CITY OF KIRKWOOD

Office of Procurement
212 South Taylor Avenue
Kirkwood, Missouri 63122

DOUGHTERY FERRY WATER MAIN REPLACEMENT

January 7, 2020

BID NUMBER 13439

TABLE OF CONTENTS

CHECKLIST
FOR
SUBMITTING A BID PROPOSAL
TO
DOUGHERTY FERRY WATER MAIN REPLACEMENT
WATER MAIN REPLACEMENT

There will be a mandatory pre-bid meeting on January 16th, 2020 at 10:00 a.m. in the Lower Level Conference Room at Kirkwood City Hall, 139 South Kirkwood Road, Kirkwood, Missouri 63122. Any contractor not present at this pre-bid meeting shall be excluded from bidding on this project.

In order for your bid to be received and accepted by the City of Kirkwood, the following criteria must be met:

- Bid proposals shall be received not later than 2:00 p.m. on January 30th, 2020, in the office of the Procurement Director, 212 South Taylor Avenue.

- **Two copies** of the Bid Proposal and all required attachments shall be enclosed in a sealed envelope and

    1. Addressed to the Procurement Director
    2. Marked "Bid Proposal 13439 – Dougherty Ferry Water Main Replacement"
    3. Endorsed with the name of the Bidder

- Bid shall be furnished on "Bid Proposal" form provided for the project. Loose copies are provided for convenience. **Two copies** of the Bid Proposal shall be submitted.

- Bid Proposal shall be completely filled out, properly executed by Bidder including signature and signature attest to.

- Qualification Form for Bidding shall be properly executed on the form provided and submitted with Bid Proposal.

- Non-Collusive Affidavit shall be properly executed on form provided and submitted with Bid Proposal.

- Employment of Unauthorized Aliens Affidavit shall be properly executed on form provided and submitted with the Bid Proposal.

This checklist is provided for the bidders' information only and is not part of the Specifications and Contract Documents. It is not required that this form be submitted with the Bid Proposal.

The City of Kirkwood reserves the right to reject any or all bids and to waive any irregularities therein.

ADVERTISEMENT FOR BIDS

Sealed bids will be received by the City of Kirkwood, Missouri, for:

DOUGHERTY FERRY WATER MAIN REPLACEMENT

Bids will be received in duplicate at the office of the PROCUREMENT DIRECTOR, 212 South Taylor Avenue, Kirkwood, Missouri, up to the hour of 2:00 p.m. on the 30th day of January, 2020, at which time and place the bids will be publicly opened and read. Bids received after said time will be returned unopened. Faxed bids will not be accepted.

There will be a mandatory pre-bid meeting on January 16th, 2020 at 10:00 a.m. in the Lower Level Conference Room at Kirkwood City Hall, 139 South Kirkwood Road, Kirkwood, Missouri 63122. Any contractor not present at this pre-bid meeting shall be excluded from bidding on this project.

Copies of the Specifications and Contract Documents are on file in the office of the PROCUREMENT DIRECTOR, City of Kirkwood, 212 South Taylor Avenue, Kirkwood, Missouri 63122, where they will be available for public inspection. Electronic copies may be obtained at no charge by contacting Cassandra James, Senior Procurement Officer/Analyst, at jamescs@kirkwoodmo.org.

All questions regarding this specification shall be submitted in writing via email to Cassandra James, Senior Procurement Officer / Analyst, at jamescs@kirkwoodmo.org by close of business day on January 23rd, 2020. Any contact by Contractor in regard to this Invitation for Bid with City personnel other than those defined above may be considered grounds for dismissal of Contractor Bid Response.

The City of Kirkwood reserves the right to reject any or all bids and to waive any irregularities therein, and accept the bid most advantageous to the City of Kirkwood.

The successful Bidder shall be required to comply in all respects with the State Statutory provisions concerning the payment of prevailing wages on Public Works, Section 290.262 and shall pay to all workmen performing work under the Contract not less than the prevailing hourly rate of wages as determined by the Dept. of Labor and Industrial Relations of the State of Missouri.

CITY OF KIRKWOOD

David Weidler, CPPO, CPPB
Procurement Director

INFORMATION FOR BIDDERS

1. PROJECT INFORMATION

The work consists of replacing approximately 2,875 feet of 8-inch and 6-inch C.I.P. on Dougherty Ferry Road, from N. Ballas Road to Lindeman Road, with 10-inch PVC pipe. All necessary service transfers, hydrants, valves, and appurtenances are included. Existing pipe shall be abandoned in place.

2. RECEIPT AND OPENING OF BIDS

Sealed bids will be received until 2:00 p.m. on the 30th day of January 2020, and then publicly opened and read. Bids will not be considered unless they are prepared on the bid forms furnished by the Procurement Director. Bids shall be enclosed in a sealed envelope. This envelope shall be marked "Bid Proposal 13439 – Dougherty Ferry Water Main Replacement" and shall be addressed to the Procurement Director, City of Kirkwood, 212 South Taylor Avenue, Kirkwood, MO 63122, and endorsed with the name of the Bidder. No faxed bids will be accepted.

3. PERFORMANCE AND PAYMENT BOND

Contractor shall procure and maintain a performance and payment bond (the "Bond") for the benefit of the City of Kirkwood ("City") as required by the laws of the State of Missouri and in an amount not less than 100 percent of the aggregate amount of the Contract. The Bond shall serve as security for the faithful performance of this Contract, including maintenance provisions, and for the payments of all persons performing labor and furnishing materials in connection with this Contract. The premiums on the Bond shall be paid by the Contractor. The Bond shall remain in full force and effect during the life of the Contract and during the term of any warranty required by the specifications and shall be held in the custody of the City.

Contractor represents, warrants, and guarantees, and Contractor shall also furnish to City a certificate of authority or some other evidence as deemed appropriate by Director of Procurement establishing, that the Bond is from a surety that is: authorized to do business in the State of Missouri, authorized to become surety on the bonds or obligations of persons or corporations, solvent with paid-up capital of not less than the applicable amount provided by the laws of Missouri, and, if organized outside the State of Missouri, in compliance with all the provisions of Missouri law relating to insurance companies other than life insurance companies. If, at any time, City shall become dissatisfied with any surety or sureties, or if for any other reason the Bond shall cease to be adequate security for City, Contractor shall, within ten days after notice from the Director of Procurement, substitute an acceptable bond (the "Additional Bond") in form and sum and signed by other sureties as may be satisfactory to City. The premiums on the Additional Bond shall be paid by Contractor. All requirements herein applicable to the Bond shall also be applicable to the Additional Bond. No further partial payments to Contractor shall be deemed due, nor shall be made until the sureties on the Additional Bond shall have qualified.

Contractor shall furnish to City such Bond together with insurance or other documents required by the Contract. The current power of attorney for the persons who sign for any

surety company shall be attached to the Bond. The power of attorney shall be sealed and certified with the manual signature of an officer of the surety. A facsimile signature will not be accepted by the Director of Procurement.

The failure of the Contractor to supply the required Bond along with the evidence of the required insurance coverage and other documents required by the Contractor within ten working days after the executed acceptance is received by the Contractor, or within such extended period as the Procurement Director may grant, based upon reasons determined sufficient by the Procurement Director, shall constitute a default and City may either award the contract to the next lowest responsible bidder or re-advertise for bids, and may charge against the Contractor the difference between the amount of his/her bid and the amount for which a contract for the work is subsequently executed. If a more-favorable bid is received by re-advertising, the defaulting Contractor shall have no claim against City for a refund. Because of the difficulty of ascertaining the damages caused to City, said sum shall be considered liquidated damages and shall not constitute a penalty.

The Contractor shall supply the following documents to verify the authenticity of the bonds and bonding company:

- Provide a certificate of authority from the Secretary of State of Missouri concerning the authority of the bonding company.

- Provide proof that the bonding company has an "A" rating from BEST'S or Standard and Poor's.

- Provide written verification from the bonding company that the bond exists and that it is an obligation of the contractor.

4. NON-COLLUSIVE AFFIDAVIT

Each person submitting a bid for any portion of the work contemplated by the bidding documents shall execute an affidavit to the effect that he has not colluded with any person, firm, or corporation in regard to any bid submitted. Such affidavit shall be attached to the Bid.

5. EMPLOYMENT OF UNAUTHORIZED ALIENS PROHIBITED AFFIDAVIT

(a) Contractor agrees to comply with Missouri Revised Statute section 285.530.1 in that it shall not knowingly employ, hire for employment, or continue to employ an unauthorized alien to perform work within the State of Missouri.

(b) As a condition for the award of this contract, the Contractor shall, by sworn affidavit and provision of documentation, affirm its enrollment and participation in a federal work authorization program with respect to the employees working in connection with the contracted services. The contractor shall also sign an affidavit affirming that it does not knowingly employ any person who is an unauthorized alien in connection with the contracted services.

(c) Contractor shall require each subcontractor to affirmatively state in its contract with Contractor that the subcontractor shall not knowingly employ, hire for employment or continue to employ an unauthorized alien to perform work within the State of Missouri and shall not henceforth do so. Alternatively, Contractor shall require each subcontractor to provide Contractor with a sworn affidavit under the penalty of perjury attesting to the fact that the subcontractor's employees are lawfully present in the United States.

6. CONSTRUCTION SAFETY PROGRAM REQUIREMENTS

(a) CONTRACTOR shall provide a ten hour Occupational Safety and Health Administration (OSHA) construction safety program for its employees working onsite on the project. The program shall include a course in construction safety and health approved by OSHA or a similar program approved by the Missouri Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program. All employees working on the project are required to complete the program within sixty (60) day of beginning work on the construction project.

(b) Any employee found on the worksite subject to this section without documentation of the successful completion of the course required under subsection (a) shall be afforded 20 days to produce such documentation before being subject to removal from project.

(c) CONTRACTOR shall require all onsite employees of any subcontractors to complete the ten-hour training program required under subsection (a).

(d) Pursuant to sec. 272.675 RSMo., CONTRACTOR shall forfeit as a penalty to the CITY $2,500 plus $100.00 for each employee employed by CONTRACTOR or subcontractor, for each calendar day, or portion thereof, such employee is employed without the required training. The penalty shall not begin to accrue until the time periods in subsections (a) and (b) have elapsed. CITY shall withhold and retain from the amount due CONTRACTOR under this contract, all sums and amounts due and owing CITY as a result of any violation of this section.

7. EXAMINATION OF CONTRACT DOCUMENTS AND SITE OF WORK

The Bidder is expected to examine carefully the site of proposed work, the Specifications, and the Contract Documents before submitting a Bid. The submission of a Bid shall be considered prima facie evidence that the Bidder has made such examination and is satisfied to the conditions to be encountered in performing the work and as to the requirements of the Contract Documents.

8. EVALUATION AND AWARD OF CONTRACT

The City reserves the right to reject any and all bids, including, without limitation, non-conforming, non-responsive, unbalanced or conditional bids. CITY will evaluate all conforming, responsive, balanced and unconditional bids and has the discretion to determine the lowest, responsible bidder. "Responsible" means that the Bidder has the technical expertise, purchasing &/or manufacturing capacity, product &/or service quality, and financial ability to accomplish the contemplated procurement. In determining a responsible bidder, the following may be considered: The ability, capacity, or skill of the bidder to perform the contract or provide the supplies, materials or services promptly or within the time specified, without delay or interference; the character, integrity, reputation,

judgment, experience, and efficiency of the bidder; the quality of performance on previous contracts or services; the previous and existing compliance by the bidder with laws and ordinances relating to the contract or supplies, materials or services; the sufficiency of the financial resources and ability of the Bidder to perform the contract or provide the supplies, materials or services; the quality, availability and adaptability of the supplies, materials or services in the particular use required; the ability of the bidder to provide future maintenance and service for the use of the subject of the contract; and the number and scope of the conditions attached to the bid.

9. PROPOSED WORK LOCATIONS

Dougherty Ferry Road from N. Ballas Road to Lindeman Road.

10. MANDATORY PRE-BID MEETING

There will be a mandatory pre-bid meeting on January 16th, 2020, at 10:00 a.m. in the Lower Level Conference Room at Kirkwood City Hall, 139 South Kirkwood Road, Kirkwood, Missouri 63122. Any contractor not present at this pre-bid meeting shall be excluded from bidding on the project.

11. TIME OF COMPLETION AND LIQUIDATED DAMAGES

The successful bidder agrees that, upon completion of the Proposal and upon the issuance of a Notice to Proceed, the work shall be completed within ninety (90) calendar days from the date of the Notice to Proceed, and that should the contractor fail to complete the work in the time specified or such additional time as may be allowed by the Water Superintendent under the Contract, the amount of liquidated damages to be recovered shall be Two Hundred Fifty Dollars ($250) per calendar day.

