Remove excess trenching material, level the area to pre-existing grade, and dispose at a suitable disposal area.

C. Damage to pre-engineered or pre-fabricated equipment caused by the Contractor's negligence or their operations shall be replaced by the manufacturer of that equipment, or their authorized representative.

D. Remove all temporary erosion and sediment controls.

END OF SECTION