12. QUESTIONS

All questions regarding this Invitation for Bids shall be submitted in writing via email to Cassandra James, Senior Procurement Officer / Analyst, at jamescs@kirkwoodmo.org by close of business day on January 23rd, 2020. Any contact by Contractor in regard to this Invitation for Bid with City personnel other than those defined above may be considered grounds for dismissal of Contractor Bid Response.

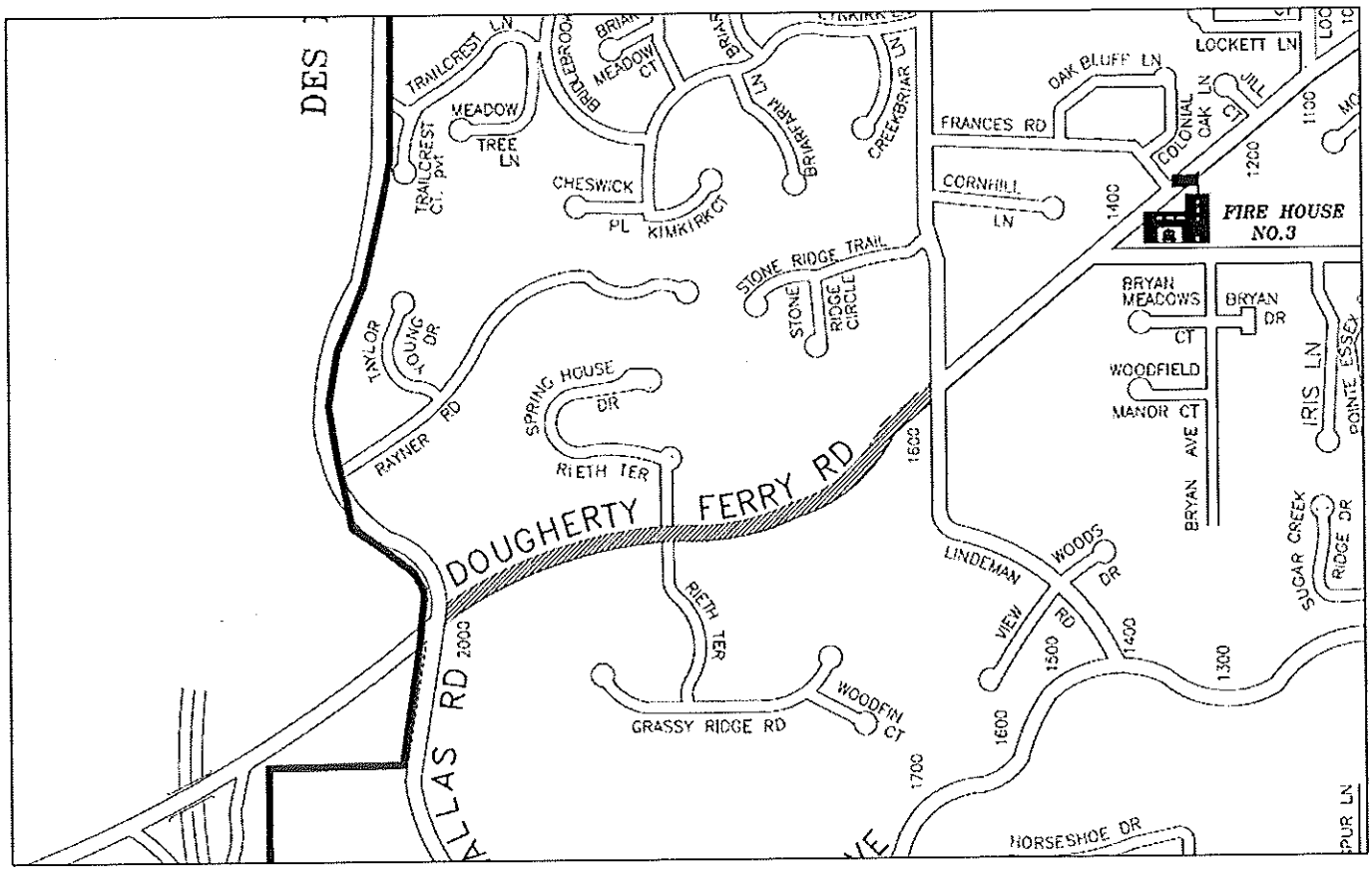
13. AMENDMENT ISSUANCE

If Contractor has any questions which arise concerning the true meaning or intent of the specifications or any other requirements stated herein, the Contractor shall request that an interpretation be made in an Addendum. Failure to request an Addendum governing any such question shall not relieve the respondent from delivery in accordance with the intent of the specifications. If it becomes evident that the material contained within this Bid Proposal requires amendment, the Director of Procurement shall issue a formal written amendment to these documents for distribution to all known prospective respondents. The issuance of an amendment may be released until the stated date and time of bid proposal receipt. If it is deemed necessary by the City the amendment may extend the current bid receipt deadline.

14. SOLICITATION NOTICE

The City of Kirkwood in accordance with Title VI of the Civil Rights Act of 1964, 78 Stat. 252, USC 2000d to 2000d-4 and Title 49, Code of Federal Regulations, Department of Federally -assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively ensure that in any contract entered into pursuant to this advertisement, minority business enterprises will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of gender, disability, race, color or national origin in consideration for an award

MAP



VICINITY MAP
NOT TO SCALE

BID PROPOSAL

_____
Contractor

FOR: Dougherty Ferry Water Main Replacement
In the City of Kirkwood
Bid No. 13439

TO: Procurement Director
City of Kirkwood
212 South Taylor Avenue
Kirkwood, Missouri 63122

Pursuant to and in compliance with your Advertisement for Bids, the Information for Bidders, and other documents relating thereto, the undersigned Bidder hereby proposes to furnish all tools, equipment, labor and materials, and to perform all work necessary to construct the Swan Avenue Pump Station Water Main Replacement in strict accordance with the Contract Documents at the following unit prices:

A. UNIT PRICE BID – DOUGHERTY FERRY WATER MAIN REPLACEMENT

Item	Description	Est. Quantity	Unit	Unit Price	Extended Total Cost
1	Mobilization	1	L.S.	$	$
2	8"X8" Tapping sleeve, tapping valve and valve box	1	Each	$	$
3	12" C909 DR 18 PVC watermain with tracer wire and marking tape, open cut installation	20	Lin. Ft.	$	$
4	10" C909 DR 18 PVC watermain with tracer wire and marking tape, open cut installation	2700	Lin. Ft.	$	$
5	8" C909 DR 18 PVC watermain with tracer wire and marking tape, open cut installation	20	Lin. Ft.	$	$
6	6" C909 DR 18 PVC watermain with tracer wire and marking tape, open cut installation	10	Lin. Ft.	$	$
7	10" C909 DR 18 PVC watermain with tracer wire and marking tape inside 16" PVC casing, open cut installation	125	Lin. Ft.	$	$
8	12" x 10" Reducer, ductile iron fitting	1	Each	$	$
9	10" X 8" Reducer, ductile iron fitting	3	Each	$	$
10	10" X 6" Reducer, ductile iron fitting	2	Each	$	$
11	10" X 10" Tee, ductile iron fitting	4	Each	$	$

Item	Description	Est. Quantity	Unit	Unit Price	Extended Total Cost
12	10" x 8" Tee, ductile iron fitting	3	Each	$	$
13	8" Solid Sleeve, ductile iron fitting	2	Each	$	$
14	6" Solid Sleeve, ductile iron fitting	2	Each	$	$
15	12" 45 Degree Bend, ductile iron fitting	1	Each	$	$
16	10" 45 Degree Bend, ductile iron fitting	6	Each	$	$
17	8" 45 Degree Bend, ductile iron fitting	8	Each	$	$
18	6" 45 Degree Bend, ductile iron fitting	8	Each	$	$
19	10" Cap, ductile iron fitting	1	Each	$	$
20	8" Cap, ductile iron fitting	10	Each	$	$
21	6" Cap, ductile iron fitting	1	Each	$	$
22	10" Gate valve with foster adaptor and valve box	11	Each	$	$
23	12" EZ valve and valve box	1	Each	$	$
24	8" EZ valve and valve box	1	Each	$	$
25	10" X 6" Tee, 6" gate valve with foster adaptor, valve box, fire hydrant & locking rings (fire hydrant assembly)	6	Each	$	$
26	Remove existing fire hydrant and valve box and plug end of existing main	6	Each	$	$
27	Water Service Transfer	14	Each	$	$
28	Water Service Transfers and Extension	14	Each	$	$
29	House Service Curb Stop	4	Each	$	$
Total for DOUGHERTY FERRY ROAD Water Main Based on Estimated Quantities					$

B. Alternate Bid Item

The total base bid shall include the cost for providing C900 DR 18 PVC water main installed by open cut methods per Specifications and Drawings. An alternate bid item shall be provided for 2705 lineal feet of 10 inch RJ C900 DR18 PVC water main with Tracer Wire, Directionally Drilled ADDED TO OR DEDUCTED FROM the total base bid for furnished and installed directionally drilled, RJ C900 DR 18 PVC pipe per Specifications and Drawings replacing line item #4 in the bid proposal. The alternate price shall also include adjustment of price resulting from the differences in the approved methods of construction associated with directionally drilled pipe. All other requirements associated with the work shall remain in force.

Alternate Bid – 10" RJ C900 DR 18 PVC water main with Tracer Wire, Directionally Drilled

ADD or DEDUCT: $_____
(Circle one)

The undersigned, as Bidder, declares that the only persons or parties interested in this Proposal as principal are those named herein; that this Proposal is made without collusion or combination of any kind or character with any other person, firm, association, or corporation, or any member or officer thereof.

It is understood by the undersigned that the quantities given in the foregoing itemized Proposal are not guaranteed by the City and are used solely for the purpose of comparing bids and awarding the Contract and may or may not represent the actual quantities encountered on the job and that the sum of the products of the quantities listed in the foregoing itemized Proposal multiplied by the unit price bid shall constitute the total Bid.

The undersigned Bidder agrees that, if awarded the Contract for the above work, he will commence construction of the work promptly upon receipt of the Notice to Proceed and will complete the same without delay in accordance with the Contract Documents. The undersigned Bidder further represents that he has visited and examined the site of the proposed construction and has carefully examined the Contract Documents which include the Advertisement for Bids, Information for Bidders, Bid Proposal, Contract Agreement, Performance Bond, General Conditions, Special Provisions, and Detailed Specifications.

The undersigned Bidder guarantees that the bid bond submitted with this proposal is from a surety that is authorized to do business in the State of Missouri and is authorized to issue bonds in the State of Missouri.

The undersigned Bidder proposes and agrees that, if this Proposal is accepted, to execute the Contract and perform all its terms, covenants, and conditions, all in strict conformity with the Specifications and other Contract Documents and that he will accept in full payment therefor certified by the Director of Procurement.

_____
Name of Bidder
(Corporation, Firm, or Individual)

By _____
Signature

_____
Typed or Printed Name

_____
Title

_____
Business Address

_____
Business Telephone Number

ATTEST:

_____
Title

Dated: _____

Attach Corporate Seal, if Applicable

ENCLOSURES:

Non-Collusive Affidavit
Employment of Illegal Aliens
Qualification Form

(BIDDER SHALL SUBMIT TWO COPIES OF BID PROPOSAL)

Qualifications Form (Bid # 13439)

The following information is required for the review of your company as it pertains to the referenced Invitation for Bid.

Prior Services Information:

1) Reference One

Company Name:_____

Address:_____

_____

Contact Name:_____

Contact Phone Number:_____

Date of Contracted Services:_____

Length of Contract:_____

Description of Services Provided: _____

_____

_____

2) Reference Two

Company Name:_____

Address:_____

_____

Contact Name:_____

Contact Phone Number:_____

Date of Contracted Services:_____

Length of Contract:_____

Description of Services Provided: _____

_____

_____

Qualifications Form (Continued)

3) Reference Three

Company Name:_____

Address:_____

_____

Contact Name:_____

Contact Phone Number:_____

Date of Contracted Services:_____

Length of Contract:_____

Description of Services Provided: _____

_____

_____

Company Information:

1) Year Established:_____

2) Number of Years Providing Requested Services: _____

Additional Experience:

List any additional experience that would be beneficial to the evaluation of your company.

_____
_____
_____
_____
_____
_____
_____

NON-COLLUSIVE AFFIDAVIT OF PRIME BIDDER

State of Missouri)
County of St. Louis) S.S.

_____, being first duly sworn, deposes and says that:

1. He is the (owner, partner, officer, representative, or agent) of _____ _____, the Bidder that has submitted the attached Bid;

2. He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such Bid;

3. Such bid is genuine and is not a collusive or sham bid; and that all statements made and fact set out in the Proposal are true and correct;

4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees, or parties in interest including this affiant, has in any way colluded, conspired, connived, or agreed, directly or indirectly with any other Bidder, firm, or person, to submit a sham bid in connection with the Contract for which the attached Bid has been submitted or to refrain from bidding in connection with such Contract; or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other bidder, firm, or person to fix the price or prices in the attached Bid or of any other bidder, or to fix the overhead, profit, or cost element of the Bid price of the other bidder, or to secure through any collusion, conspiracy, connivance, or unlawful agreement any advantage against the City of Kirkwood or any person interested in the proposed Contract;

5. The price or prices quoted in the attached Bid are fair and proper, and are not tainted by any collusion, conspiracy, connivance, or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest, including this affiant; and

6. He further certifies that Bidder is not financially interested in or financially affiliated with any other Bidder on this project.

Signed _____

Title _____

Subscribed and sworn to before me this _____ day of _____, 2020.

_____
Notary Public

My Commission expires:

EMPLOYMENT OF UNAUTHORIZED ALIENS PROHIBITED

I, _____, (Contractor Agent), being duly sworn, attest and state, under penalty of perjury, as follows:

1. I am employed by _____(Contractor) and serve as the _____(Position with Contractor).

2. I hereby affirm _____(Contractor's) enrollment and participation in a federal work authorization program with respect to all employees working in connection with any services provided to the City of Kirkwood. Documentation of participation in a federal work authorization program is attached to this affidavit.

3. _____(Contractor) does not knowingly employ, hire for employment, or continue to employ an unauthorized alien in connection with the services being provided to the City of Kirkwood.

4. Furthermore, all subcontractors working on this contract for services to the City of Kirkwood shall affirmatively state in writing in their contracts with _____ _____(Contractor) that they are not in violation of Section 285.530.1, R.S. Mo., and shall not thereafter be in violation. Alternatively, the subcontractor shall submit a sworn affidavit under penalty of perjury attesting that all employees are lawfully present in the United States.

_____
(Contractor Agent)

State of Missouri)
County of St. Louis) S.S.

Subscribed and sworn to before me this _____ day of _____, 2020.

_____
Notary Public

My Commission expires:

DRAFT CONTRACT AGREEMENT

FOR: DOUGHERTY FERRY WATER MAIN REPLACEMENT IN THE CITY OF KIRKWOOD

This Agreement dated this ____ day of _____, 2020, by and between the CITY OF KIRKWOOD, hereinafter called OWNER, and _____, (a corporation organized and existing under the laws of the State of _____), (a partnership consisting of _____), (or an individual trading under the above name), hereinafter called CONTRACTOR.

WITNESSETH: The Owner and the Contractor, for the consideration stated herein, agree as follows:

The Contractor shall perform all required work and shall provide and furnish all labor, materials, necessary tools, equipment, and utility and transportation services to complete the Dougherty Ferry Watermain Replacement in the City of Kirkwood, Missouri, in strict compliance with the Contract Documents hereinafter enumerated. It is understood and agreed that said labor, materials, tools, equipment, and service shall be furnished; and said work performed and completed under the direction and supervision and subject to the approval of the Owner or its authorized representative.

The Contractor further agrees that he is fully informed regarding all of the conditions affecting the work to be done, and labor and materials to be furnished for the completion of this Contract; and that his information was secured by personal investigation and research and not from any estimates of the Owner; and that he will make no claim against the Owner by reason of estimates, tests, or representation of any officer, agent, or employees of the Owner.

The Contractor expressly warrants that he has employed no third person to solicit or obtain this Contract in his behalf, or to cause or procure the same to be obtained upon compensation in any way contingent, in whole or in part, upon such procurement; and that he has not paid, or promised, or agreed to pay to any third person in connection therewith, any brokerage, commission, or percentage upon the amount receivable by him hereunder; and that he has not, in estimating the Contract Price demanded by him, included any sum by reason of any such brokerage, commission, or percentage; and that all moneys payable to him hereunder are free from obligation of any other person for services rendered, or supposed to have been rendered, in the procurement of this Contract. He further agrees that any breach of this warranty shall constitute adequate cause for the annulment of this Contract by the Owner, and that the Owner may retain to its own use from any sums due or to become due hereunder an amount equal to any brokerage, commission, or percentage so paid, or agreed to be paid.

The undersigned Bidder agrees that, if this Proposal is accepted, he shall complete the said work within ninety (90) calendar days from the date of the Notice to Proceed and that should he fail to complete the work in the time specified or such additional time as may be allowed by the Water Superintendent under the Contract, the amount of liquidated damages to be recovered shall be Two Hundred Fifty Dollars ($250) per calendar day.

The Owner shall pay the Contractor as just compensation for the performance of this Agreement, subject to any additions or deductions as provided in the Contract Documents, the following unit prices:

A. UNIT PRICE – DOUGHERTY FERRY WATER MAIN REPLACEMENT

Item	Description	Est. Quantity	Unit	Unit Price	Extended Total Cost
1	Mobilization	1	L.S.	$	$
2	8"X8" Tapping sleeve, tapping valve and valve box	1	Each	$	$
3	12" C909 DR 18 PVC watermain with tracer wire and marking tape, open cut installation	20	Lin. Ft.	$	$
4	10" C909 DR 18 PVC watermain with tracer wire and marking tape, open cut installation	2700	Lin. Ft.	$	$
5	8" C909 DR 18 PVC watermain with tracer wire and marking tape, open cut installation	20	Lin. Ft.	$	$
6	6" C909 DR 18 PVC watermain with tracer wire and marking tape, open cut installation	10	Lin. Ft.	$	$
7	10" C909 DR 18 PVC watermain with tracer wire and marking tape inside 16" PVC casing, open cut installation	125	Lin. Ft.	$	$
8	12" x 10" Reducer, ductile iron fitting	1	Each	$	$
9	10" X 8" Reducer, ductile iron fitting	3	Each	$	$
10	10" X 6" Reducer, ductile iron fitting	2	Each	$	$
11	10" X 10" Tee, ductile iron fitting	4	Each	$	$
12	10" x 8" Tee, ductile iron fitting	3	Each	$	$
13	8" Solid Sleeve, ductile iron fitting	2	Each	$	$
14	6" Solid Sleeve, ductile iron fitting	2	Each	$	$
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Item	Description	Est. Quantity	Unit	Unit Price	Extended Total Cost
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20	8" Cap, ductile iron fitting	10	Each	$	$
21	6" Cap, ductile iron fitting	1	Each	$	$
22	10" Gate valve with foster adaptor and valve box	11	Each	$	$
23	12" EZ valve and valve box	1	Each	$	$
24	8" EZ valve and valve box	1	Each	$	$
25	10" X 6" Tee, 6" gate valve with foster adaptor, valve box, fire hydrant & locking rings (fire hydrant assembly)	6	Each	$	$
26	Remove existing fire hydrant and valve box and plug end of existing main	6	Each	$	$
27	Water Service Transfer	14	Each	$	$
28	Water Service Transfers and Extension	14	Each	$	$
29	House Service Curb Stop	4	Each	$	$
Total for DOUGHERTY FERRY ROAD Water Main Based on Estimated Quantities					$

B. Alternate Bid Item

The total base bid shall include the cost for providing C900 DR 18 PVC water main installed by open cut methods per Specifications and Drawings. An alternate bid item shall be provided for 2705 lineal feet of 10 inch RJ C900 DR18 PVC water main with Tracer Wire, Directionally Drilled ADDED TO OR DEDUCTED FROM the total base bid for furnished and installed directionally drilled, RJ C900 DR 18 PVC pipe per Specifications and Drawings replacing line item #4 in the bid proposal. The alternate price shall also include adjustment of price resulting from the differences in the approved methods of construction associated with directionally drilled pipe. All other requirements associated with the work shall remain in force.

Alternate Bid – 10" RJ C900 DR 18 PVC water main with Tracer Wire, Directionally Drilled

ADD or DEDUCT: $_____
(Circle one)

This Contract consists of the following component parts, all of which are part and parcel of this Contract and are incorporated in this Contract as full and effectively as if set forth in detail herein:

1. This Agreement
2. Invitation for Bids # 13439
3. Accepted Contractor Response # 13439

Execution of this Agreement may be accomplished by fax or PDF signatures and the execution of the Agreement in that manner shall be binding upon the parties.

This agreement is binding upon the agents, servants, successors, assigns, representatives and any parent corporations, subsidiaries or partners of the parties hereto and the signatories to the Agreement represent and warrant that they have the authority to sign the Agreement.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed as of the day and year first above written.

CITY OF KIRKWOOD
(OWNER)

By_____
(Mayor)

ATTEST

By_____
(City Clerk)

_____
(CONTRACTOR)

By_____

Title_____

* 1. Director of Public Services
2. Director of Procurement
3. Contractor

With the signing of this document, the contractor certifies that the performance bond and payment bond are issued from a surety that is authorized to do business in the State of Missouri and is authorized to issue bonds in the State of Missouri.

GENERAL CONDITIONS

1. DEFINITIONS

It is understood that the following terms are defined as follows:

Municipality	–	City of Kirkwood
City	–	City of Kirkwood
Owner	–	City of Kirkwood
MSD.	–	Metropolitan St. Louis Sewer District
Water Superintendent	–	Water Superintendent of the City of Kirkwood or his authorized representative
City Engineer	–	City Engineer of the City of Kirkwood
Contractor	–	Successful bidder awarded the work of constructing the project

Standard Specifications

– "Standard Drawings and Detailed Specifications for Pavement Restoration", including all addenda, latest edition, City of Kirkwood

– For Sewer Construction: "Standard Specifications and Revised Standard Construction Details for Sewers and Drainage Facilities", latest edition, Metropolitan St. Louis Sewer District

– "Missouri Standard Specifications for Highway Construction", latest edition, Missouri Highway and Transportation Commission

– Rules of Department of Natural Resources Division 60 – Safe Drinking Water Commission

2. CONSTRUCTION AREA

All construction will be in public rights-of-way or easements acquired by the Owner. The Contractor shall provide all additional land necessary for temporary construction operations and for erection of temporary construction facilities and storage of his materials, together with right of access to same.

3. PERMITS, LICENSES AND NOTIFICATIONS

The Contractor shall procure all permits and licenses, pay all charges and fees, and give all notices to residents, utilities, and other agencies necessary and incidental to the due and lawful prosecution of the work. A City of Kirkwood Contractor's License is required of the Contractor and all subcontractors and may be obtained at Kirkwood City Hall.

4. TAX EXEMPTION FOR CONSTRUCTION MATERIALS AND SUPPLIES

This project is exempt from all sales taxes for construction materials and supplies used directly in fulfilling contract requirements. Sales tax shall not be included into the unit costs for this project. The contractor shall follow the regulation as outlined in Missouri 12 CSR 10-3.388 Construction Materials.

The City will issue the contractor a tax exemption letter and a project exemption certificate. These documents are to be given to the applicable suppliers and used only for the specific project identified and will expire on the date indicated unless renewed by the City.

5. LAWS TO BE OBSERVED

The Contractor shall at all times observe and comply with all Federal and State laws, all local laws, ordinances, and regulations existing at the time of or enacted subsequent to the execution of the contract which, if in any manner, affect the prosecution of the work. The Contractor and his surety shall indemnify and save harmless the Owner and all of his representatives, engineers, and employees against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by himself, his employees, or his subcontractors.

6. PUBLIC SAFETY AND TRAFFIC CONTROL

All work is to be performed in full compliance with City of Kirkwood Ordinance No. 5198, "Public Safety", which hereby is made a part of this contract document; and, for the convenience of the Contractor, is attached to this document.

All traffic and safety devices shall conform to the "Manual on Uniform Traffic Control Devices for Streets and Highways", American National Standard Institute D6.1-1971. At all times until final acceptance of the work, the Contractor shall provide and maintain at his own expense such signs, lights, watchmen, fences, and barriers as may be necessary to properly protect the work and provide for safe and convenient public travel.

The Contractor shall provide, erect, and maintain an adequate number of warning and protection devices along the project to inform and protect the public. All excavations three feet or greater in depth shall be protected with a fence not less than 42 inches high. Obstructions shall be illuminated during the hours of darkness. Suitable warning signs shall be provided to properly control and direct traffic. All street name signs and traffic signs shall be kept in service by the Contractor during the construction period.

Through traffic may be detoured with approval of the City Engineer. The Contractor is responsible for all detour signing and routing which must be approved by the Engineer before the detour is established.

The Contractor shall provide the Engineer with the name and telephone numbers of an individual who shall be on 24-hour call for erection and maintenance of the warning and protection devices. The cost of any erection or maintenance of the warning or protection devices by City Forces may be filed against the Contractor's monthly or final statement without any notice to the Contractor.

The Engineer shall, in all cases, determine questions which may arise relative to additional safety and control devices.

The Contractor shall immediately replace or install any street name or stop sign that has been removed during construction.

No direct payment, as such, will be made because of these requirements; but the cost thereof will be as incidental to the Contract.

Failure to properly provide safety control devices or replace signs in accordance with this section, the City will issue one verbal warning and an eight-hour grace period for the Contractor to correct the problem. The second infraction, the City will place safety devices at a cost of fifty dollars ($50) per day per safety device. The cost of the safety devices will be deducted from the Contractor's monthly invoice.

7. PUBLIC CONVENIENCE

The Contractor shall be responsible for informing residents of any change in access to their property, sufficiently in advance of such interruption of service so that the resident can take steps to minimize personal inconvenience. The Contractor shall schedule this work, as approved by the Owner, to provide minimum inconvenience to the Public. Private residential driveways shall not be closed for more than ten consecutive calendar days except for emergency conditions. Private commercial driveways shall not be completely closed at any time without approval of the Water Superintendent.

The Contractor shall continuously maintain the roadway, private driveways, and commercial driveways for local traffic. All public streets must be kept open for local traffic at all times. Any maintenance of the roadway or driveways by City Forces may be billed against the Contractor's monthly or final statement without any notice to the Contractor.

8. PROTECTION OF WORK AND PROPERTY

The Contractor shall continuously maintain adequate protection of all his work from damage. The Contractor shall be responsible for the preservation of all public and private property. He shall make good any damage, injury, or loss. He shall adequately protect adjacent property as provided by law and the Contract.

All survey monuments and property markers shall be carefully preserved in place by the Contractor who shall be responsible for the correct replacement of all such monuments and markers disturbed during the work.

The Contractor is responsible for the protection of fresh concrete from vandalism and shall place and protect fresh concrete in such a manner as to minimize vandalism and maximize safety. Contractor will repair or replace vandalized areas as directed by Water Superintendent.

The Contractor shall provide for normal drainage and shall continuously maintain channels, swales, pipes, culverts, and all drainage structures in the project area. The Contractor is responsible for any damage caused by his failure to provide and maintain normal drainage.

9. INSPECTION OF THE WORK

All work, materials, and methods of construction shall be subject to the inspection of the Water Superintendent or designee, who shall be the judge of the quality and suitability of them for all purposes for which they are used. Acceptance of any material or workmanship shall not serve to prevent subsequent rejection by the Water Superintendent or designee if he finds either or both to be unsatisfactory. The Water Superintendent or designee shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection. Any work done or materials used failing to meet the approval of the Water Superintendent or designee shall be replaced by the Contractor at his own expense. Any work done or materials used without inspection by the Water Superintendent or designee may, at the option of the Water Superintendent or designee, be ordered removed at the Contractor's expense. Inspection by the Water Superintendent is not for the purpose of running the job and does not relieve the Contractor of his responsibilities to meet the conditions of the plans and Contract Documents.

All drainage and sewer work may be subject to the inspection of the Metropolitan St. Louis Sewer District. Their authorized representatives shall be furnished with such information and assistance by the Contractor as is required to make a complete and detailed inspection.

10. WORK PROGRESS PAYMENTS TO THE CONTRACTOR

During the progress of the work, the Contractor shall submit to the Water Superintendent, within five (5) days after the first of each month, an invoice for the actual cost of the work satisfactorily completed to the first day of that month. The invoice shall have an itemized listing of all items of work and be based on measured quantity of completed work in place and the unit bid prices. From the amount so determined shall be deducted five percent (5%) of such amount and all sums previously paid or properly retained under this Contract and the remainder approved for payment. The invoice is subject to review and possible rejection by the Water Superintendent if, in the opinion of the Water Superintendent, the invoice does not adequately represent the work completed. However, the Water Superintendent's approval of the invoice does not represent acceptance of any work, nor acceptance of the quantities estimated.

11. FINAL INSPECTION AND FINAL PAYMENT

Upon due notice from the Contractor of presumptive completion of the entire project, the Water Superintendent will make an inspection; and the Contractor will be notified of any unacceptable work. When all construction provided for and contemplated by the Contractor is found complete to the satisfaction of the Water Superintendent, that inspection shall constitute the final inspection. After the final inspection has been completed and all conditions of the Contract have been satisfied, the City Water Superintendent shall execute a certificate that the whole work provided for in the Contract has been completed and accepted by him under the conditions and terms thereof, whereupon the entire balance found to be due to the Contractor, including said retained percentage, shall be paid to the Contractor within thirty (30) days after the date of said certificate. All prior partial estimates and payments shall be subject to correction in the final payment.

12. CLEANING UP, RESTORATIONS, AND REPLACEMENTS

Unless otherwise stipulated, the Contractor shall remove daily from the Owner's property and from all public and private property, at his own expense, all temporary structures, rubbish, and waste material resulting from his operations; and he shall restore and replace the surfaces of such properties to the conditions existing prior to his operations. All materials and equipment to be stored on site, with Water Superintendent's approval, will be outside of traffic lanes with proper warning devices. No excavated material shall remain on site overnight.

13. THE OWNER'S RIGHT TO DO THE WORK

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the Owner, after three (3) days written notice to the Contractor, may, without prejudice to any other remedy he may have, make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor.

14. TERMINATION OF THE CONTRACT

If the Contractor should be adjudged a 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 of which extension of time provided, to supply enough properly skilled workmen or proper materials, or if he should fail to make prompt payment to subcontractors for material or labor, or persistently disregard laws, ordinances, or the instructions of the Water Superintendent, or otherwise be guilty of a substantial violation of any provision of the Contract, then the Owner, upon the certificate of the Director of Procurement that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor seven 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 he may deem expedient. In such cases, 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 expenses shall be paid to the Contractor. If such expenses shall exceed such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred through the Contractor's default shall be certified by the Director of Procurement.

15. SCOPE OF CONTRACTOR'S WORK

Unless otherwise stipulated, the Contractor shall provide and pay for all bonds, insurance, materials, labor, tools, equipment, light, power, water, transportation, and other facilities necessary for the execution and completion of the work. If the Contractor, in the course of the work, finds any discrepancy between the drawings and the physical conditions of the locality, or any error or omissions in the drawings or in the layout as given by points and instructions, it shall be his duty to immediately inform the Water Superintendent in writing; and the Water Superintendent shall promptly verify the same. Any work done after such discovery, until authorized, will be done at the Contractor's risk.

16. CLAIMS FOR DAMAGES

Any claim for damages arising under this Contract shall be made in writing to the party liable within a reasonable time from the first observance of such damage, and not later than the time of final payment, except as expressly stipulated otherwise in the cause of faulty work or materials, and shall be adjusted by agreement or arbitration.

17. LIQUIDATED DAMAGES FOR FAILURE OR DELAY IN COMPLETING WORK ON TIME

The time for the completion of the work is specified, and it is an essential part of the Contract. The Contractor will not be entitled to any extension of Contract time because of unsuitable conditions unless suspension of the work for such conditions was authorized in writing by the Water Superintendent.

The Water Superintendent may make allowance for time lost due to causes which he deems justification for extension of Contract time. If the Contractor claims an extension of Contract time on the grounds that he is unable to work due to causes beyond his control, he shall state his reasons in writing, furnish proof to establish his claim, and state the approximate number of days he estimates he will be delayed. Notice of intention to claim an extension of Contract time on the above grounds shall be filed with the Water Superintendent at the time the cause or causes occur, and the claim shall be filed in writing within 30 days after the claimed cause for the delay has ceased to exist. The count of calendar days will start on the date authorized in the Notice to Proceed.

Time is an essential element of the Contract; and it is, therefore, important that the work be pressed vigorously to completion. Should the Contractor, or in cause of default, the surety fail to complete the work within the time specified in the Contract, or within such extra time as may be allowed in the manner set out in the preceding sections, a deduction of an amount set out in the Proposal form will be made for each and every calendar day that such Contract remains uncompleted after the time allowed for the completion. The said amount set out in the Proposal is hereby agreed upon, not as a penalty, but as liquidated damages for loss to the City of Kirkwood and the public, after the expiration of the time stipulated in the Contract; and the Contractor and his surety shall be liable for any and all liquidated damages. Permitting the Contractor to continue and finish the work or any part of it after the expiration of the specified time, or after any extension of the time, shall in no way operate as a waiver on the part of the City of Kirkwood or any of its rights under the Contract.

When extra or additional work is ordered by the Water Superintendent, the Contractor will be allowed an extension of Contract time based upon the ratio cost of such additional work bears to the Contract price unless it can definitely be established that the extra work was of such character that it required more time than is indicated by the money value. In such cases, the reasonable time required may be allowed.

The Contractor shall be liable for liquidated damages chargeable under the Contract when the work is being completed by the City by reason of default of the Contract unless the delay is due to the negligence of the City. A delay in any part of the work or in the final completion of the project caused by the City or its agents shall not void the provisions of

the Contract as to liquidated damages. Any such delay by the City or its agents will be compensated for only by the extension of Contract time.

An extension of contract time will not be given due to weather conditions, unless such weather conditions (temperature, snow, or rain) for any 30-day period are, on the average for the 30 days, more severe than the average for the same 30-day period for the previous 30 years, as established by NOAA for the area of the project.

National Oceanic and Atmospheric Administration (NOAA)
U.S. Department of Commerce
National Climatic Data Center
Federal Building
Asheville, North Carolina 28801
(704) 259-0682

In requesting an extension of time for severe weather conditions, the Contractor shall present complete records and averages referred to above and such request shall document how the weather conditions delayed the work in progress. Request must be made within 60 days of the occurrence.

Severe weather shall be defined as the total of actual days, in any period, in excess of the normal expected for the same period based upon the following criteria:

Precipitation greater than .01"
Snow greater than 1" depth
Temperature maximum 32 degrees and below.

It is recognized that temperature variations in rain and/or snow occurs in the various seasons of the year; and the Contractor shall allow for this in scheduling his work, allowing the average number of days work stoppage of the various trades due to such weather conditions, without the necessity of extending the contract completion date.

18. CONTRACTOR'S PLAN OF OPERATIONS

The Contractor shall vigorously pursue the work to completion. To ensure that the work will proceed continuously through the succeeding operation to its completion with the least possible interference to traffic and inconvenience to the public, the Contractor shall submit for approval a complete, detailed schedule of his proposed construction procedure stating the time and sequence of his various operations of work, his traffic and detouring plan, and his signing and barricading plan. The Contractor shall not begin construction activities until approval from the Owner of his above proposals.

19. CHARACTER OF WORKMEN, SUPERINTENDENT

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. All workmen shall have sufficient skill and experience to perform properly the work assigned to them. Any person employed by the Contractor or by the subcontractor who, in the opinion of the Water Superintendent, does not perform his work in a proper and skillful

manner or is intemperate or disorderly shall, at written request of the Water Superintendent, be removed forthwith by the Contractor or subcontractor and shall not again be employed in any portion of the work without approval of the Water Superintendent.

20. CHANGES IN THE WORK

The Owner, without invalidating the Contract, may order extra work or make changes by altering, adding to, or deducting from the work, the Contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original Contract except that any claim for extension of time caused thereby shall be adjusted at the time of ordering such change. In giving instructions, the Water Superintendent shall have authority to make minor changes in the work, not involving extra cost and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Director of Procurement; and no claim for an addition to the Contract sum shall be valid unless so ordered.

The value of any such extra work or change shall be determined in one or more of the following ways:

1. By estimate and acceptance in a lump sum.

2. By unit prices named in the Contract or subsequently agreed upon.

3. By cost and percentage or by cost and a fixed fee.

If none of the above methods is agreed upon, the Contractor, provided he receives an order as above, shall proceed with the work. In such case and also under case No. 3, he shall keep and present in such form as the Water Superintendent may direct, a correct amount of the net cost of labor and materials, together with vouchers. In any case, the Water Superintendent shall certify to the amount due to the Contractor, including reasonable allowance for overhead and profit. Pending final determination of value, payment on account of changes shall be made on the Engineer's estimate.

21. STATUS OF THE WATER SUPERINTENDENT

The work shall be subject at all times to the supervision and direction of the Water Superintendent, or his authorized representative. To prevent disputes and litigation, it is mutually agreed that the Water Superintendent shall, in all cases, determine the amount or quantity of the various kinds of work, and the quality of materials and workmanship to be paid for under this Contract, and he shall decide all questions which may arise relative to the performance of the work covered by the Contract. Any doubt as to the meaning of the specifications and the drawings and any obscurity or discrepancy as to their wording and intent, will be explained by the Water Superintendent, and this explanation shall be final and binding by both parties of this Contract. The Water Superintendent may amend or correct any errors or omissions in the plans and specifications, when such amendments or corrections are necessary to make definite the intent indicated by a reasonable interpretation of the Contract requirements.

22. CORRECTION OF WORK

The Contractor shall promptly remove from the premises all materials condemned by the Water Superintendent as failing to conform to the Contract whether incorporated in the work or not; and the Contractor shall promptly replace and re-execute all unacceptable work in accordance with the Contract and without expense to the Owner. Upon failure of the Contractor to comply with any order of the Water Superintendent to remove and replace unacceptable work, the Water Superintendent will have the authority to cause said work to be removed and replaced and to deduct costs from any monies due or to become due to the Contractor.

23. CONTRACTOR'S CERTIFICATION REGARDING SETTLEMENT OF CLAIMS

The Contractor shall, by affidavit, certify to the City of Kirkwood that all bills and claims properly due and chargeable against the work have been satisfied and shall release the City of Kirkwood from all further claims. The acceptance by the Contractor of the final payment shall constitute a release and waiver of any and all rights and privileges under the terms of the Contract; further, the acceptance by the Contractor of final payment shall relieve the City from any and all claims or liabilities for anything done or furnished relative to the work or for any act or neglect on the part of the City relating to or connected with the Contract.

If said affidavit that claims have been paid cannot be given because of a dispute as to the amount or legality of a claim and if the Contractor's affidavit clearly sets out the facts as to (1) the name and address of the unpaid claimant or claimants, (2) the amount of the disputed claim, and (3) a brief statement of the cause of the dispute, the Director of Public Services, with the consent of the surety, then may consent to and make payment of all of the final amounts and percentage due the Contractor if the Director is of the opinion that the claim has not been paid solely because the Contractor is, in good faith, questioning the legality of said claim or its amount and if the Director of Public Service is further satisfied that there is good and sufficient bond to fully protect said claimant.

24. GUARANTEE OF MATERIALS AND CONSTRUCTION

All materials and construction involved in this work shall be guaranteed free from defects owing to faulty material or workmanship for a period of one year after date of acceptance. Any part of work proving defective from these causes, within this period, shall be replaced free of cost to the Owner. Copies of all guarantees must be furnished the Owner before final acceptance of the work.

25. RESPONSIBILITY FOR THE WORK

Prior to the completion of the work by the Contractor and the acceptance thereof by the Owner, the work shall remain at the risk of the Contractor; and said Contractor shall be required to repair, replace, renew, and make good, at his own expense, all damages caused by force, vandalism, or violence of the elements or any other cause whatsoever provided; however, that in such cases the Contractor shall be entitled to a reasonable extension of time which to complete said work. In case of suspension of work from any cause whatever, the Contractor shall be responsible for the project and shall take such precautions as may be necessary to prevent damage to the project, for normal drainage,

and shall erect any necessary warning signs or barricades at his expense. The Contractor shall properly and continuously maintain the roadway and private driveways for local traffic.

26. **USE OF AMERICAN MADE PRODUCTS**

The City of Kirkwood has adopted a policy that requires every public works project in excess of $5,000 to use American products. These products are to be used whenever the quality and price are comparable with other goods.

27. **EQUAL EMPLOYMENT OPPORTUNITY**

The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, or disability. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment; advertising; layoff or termination; rates of pay or other forms of compensation; and selection of training, including apprenticeship. The Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, or disability. The Contractor shall incorporate the foregoing requirements of this paragraph in all of its subcontracts for work performed under the terms and conditions of this Contract. A breach of this provision may be grounds for Contract termination.

28. **ACCIDENT PREVENTION: OSHA**

In the performance of this Contract, the Contractor shall comply with all applicable Federal, State, County, and local laws governing safety, health, and sanitation. The Contractor and any subcontractor shall not require any labor or mechanic employed in performance of this Contract to work in surroundings or other working conditions which are unsanitary, hazardous, or dangerous to his health or safety, as determined under Construction Safety and Health Hazards Title 29, Code of Federal Regulations, Part 1926.

29. **PUBLIC UTILITIES**

Contractor shall contact all public utility companies and all other agencies prior to start of construction so that they may adjust their facilities that conflict with the proposed construction.

(a) Power poles are to be relocated by City of Kirkwood Electric Department, or Ameren Electric Company, as the case may be.

(b) Gas valve boxes and drips will be adjusted to grade by Spire Inc., but the Contractor shall see that they are so maintained until final completion of the job.

(c) The Contractor shall adjust water house service curb boxes to proper final grade and so maintain them until final completion of the project.

(d) Cost of adjusting water boxes and of maintaining both gas and water boxes at proper final grade during the construction period shall be included in the unit prices bid for other items.

(e) Water Superintendent shall designate which gas or water boxes are to be replaced. Payment will be made as designated in the contract.

(f) It is understood and agreed that the Contractor has considered in his bid all of the permanent and temporary utility appurtenances in their present or relocated positions whether or not shown on the plans and that no additional compensation will be allowed for any delays, inconvenience, or damage sustained by him due to any interference from the said utility appurtenances or the operation of moving them.

(g) The Contractor shall use every precaution necessary to prevent damage to all public and private utility wires, lines, pipes, poles, cables, and conduits within the right-of-way. The Contractor shall be responsible for all damage to any utility facility due directly to his operations regardless of location; and he shall repair and replace as necessary any such damaged facility or make payments to the Owner for repair or replacement.

(h) When the failure of the Owners of utility facilities to cooperate and coordinate their work with that of the Contractor results in actual delays to the Contractor in the over-all completion of his work, such delay will be considered in the date specified for completion, provided the Contractor notifies the Water Superintendent in writing of the delay at the time it occurs.

30. CONTRACTOR AND SUBCONTRACTOR INSURANCE

The Contractor shall not commence work under this Contract unless he has obtained the insurance required under this paragraph, and such insurance has been approved by the Owner, nor shall the Contractor permit any subcontractor to commence work on his subcontract until the insurance required of the subcontractor has been so obtained and approved.

(a) Workman's Compensation

The Contractor shall furnish evidence to the City that, with respect to the operations he performs, he carries Workmen's Compensation Insurance, in addition to Employer's Liability Insurance.

(b) Contractor's Bodily Injury Liability and Property Damage

The Contractor shall furnish evidence to the City that, with respect to the operations he performed, he carries regular Contractor's Bodily Injury Liability Insurance providing for a limit of not less than $1,000,000 for all damages arising out of bodily injuries to or death of one person, and, subject to that limit for each person, a total limit of $1,000,000 for all damages arising out of bodily injuries to or death of two or more persons in any one accident, and regular Contractor's Property Damage Liability Insurance providing for a limit of not less than $1,000,000 for all damages arising out of injury to or destruction of property in any one accident, and, subject to that limit per accident, a total or aggregate limit of

$1,000,000 for all damages arising out of injury to or destruction of property during the policy period.

Policy requirements shall be such that insurance provided in compliance with Contractor's Bodily Injury and Property Damage Liability Insurance shall cover liability of the Contractor for damage because of bodily injury to or death of persons and injury to or destruction of property which may be suffered by persons other than his own employees as a result of the negligence of the Contractor in performing the work covered by his Contract. Policy requirements shall also be such that insurance provided in compliance with Contractor's Property Damage Liability Insurance shall include liability of the Contractor for damage to or destruction of property which may be suffered by persons other than his own employees as a result of blasting operations, tunneling, or similar underground work, and demolition operations of the Contractor in performing the work covered by his Contract. Explosion, collapse, and underground insurance with limits of not less than $1,000,000 bodily injury and $1,000,000 property damage is required from contractors or subcontractors who are involved in this type of work under this contract.

If any part of the work is sublet, similar insurance shall be provided by or in behalf of the subcontractors to cover their operations.

If the Contractor elects to provide single limit coverages, the limit shall not be less than $1,000,000 for bodily injury or death and $1,000,000 for damages arising out of injury to or destruction of property. If he elects to provide single limit coverage for combined damages arising out of bodily injury or death and injury to or destruction of property, the limit shall not be less than $1,000,000.

(c) Insurance With Other Than Missouri Companies

Any insurance policy required as specified hereinbefore, if written by an insurance company organized in a state other than Missouri, shall be countersigned by a Missouri resident agent of such company. Any certificate or other evidence of insurance, submitted to the City, shall be in a form acceptable to the City. In the case of policies written by companies organized in a state other than Missouri, the certificate of insurance, or other evidence submitted, shall be countersigned by a Missouri resident agent.

(d) Certificate of Insurance

All insurance hereinbefore specified shall be carried until all work required to be performed under the terms of the Contract is satisfactorily completed as evidenced by the formal acceptance by the Council.

A certificate of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the work. These certificates shall contain a provision that coverages afforded under the policies will not be canceled until at least thirty days prior written notice has been given to the Owner. The certificate shall name the City of Kirkwood as an additional insured.

31. PERSONAL LIABILITY OF PUBLIC OFFICIALS

The Contractor and its surety shall indemnify and save the Owner and all of its officers, engineers, representatives, agents, and employees harmless from all suits, actions, including costs of defense, or claims of any character, name, and description brought for or on account of any injuries or damages received or sustained by any persons or property, by or from the Contractor, or by or in consequence of any neglect in safeguarding the work, or through the use of unacceptable materials in constructing the roadway, or by or on account of any claims or amounts recovered from any infringement of patent, trademark, or copyright, or from any claims or amounts arising or recovered under the Workmen's Compensation Law or any other law, bylaw, ordinance, order, or decree. The Owner may retain from any monies due or to become due to the Contractor such sum or sums as shall be deemed necessary to protect the Owner's interest until such suits, action or actions, claim or claims for injuries or damages as aforesaid shall have been settled and suitable evidence to that effect furnished to the Owner.

32. HANDICAPPED ACCESSIBILITY

All buildings, structures, sidewalks, curbs, and facilities shall be designed and constructed for handicapped accessibility in strict accordance Federal, State, and local regulations.

33. MISSOURI PREVAILING HOURLY WAGE RATES

(a) The proposal for this Contract shall be based upon the required payment by the Contractor for wages for each craft or type of workmen required to execute the Contract as determined by the Department of Labor and Industrial Relations of Missouri, pursuant to Sections 290.262, RSMo 1994. A schedule of such prevailing hourly rate of wages as determined by the Department of Labor and Industrial Relations of Missouri, pursuant to said statutory provisions is attached hereto and made a part of this Contract.

(b) The principal Contractor and all subcontractors shall comply in all respects with House Substitute for House Bill No. 294, as enacted by the 69th General Assembly and which became effective August 29, 1957, and embodied into the Revised Statutes of Missouri, as Sections 290.262, Revised Statutes of Missouri, 1994.

(c) The Contractor and each subcontractor shall keep an accurate record showing the names and occupations of all workmen employed by him, together with the actual wages paid to each workman, which shall be open to inspection at all reasonable hours by the representative of the Department of Labor and Industrial Relations of Missouri and the Owner.

(d) The aforesaid prevailing hourly rate of wages is subject to change by the Department of Labor and Industrial Relations of Missouri or by court decision as provided by law during the life of the Contract, and such change shall not be the basis of any claim by the Contractor against the Owner nor will deduction or claim be made by the Owner against sums due the Contractor by reason of any such change.

(e) Upon completion of the Contract, the Contractor shall submit to the Engineer an affidavit stating that he has fully complied with the Missouri Prevailing Wage Law.

(f) The Contractor shall forfeit as liquidated damages to the Owner One Hundred Dollars ($100.00) for each workman employed by the Contractor or any of his subcontractors, for each calendar day, or portion thereof, if such workman is paid less than the prevailing hourly rate of wages for that type of workman or craft for work performed under this Contract.

(g) The Contractor shall submit certified copies of their payrolls to the City of Kirkwood. The payrolls shall be submitted weekly on Payroll Form LS-57-AI or other form approved by the Director of Procurement.

SPECIAL PROVISIONS

1. PAYMENT PRICE

The quantities shown in the Proposal are estimated quantities of the various items of work. Payment will be made at the applicable unit price; and final payment will be the sum of the product of the actual quantity of each item as finally determined, multiplied by the applicable Contract unit price.

2. CONTRACTOR CONTRACT DOCUMENTS

The Contractor will be supplied with a minimum of two sets of Contract Documents, one set of which the Contractor shall keep available on the work at all times. Additional sets of the Contract Documents, if required, may be obtained from the Engineer.

3. PROGRESS OF CONTRACTORS WORK

The Water Superintendent shall mark the improvements to be made. The Contractor shall commence work promptly after the concrete is marked for replacement. The Contractor shall complete the work in phases. All work, including site restoration, shall be completed in each phase before the Contractor may commence work in another phase.

4. ADDITIONS AND DELETIONS TO THE WORK

The Water Superintendent may, upon written change order, limit or expand the work under the Contract. The Water Superintendent may delete and/or add work at the Contract Unit Price without invalidating the Contract. All work is contingent upon funding by the Mayor and Council of the City of Kirkwood.

5. SITE RESTORATION

Site restoration shall follow construction as closely as possible. Contractor shall restore all work areas in each phase before proceeding to next phase. Contractor shall ask before proceeding to the next street or phase. Work shall cease if, in the opinion of the Water Superintendent, site restoration is not being completed in a timely manner. If the restoration still is not completed, City forces shall complete the restoration at a unit price of $250 per square yard for asphalt repairs and $200 per square yard for earth work. Any work performed by City forces will be charged against the contractor's monthly or final invoice.

6. MANHOLE ADJUSTMENT PAYMENT

When, in the opinion of the Water Superintendent, a utility manhole requires adjustment, the Contractor will be paid as follows:

☐	0 to 1 inch adjustment	No payment
☐	Greater than 1" but less than 6"	$200 each
☐	Greater than 6" but less than 12"	$250 each

JOB SPECIAL PROVISIONS

W. WATER MAIN

Description:

This work is for the replacement of the existing water mains, fire hydrants, valves and house service connections with the following materials:

Specifications:

Bidder/Contractor is cautioned to read the specifications carefully and thoroughly as they have undergone recent changes.

Subsurface Conditions:

Geotechnology performed soil test borings, laboratory testing and preparation of boring logs for this project. The Geotechnology report was used to identify subsurface conditions at the site that may affect cost, progress or performance of the work which have been relied upon in the preparation of the drawings and specifications. The City will make copies of the Geotechnology report available to any bidder requesting them. This report is not guaranteed as to accuracy, completeness, nor is the report part of the contract documents. Before submitting a bid each bidder will, at their own expense, make such additional investigations and tests as the bidder may deem necessary to determine their bid for performance of the work in accordance with the time, price, and other terms and conditions of the contract documents.

Available Water Supply:

The Contractor may use water from nearby hydrants at no additional cost Monday through Friday during normal business hours. For any water needed outside of normal business hours, the Contractor has the option to collect water from a nearby hydrant during normal business hours to be stored for later use. Optionally, the Contractor may purchase water from Missouri American Water at the Contractor's own expense. The Contractor is not required to obtain a permit to use hydrants, but must comply with all City rules and regulations regarding the use of fire hydrants, including the requirement that an RPZ backflow prevention device be used. The Contractor must provide the City with a test report indicating the backflow device to be used has been tested and passed within the past year.

SECTION 00415
BID FORM ITEM DESCRIPTIONS

1. GENERAL

A. Specifications for the work shall consist of the documents contained in Divisions 1 through 15 of the Contract Documents, "Rules of Department of Natural Resources Division 60 – Safe Drinking Water Commission", and the Missouri Highways and Transportation Commission: "Missouri Standard Specifications for Highway Construction" and City of Kirkwood "Standard Drawings and Detailed Specifications for Pavement Restoration", including all addenda, latest edition and Detailed Specifications pages DS1 through DS 12 included in these documents. The more stringent requirements between the specifications listed shall take precedence whenever any disagreement exists.

B. Additional requirements for execution of the work are provided in the Contract Documents and Divisions 1 through 15.

C. Each of the following bid items shall be inclusive of all related activities for the complete installation of the item including but not limited to: labor, machinery and equipment, installing maintaining and removing traffic control devices, protection of existing utilities, saw cutting of pavements, excavation in any type of soil or rock strata, removal of excess spoils off site, shoring, excavation dewatering, backfill with select granular rock backfill, backfill compaction and all surface restoration.

D. Work under each of the following items shall include, but not be limited to, the removal and replacement of existing street or driveway asphalt pavement necessary for the installation of the proposed water main, fittings, valves, fire hydrants, house service connections and all associated construction operations. It shall include all materials, labor, machinery, construction equipment and appliances required to remove along clean cut lines and install an aggregate base course and bituminous concrete pavement in accordance with the latest edition of the City of Kirkwood standard specifications. Work under this item shall also include removal and disposal of existing pavement off site, scarifying, shaping, priming, and furnishing, installing and compacting of the replacement materials as specified here in and as detailed on the plans. All work to be completed in a workmanlike manner as shown on the plans and in accordance with the City of Kirkwood "Standard Drawings and Detailed Specifications for Pavement Restoration" as specified herein and as necessary to provide a complete and operational system.

E. Work under each of the following items also includes providing the necessary labor, materials and equipment to maintain the aggregate base course before replacement of the asphalt pavement. Where necessary the Contractor shall install additional crushed rock and regrade the surface at no additional cost to the contract.

2. MOBILIZATION

A. This item shall consist of, but not be limited to, preparatory work and operations, including, but not limited to, those necessary for the movement of personnel, equipment, supplies, and incidentals to the Project site; for the establishment of all offices, buildings, and other facilities necessary for work on the Project except as provided in the Contract as separate

bid items; and for all other work and operations which must be performed or costs incurred prior to beginning construction.

B. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid Lump Sum (LS) amount for Mobilization completed as shown on the plans and as specified herein.

3. TAPPING SLEEVE, TAPPING VALVE AND VALVE BOX

A. Work under this item shall include, but not be limited to, furnishing and installing stainless steel tapping sleeves, tapping valves and valve boxes of the sizes shown on the plans. It shall include hot tap of existing water main, installation of tapping sleeve, air testing tapping sleeve, installation of tapping valve, valve box, poly-wrap, thrust block, tracer wire and marking tape. All work to be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid per each (EA) for Tapping Sleeve, Tapping Valve and Valve Box of the diameter list installed as shown on the plans and as specified herein.

4. C909 WATER MAIN WITH TRACER WIRE AND MARKING TAPE, OPEN CUT INSTALLATION

A. Work under this item shall include, but not be limited to, furnishing and installation of C909 DR18 PVC pipe with tracer wire and marking tape at the locations shown on the plans and at minimum of 42" cover to top of pipe. It shall include required pipe jointing, installation of tracer wire and marking tape. It shall include pipe hydrostatic testing, flushing and disinfection. It shall also include cutting and plugging with 2 ft of grout, all ends of existing water main to be abandoned, removal of existing valve boxes on main to be abandoned, tracer wire, encasement and cleaning and sweeping of road. All work shall be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid per lineal feet (Lin. Ft.) of C909 water main of the diameters listed with tracer wire and marking tape installed as shown on the plans and as specified herein.

5. C909 WATER MAIN WITH TRACER WIRE AND MARKING TAPE INSIDE 16" PVC CASING, OPEN CUT INSTALLATION

A. Work under this item shall include, but not be limited to, furnishing and installation of C909 DR18 PVC carrier pipe with tracer wire inside 16" PVC casing pipe including casing spacers and end seals at the locations and depths shown on the plans. It shall include required casing pipe jointing, carrier pipe jointing, installation of casing spacers and end seals and tracer wire along with hydrostatic testing, flushing and disinfection. It shall also include cutting and plugging with 2 ft of grout, all ends of existing water main to be abandoned, removal of existing valve boxes on main to be abandoned, tracer wire and cleaning and sweeping of road. All work shall be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid per lineal feet (Lin. Ft.) of C909 water main with tracer wire and marking tape inside 16" PVC casing, open cut installation of the diameters listed as shown on the plans and as specified herein.

6. DUCTILE IRON FITTINGS, ALL SIZES

A. Work under this item shall include, but not be limited to, furnishing and installing ductile iron fittings of the sizes and configurations specified and at the locations shown on the plans. It shall include installation of each fitting and associated mega lugs and stainless steel accessories, poly-wrap, thrust block, tracer wire and marking tape. It shall also include hydrostatic testing, flushing and disinfection as specified. All work to be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid per each Ductile Iron Fitting of the diameter and type listed, installed as shown on the plans and as specified herein.

7. GATE VALVE WITH FOSTER ADAPTOR AND VALVE BOX

A. Work under this item shall include, but not be limited to, furnishing and installing gate valve with Foster Adaptor and valve box with appropriate extensions as specified and at the locations shown on the plans. Valve shall be installed in a horizontal position with the operating nut vertical and centered in the valve box. It shall include installation of valve and all associated mega lugs and stainless steel accessories, polywrap, tracer wire and marking tape. It shall also include hydrostatic testing, flushing and disinfection as specified. All work to be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid for each (EA) Gate Valve of the diameters listed with Foster Adaptor and Valve Box installed as shown on the plans and as specified herein.

8. EZ VALVE AND VALVE BOX (ALL SIZES)

A. Work under this item shall include, but not be limited to, furnishing and installing EZ valve and valve box with appropriate extensions as specified and at the locations shown on the plans. Valve shall be installed in a horizontal position with the operating nut vertical and centered in the valve box. It shall include installation of valve and all associated stainless steel accessories, poly-wrap, tracer wire and marking tape. It shall also include hydrostatic testing, flushing and disinfection as specified. All work to be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid for each (EA) EZ Valve of the diameters listed with the Valve Box installed as shown on the plans and as specified herein.

9. 10"x6" TEE, 6" GATE VALVE WITH FOSTER ADAPTOR AND VALVE BOX, FIRE HYDRANT AND LOCKING RINGS (FIRE HYDRANT ASSEMBLY)

A. Work under this item shall include, but not be limited to, furnishing and installing 10"x6" ductile iron tee, 6" gate valve with Foster Adaptor and valve box, 6" ductile iron spools with locking rings and fire hydrant with appropriate extensions as specified and at the locations shown on the plans. It shall include installation of tee, valve, spools with locking rings, fire hydrant, all associated mega lugs and stainless steel accessories, poly-wrap, thrust block, tracer wire and marking tape. It shall also include hydrostatic testing, flushing and disinfection of fire hydrant assembly as specified. All work to be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid for each (EA) 10"x6" Tee, 6" Gate Valve with Foster Adaptor and Valve Box, Fire Hydrant and Locking Rings (Fire Hydrant Assembly) installed as shown on the plans and as specified herein.

10. REMOVE EXISTING FIRE HYDRANT AND VALVE BOX AND PLUG EXISTING END OF EXISTING MAIN

A. Work under this item shall include, but not be limited to, the removal of existing fire hydrants, thrust block, pipe spool pieces, and hydrant isolation valve boxes, and plugging end of existing hydrant line with grout at existing hydrant valve. It shall include the removal and disposal of the fire hydrant, spool pieces and valve box off site or to a location designated by the owner. All work to be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid for each (EA) Remove Existing Fire Hydrant and Valve Box and Plug Existing end of Existing Main completed as shown on the plans and as specified herein.

11. WATER SERVICE TRANSFER

A. Work under this item shall include, but not be limited to, furnishing and installing 10" X 1" bronze body tapping saddles, 1" corporation stop, copper fittings and pipe necessary to connect new water main to existing water connections with new 1" copper service within new pipe trench. It shall include installation of tapping saddle, corporation stop, copper fittings and pipe. It shall also include hydrostatic testing of tapping saddle and corporation stop, flushing and disinfection of copper pipe and fittings. All work to be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Work under this item shall also include plugging the end of existing water service pipe to be abandoned at the existing water main service saddle. All work to be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

C. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid for each (EA) Water Service Transfer installed as shown on the plans and as specified herein.

12. WATER SERVICE TRANSFER AND EXTENSION

A. Work under this item shall include, but not be limited to, furnishing and installing 10" X 1" bronze body tapping saddles, 1" corporation stop, copper fittings and pipe necessary to connect new water main to existing water connections with new 1" copper service at the existing water main connection point; extend new water service from proposed water main to existing service at the existing water main. It shall include installation of tapping saddle, corporation stop, copper fittings and pipe. It shall also include hydrostatic testing of tapping saddle and corporation stop, flushing and disinfection of copper pipe and fittings. All work to be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Work under this item shall also include plugging the end of existing water service pipe to be abandoned at the existing water main service saddle. All work to be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

C. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid for each (EA) Water Service Transfer and Extension installed as shown on the plans and as specified herein.

13. HOUSE SERVICE CURB STOP

A. Work under this item shall include, but not be limited to, furnishing and installing new 1" curb stops and all associated accessories, including fittings on house service lines where relocation is required or they do not currently exist. It shall also include hydrostatic testing, flushing and disinfection as specified. All work to be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Method of Measurement and Payment: Payment for this item will be made at the contract unit price bid for each (EA) House Service Curb Stop installed as shown on the plans and as specified herein.

14. ALTERNATE BID: RJ C900 WATER MAIN WITH TRACER WIRE, DIRECTIONALLY DRILLED.

A. Work under this item shall include, but not be limited to, furnishing and installation of RJ C900 DR18 PVC water main with tracer wire, horizontally directional drilled at the locations and depth shown on the plans. It shall include all labor, machinery, construction equipment and appliances necessary to perform required directional drilling operation in any type of soil and rock strata. It shall include saw cutting and removing pavement, excavation of directional drilling pits in any type of soil and rock strata, haul off of excavated material, pits shoring, dewatering and protection, bypass pumping, drilling fluid maintenance, groundwater control, treatment and disposal, furnishing and installing pipe and fittings not indicated as an item on the bid form, bedding, haunching, testing, topsoil;

replacement and repair of utilities, drainage systems, structures, and property; pipe jointing, tracer wire and backfilling pits with excavated material or select granular rock backfill as required in turf or under pavements and driveways, removal and legal disposal of surplus excavated material. It shall include pipe hydrostatic testing, flushing and disinfection. It shall also include cutting and plugging with 2 ft of grout both ends of existing water main to be abandoned in place, removal of existing valve boxes on main to be abandoned, tracer wire, encasement, and cleaning and sweeping of the road. All work shall be completed in a workmanlike manner as shown on the plans, as specified herein and as necessary to provide a complete and operational system.

B. Method of Measurement and Payment: Payment for this item will be made by ADDING TO or DEDUCTING FROM the TOTAL UNIT BID PRICE at the amount provided in the ALTERNATE BID ITEM.

END OF SECTION 00415

SECTION 01600
MATERIAL AND EQUIPMENT SHIPMENT HANDLING, STORAGE AND PROTECTION

PART 1 GENERAL

1.01 PREPARATION FOR SHIPMENT

A. When practical, equipment shall be factory assembled. The equipment parts and assemblies that are shipped unassembled shall be furnished with an assembly plan and instructions. The separate parts and assemblies shall be match-marked or tagged in a manner to facilitate field assembly.

B. Generally, machined and unpainted parts subject to damage by the elements shall be protected with an application of a strippable protective coating.

C. Equipment shall be packaged or crated in a manner that will provide protection from damage during shipping, handling, and storage.

D. The outside of the package or crate shall be adequately marked or tagged to indicate its contents by name and equipment number, if applicable; approximate weight; state any special precautions for handling; and indicate the recommended requirements for storage prior to installation.

1.02 RECEIVING

A. The Contractor shall unload and record the receipt of all equipment and materials at the jobsite.

1.03 INSPECTION

A. Immediately upon receipt of equipment and materials at the jobsite, the Contractor shall inspect for completeness and any evidence of damage during shipment. Should there appear to be any damage, the Water Superintendent shall be immediately notified; and the Contractor shall be responsible for informing the manufacturers and the transportation company of the extent of damage. If the item or items require replacing, the Contractor shall take the necessary measures to expedite the replacement.

1.04 HANDLING

A. Equipment and materials received for installation on this project shall be handled in accordance with the manufacturer's recommendations, and in a manner that will prevent damage.

1.05 STORAGE AND LAYDOWN

A. Equipment and materials shall be stored prior to installation as recommended by the manufacturer.

B. Store all materials prior to installation off the ground and out of mud and standing water.

C. Store all items subject to the elements, vandalism, or theft such that they are protected and/or secure.

D. Do **not** store any materials on private property without written permission of the property owner or lessee.

1.06 INSURANCE

A. The Contractor's insurance shall adequately cover the value of materials delivered but not yet incorporated into the work. The Contractor and Owner shall be named as co-insureds insofar as their respective interests may appear. Proof of this coverage must be submitted to the Water Superintendent at the time of request for progress payments. The Contractor is responsible for all premiums and deductibles.

1.07 INVENTORY CONTROL

A. Equipment and materials shall be stored in a manner to provide easy access for inspection and inventory control. The Contractor shall keep a running account of all materials in storage to facilitate inspection and to estimate progress payments for materials delivered but not installed in the work.

1.08 EQUIPMENT MAINTENANCE PRIOR TO OWNER'S ACCEPTANCE

A. The Contractor shall provide the required or manufacturer's recommended equipment maintenance during storage, during installation, and until such time as the Owner accepts the equipment for full-time operation.

PART 2 PRODUCTS – not used

PART 3 EXECUTION – not used

END OF SECTION 01600

SECTION 02140
DEWATERING

PART 4 GENERAL

4.01 GENERAL

A. Maintain excavations in a dewatered state to facilitate construction.

B. For the purpose of this section, the following definitions shall apply:

1. Dewatering is defined as lowering of ground water to ensure stable, firm working conditions and reduction to safe levels of any hydrostatic uplift pressures in any confined foundation strata and/or aquifers which is necessary to ensure stability and integrity of foundation.
2. Dewatering system is defined as machinery, equipment and appurtenances necessary for and related to accomplishment of dewatering, and collection and disposal of all surface water within protected area.
3. Excessive Dewatering is defined as Dewatering that would require well points or other special dewatering methods to control unusual infiltration, if considered necessary and ordered by the Engineer.

C. Dewatering is considered incidental to the contract and will not be paid for separately. Excessive Dewatering is not anticipated.

4.02 RELATED SECTIONS

A. Section 02222 – Excavating, Backfilling and Compacting for Utilities.

4.03 REFERENCE TO STANDARDS

A. Occupational Safety and Health Administration (OSHA): Contractor shall note the OSHA requirements for excavations, particularly requirements set forth in Federal Register, Tuesday, October 31, 1989, 29 CFR Part 1926. Compliance with this publication and any other OSHA excavation requirements is the Contractor's responsibility only.

4.04 SYSTEM DESCRIPTION

A. Dewatering System

1. The dewatering/support system shall be of a type and capacity to accomplish all requirements specified herein.
2. The water level shall be maintained continuously so that construction operations can be performed without interruption due to wet conditions.
3. The dewatering system shall be designed, constructed, and operated at all times so as to prevent movement of adjacent structures, foundations, excavation slopes, and backfill materials.
4. The dewatering systems shall consist of pumps, sump pumps, ditches, and necessary appurtenances capable of intercepting seepage before it exits on any interior surface or excavation face and of providing control of interior (excavation) surface water. The system shall be operated as required

above to prevent damage to the work. Protection of all slopes will be required to prevent erosion under normal surface runoff and construction conditions.

5. Power for the dewatering system shall be supplied by the Contractor.

4.05 MAINTENANCE SERVICE

A. If, during progress of work, installed dewatering system proves inadequate to meet requirements specified, Contractor shall, at his expense, furnish, install, and operate such additional dewatering facilities and/or make such changes, either in features of system or plan of operation, as may be necessary to perform required dewatering in a satisfactory manner. Such changes and additions shall be submitted in writing to Engineer prior to being made.

PART 5 PRODUCTS – NOT USED

PART 6 EXECUTION

6.01 DEWATERING

A. Design

1. Design, furnish, install, operate and maintain such facilities necessary to accomplish the following:
   a. Protect excavation walls and/or side slopes as well as existing and new construction adjacent to excavation areas.
   b. Collect and dispose of all surface water in the protected area regardless of source.
   c. Control and dispose of all surface water around the periphery of the excavation areas to prevent such water from entering the excavation.
2. The design, installation, construction sequence, and operation of different items of work shall be such that there shall be no loss of ground from the bottoms of excavations or around the areas of construction. The excavations shall remain dewatered as specified until backfilled to the original surface or proposed grade.

B. Damage Restitution

1. The Contractor shall be responsible for and shall repair without cost to the Owner, any damages to work in place, other contractor's equipment, existing structures, temporary berms, and excavation, including damage to the bottom of the excavation, including removal of material and pumping out of the excavated area, that may result from his negligence, inadequate or improper design and operation of the dewatering system, any mechanical or electrical failure of the dewatering system, or flooding for any other reason.

C. Operation

1. The Contractor will be required to perform such dewatering and to maintain the work areas in a dry condition as long as is necessary for the work to be completed under this contract. Once an area is dewatered, it shall be

maintained in a dewatered condition until all work in that area is completed and excavations backfilled to the original surface or proposed grade.

D. Control of Water

1. The Contractor shall control, by acceptable means, all water regardless of source. The site shall be graded such that all surface drainage shall be away from excavation areas. All access roads in the vicinity of the excavations shall be constructed so as to prevent surface drainage into the excavations. Discharge from dewatering pumps shall be at approved locations so as not to damage existing facilities or new construction. The Contractor shall be fully responsible for disposal of the water and shall provide all necessary means to accomplish this at no additional cost to the Owner.

E. Maintenance and Service

1. The Contractor shall be responsible for the maintenance, service, and repairs of the entire dewatering system and appurtenances during the life of the contract, including replacement of any and all dewatering pumps found performing unsatisfactorily.
2. System maintenance shall also include periodic operation of standby equipment previously described in this Specification, and any other work required by the contractor to maintain the excavations in dewatered conditions. Dewatering by whatever means shall be a continuous operation and interruptions due to outages, below freezing temperatures, or any other reason shall not be permitted.

F. Discontinuing Operation of Dewatering Systems

1. The Contractor shall maintain the dewatering system in each area in operation until work in the area being dewatered has been completed.

END OF SECTION 02140

SECTION 02222
EXCAVATING, BACKFILLING AND COMPACTING FOR UTILITIES

PART 7 GENERAL

7.01 SUMMARY

A. Section Includes:

1. Excavation of trenches for sanitary sewer and storm sewers, water mains and other utilities.
2. Compacted bed and compacted fill.
3. Compaction.
4. Compaction inspection and testing service.

B. Related Sections:

1. Section 02140 – Dewatering.
2. Section 02930 – Sodding.

7.02 REFERENCE TO STANDARDS

A. The portions of the work specified in this section shall conform to the following standards, rules, and regulations with modifications and additional requirements as stated in or reasonably inferred from the Contract Documents.

1. 10-States Standards: "Recommended Standards for Water Works" as issued by the Great Lakes – Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 2003 Edition.
2. "Rules of Department of Natural Resources Division 60 – Safe Drinking Water Commission".
3. Missouri Highways and Transportation Commission: Missouri Standard Specifications for Highway Construction, including all addenda, latest edition.
4. Occupational Safety and Health Administration (OSHA): Current OSHA Occupational Safety and Health Standards – Excavations, 29 CFR Part 1926, including any successor regulations.
5. ANSI C136, Standard for Sieve Analysis of Fine and Coarse Aggregate.
6. ANSI/AWWA C600-93, AWWA Standard for Installation of Ductile-Iron Water Mains and their Appurtenances, as published by American Water Works Association.
7. ANSI/AWWA C605-94, AWWA Standard for Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water, as published by American Water Works Association.
8. ASTM D698 – Test for Moisture-Density Relationship of Soils and Soil-Aggregate Mixtures Using 5.5 lb. Rammer and 12 in. Drop.
9. ASTM D1556 – Density of Soil In Place by Sand-Cone Method.
10. ASTM D1557 – Tests for Moisture-Density Relationship of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18 in. Drop.

11. ASTM D2321-04 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications.
12. Ductile Iron Pipe Research Associate (DIPRA) "Installation Guide for Ductile Iron Pipe," latest edition.
13. City of Kirkwood Public Works Department standards.

7.03 PROTECTION

A. Protect excavations by shoring, bracing, sheet piling, underpinning or other methods to prevent cave-in or loose soil from falling into excavation.

B. Underpin adjacent structures which may be damaged by excavation work, including service utilities and pipe chases.

C. Notify Engineer immediately of unexpected subsurface conditions. Confirm notification in writing. Discontinue work until Engineer issues written notification to resume work.

D. Protect bottom of excavations and soil adjacent to and beneath foundations from frost.

PART 8 PRODUCTS

8.01 BACKFILL MATERIAL

A. See Section 15065 – Piping Installation for backfill material requirements.

8.02 PRIVATE EASEMENTS

A. Where excavation occurs on private easements, topsoil shall be stockpiled and replaced after construction on disturbed areas. See Specification Section 02920 for additional details regarding topsoil.

PART 9 EXECUTION

9.01 PREPARATION

A. Identify specified lines, levels, contours and data.

B. Compact subgrade surfaces to density specified for backfill materials.

9.02 EXCAVATION

A. General

1. Excavation consists of trenching for water mains and their apparatus by removal of material encountered when establishing required grade and subgrade elevations.
2. The Contractor is solely responsible for designing and constructing stable excavations and should shore, slope or bench the sides of the excavations as required to maintain stability of both the excavation sides and bottom.
3. Trench excavations shall be protected in accordance with the applicable federal, state, and local regulations, laws, and rules; but shall not be less than the standards and regulations established by the current OSHA

Standards for Excavation in 29 CFR Part 1926, including any successor regulations.

4. All sheeting, shoring and bracing of trenches, pits and excavations shall be the sole responsibility of the Contractor.
5. If the contractor elects to construct the trench with sloped or benched sides in lieu of shoring, no additional compensation will be allowed for the trench backfill material required outside the vertical limits of the specified trench width.
6. The trench bottom shall be excavated and prepared to provide uniform, stable support of the pipe. Relief cuts shall be made at pipe bells, fittings, and couplings.
7. The trench shall be dewatered until backfill has been placed to prevent softening of the foundation and to prevent buoyant forces from deflecting the pipe alignment and grade. Dewatering shall be implemented at no additional cost to the owner.

B. Unauthorized Excavation

1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at Contractor's expense.

C. Additional Excavation

1. Additional excavation consists of carrying excavations deeper and replacing the excavated material as directed by the Engineer if unsuitable materials are encountered at the required subgrade elevations. When excavation has reached required subgrade elevations, Contractor shall notify the Engineer, who will make an inspection of conditions.

D. Dewatering

1. Prevent surface water and subsurface or groundwater from flowing into the trench and from flooding project site and surrounding area.
2. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
3. Protect existing roadway drainage ditch, establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
4. Dewatering for supported excavations shall be accomplished in accordance with Articles 3.02.D.1 through 3.02.D.3 (above) and Section 02140 – Dewatering.

E. Excavation Near Utilities

1. Protect, support, shore, brace, etc. all utility services uncovered by excavation.

2. Accurately locate and record abandoned and active utility lines rerouted or extended, on Project Record Documents.
3. Repair damaged utilities to the satisfaction of the Utility Owner.

9.03 BACKFILLING AND COMPACTING

A. Support pipe and conduit during placement and compaction of bedding fill.

B. Backfill trenches to contours and elevations shown. Backfill systematically, as early as possible to allow maximum time for natural settlement. Do not backfill over porous, wet or spongy subgrade surfaces.

C. The trench shall be backfilled in a manner to restore the original soil profile as much as practical.

D. Place and compact select fill materials in continuous layers not to exceed 8 in. loose depth.

E. Place and compact common fill materials in continuous layers not exceeding 12 in. loose depth.

F. Use a placement method that will not disturb or damage utilities in trenches.

G. Maintain optimum moisture content of backfill materials to obtain specified compaction density.

H. Remove surplus backfill materials from site.

I. Leave stockpile areas completely free of excess fill materials.

J. Haunching or backfill materials disturbed by moving or removing any trenching shall be removed, replaced, and recompacted in accordance with this specification.

K. Haunching shall be worked around the pipe by hand to eliminate voids underneath the pipe.

9.04 GRADING

A. Unpaved areas shall be finished to receive topsoil to within not more than 0.10 feet above or below the required subgrade elevations, compacted as specified, and free from irregular surface changes.

B. Paved areas shall be graded smooth and even, free of voids, compacted as specified, and to required elevation. Final grades shall be within a tolerance of not more than 0.10 feet above or below the required subgrade elevation.

9.05 MOISTURE CONTROL

A. Where the subgrade layer of soil material must be moisture conditioned before compaction, uniformly apply water to the surface of subgrade, or layer of soils material to prevent free water from appearing on the surface during or subsequent to compaction operations.

B. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

1. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until the moisture content is reduced to a satisfactory value.

9.06 COMPACTION TESTING

A. Testing shall be performed in accordance with ASTM D698 and Section 01400.

9.07 WASTE MATERIAL

A. Waste materials include excess suitable materials and all materials unsuitable for use. Unsuitable materials include all materials that contain debris, roots, organic matter, frozen matter, rock or other materials that are determined by the Engineer as too wet or otherwise unsuitable for providing a stable subgrade. Suitable materials include materials free from debris, roots, organic matter, refuse, ashes, cinders, frozen matter and that which is free of rock with any dimension greater than one-half of the specified loose layer thickness.

B. All waste material encountered during excavation shall be removed from the immediate work area and properly disposed of offsite at no additional cost to the Contract. Any surplus of materials or materials which are judged by the Engineer as not suitable for backfilling or filling shall be removed from the site and disposed of by the Contractor offsite at no additional cost to the Contract.

C. Piled surplus or unsuitable excavated materials or any material temporary stored in any given location for the convenience of the Contractor may be required to be removed if such area or areas are required for use in connection with any other contract which may be awarded by the Owner for the work related to this improvement. This includes if the operation and maintenance of an existing plant is hindered or impeded in any way. The Contractor shall promptly remove such materials without additional payment.

D. After acceptance of the work, or when so ordered by the Engineer, that portion of material remaining on the storage areas which may be spoiled on those areas, shall be rough graded to the elevations established on the plans or prior to construction.

9.08 PROTECTION

A. Stability of Excavation

1. Slope sides of excavation to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible either because of space restrictions or stability of material excavated. Maintain sides and slopes of excavation in a safe condition until completion of backfilling.
2. Comply with current OSHA Standards for Excavation 29 CFR Part 1926, including a successor regulation.
3. Where indicated on the drawings, sloped and vertical sides of excavations shall be stabilized with an erosion control system.

B. Protection of Persons and Property

1. All excavations located in a street, highway, or parking pavement shall be backfilled by the end of the workday and shall not be left open overnight. Trenches not located in a pavement may be left open only if surrounded by construction fence and barricades.
2. Protect structures, landscaping, utilities, sidewalks, pavements or other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
3. Construction site safety is the sole responsibility of the Contractor, including but not limited to, the means, methods, and sequencing of construction operations.

C. Protection of Graded Areas

1. All newly graded areas shall be protected from traffic and erosion and kept free of trash and debris.
2. Contractor shall repair and re-establish grades in settled, eroded and rutted areas to the specified tolerances.
3. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, re-shape and compact to the required density prior to further construction. Use hand tamping for recompaction over underground utilities.

END OF SECTION 02222

SECTION 02930
SODDING

PART 10 GENERAL

10.01 DESCRIPTION OF THE WORK

A. This section includes all labor and materials necessary to fine grade, fertilize, and sod the disturbed areas of the site as specified.

10.02 RELATED WORK

A. Section 02222 – Excavating, Backfilling and Compacting for Utilities

10.03 QUALITY ASSURANCE

A. The work under this section shall be done by a contractor regularly engaged in the landscape business as it pertains to grading, fertilizing, sodding.

10.04 SUBMITTALS

A. The Contractor shall submit his plan for executing the work included herein. This submittal shall include fertilizer and sod to be used.

10.05 WARRANTY

A. The sodding subcontractor shall be responsible for the satisfactory growth of sod on all areas sodded until 21 days after placing and until final acceptance of the project by the Owner: or in the opinion of the Water Superintendent, the sod is well established, deeply rooted to the underlying soil, and in good living condition.

B. If, during the guarantee period following acceptance of the completed project by the Owner, it can be shown that defective materials or workmanship were used in sodding, the Contractor shall replace and maintain the sodding until approved by the Water Superintendent.

PART 11 PRODUCTS

11.01 FERTILIZER

A. Fertilizer shall be standard commercial 1:1:1 ratio, uniform in composition, free flowing and suitable for application with approved equipment, delivered to the site in bags or other convenient containers, each fully labeled, conforming to applicable State Laws.

11.02 LIME

A. Lime shall be Agricultural Ground Limestone which shall have not less than 90 percent passing the No. 4 sieve and is graded relatively uniform through the Nos. 8, 30 and 60 sieves. The percentages of calcium carbonate common to the area or hydrated lime containing not less than 45 percent calcium hydroxide shall be used for soil neutralization, unless otherwise indicated. Approved sources of Agricultural Ground Limestone shall be tested by the U.S. Department of Agriculture and rated with a source correction factor.

11.03 SOD

A. Each piece of sod shall be well covered with turf grass, shall be free from noxious weeds and other objectionable plants and shall not contain substances injurious to growth. The grass shall not be cut to a length of less than one and a half inch nor more than four (4) inches before the sod is cut. The sod shall be cut in rectangular pieces with its shortest side not less than twelve (12) inches. The sod shall not be cut less than one (1) inch thick. This thickness measurement does not include grass.

B. An inspection certificate for plant disease and insect infestation shall accompany each shipment and on arrival shall be filed with the Engineer.

C. The sod used shall be approved grass that is native to the locality of work. The lots that have Zoysia sod must be replaced with Zoysia. If the project is completed in a season not conducive to planting Zoysia sod, then bluegrass sod will be placed. And, once growing season for Zoysia returns, the contractor must remove the bluegrass sod and replace with Zoysia. Zoysia sod shall be placed any time during the growing season from May 1 to August 15. The full area shall be sodded. Plug or strip sodding will not be permitted.

D. The sod used shall be either nursery grown or field grown and be well rooted and approved by the Water Superintendent prior to being cut and again before it is laid. Sod that has been grown on soil high in organic matter such as peat will not be acceptable. The consistency of adherent soil shall be such that it will not break, crumble or tear during handling and placing of sod.

PART 12 EXECUTION

12.01 SODDING LOCATIONS

A. Contractor shall fertilize and sod all disturbed areas. Areas include, but not limited to, all embankments, fill areas, tree yards, and swales.

12.02 GROUND PREPARATION FOR SOD

A. All prepped surfaces must receive Water Superintendent approval before the placing of sod.

B. The contractor shall be responsible for clearing and grading the areas for sodding, as required and approved by the Water Superintendent prior to tilling the surface for sodding. Approved borrow may be required for the grading work. Immediately prior, but not in excess of 24 hours before the sod is placed, the soil surface shall be worked until it is free from debris, washes, gullies, clods and stones. The surface shall be worked to a depth of not less than three (3) inches with a disk, tiller or other equipment approved by the Water Superintendent. Prepared surface shall be finished to a fine smooth finish free of irregularities. The Contractor shall furnish and uniformly spread a minimum 2 inches of top soil prior to the placement of the sod. Finished ground elevations shall allow for the thickness of sod to match grade of existing turf or structures.

C. All soil surfaces shall be moist when sod is placed.

D. Fertilizer shall be distributed uniformly over the areas to be sodded at a rate which will provide not less than 50 pounds of nitrogen per acre. Distribution shall be by hand or by common fertilizer distributor. When fertilizer is specified, 180 pounds of fertilizer nutrients per acre shall be applied over the areas to be sodded at a 1:1:1 ratio.

12.03 SOD PLACEMENT

A. Sod shall be placed when the ground is in a workable condition and temperatures are less than 85 degrees F. Sod shall not be placed when the sod or ground surface is frozen. Sod shall not be placed during the months of July and August or during periods of freezing weather or expected freezing weather during the watering period. The sod shall be placed on the prepared surface with the edges in close contact and alternate courses staggered. New sod is to be installed with no gaps between the rows, rolled into place, and fertilized. At the discretion of the Water Superintendent, sod installed on slopes shall be secured so that sod will not slide downhill. The Contractor shall protect sod from washing out or eroding until the grass is well established, deeply rooted and in good living condition.

B. In ditches, the sod shall be placed with the longer dimension perpendicular to the flow of water in the ditch. On slopes, starting at the bottom of the slope, the sod shall be placed with the longer dimension parallel to the contours of the ground. The exposed edges of sod shall be buried flush with the adjacent soil. The sod shall be staked on all slopes of 2:1 (H:V) or steeper.

C. Sod placed in the winter season will not be approved until sufficient time of the following growing season has elapsed to assure that the sod is well established, deeply rooted to the underlying soil and in good live growing condition.

12.04 SOD WATERING

A. Within two (2) hours after the sod has been placed, water shall be applied at a rate of five (5) gallons per square yard. Additional water shall be applied every other day at a rate of three (3) gallons per square yard for a total of twenty one (21) days of additional watering. During the periods exceeding 85 degrees F or subnormal rainfall, the schedule of additional watering may be altered with the approval of the Water Superintendent.

B. All watering described shall be done with a spray application. An open end hose is not acceptable.

C. The Contractor shall be responsible for the proper care of sodded areas during the period when grass is becoming established. Any area to be sodded which does not produce a suitable stand of grass shall be re-sodded at the Contractor's expense, as directed by the Water Superintendent.

END OF SECTION 02930

SECTION 15060
PIPE AND PIPE FITTINGS

PART 13 GENERAL

13.01 SECTION INCLUDES

A. This section covers the work necessary to provide, install and test all system and process pipe and fittings. The portions of the Work specified in this section include system piping for gravity sewers and pump station force main piping.

13.02 RELATED SECTIONS

A. Section 01600 - Material and Equipment Shipment, Handling, Storage and Protection

B. Section 02140 - Dewatering

C. Section 02222 - Excavating, Backfilling and Compacting for Utilities

D. Section 15271 - General Requirements for Valves and Valve Actuators

E. Section 15272 - Valves for Actuator Control

13.03 REFERENCE TO STANDARDS

A. ASTM - American Society of Testing Materials

B. AWWA - American Waterworks Association

C. ANSI - American National Standards Institute

13.04 SUBMITTALS

A. Shop Drawings:

1. The manufacturer's catalog description of all valves, hangers, supports, equipment, and other items shall also be submitted for approval to show conformance with the requirements of these specifications and the contract drawings. The piping shop drawings shall be new drawings prepared by the Contractor, not a mark-up of contract drawings, and the shop drawings shall have a bill of material on each drawing defining all items mentioned above. All catalog and descriptive data shall note where the specific item is to be installed and a cross reference made on the piping show drawings.

13.05 QUALIFICATIONS

A. Manufacturer shall certify to a minimum 5 years of experience specializing in manufacturing of products specified herein.

13.06 QUALITY ASSURANCE

A. The Contractor shall establish and maintain quality control of all equipment and construction operations involved under this item. To assure compliance with contract requirements, the contractor shall maintain records of his quality control for all items listed below.

1. Check for damage to and defects in materials.
2. Check for proper storage of materials and provide a systematic listing of these items and their location.
3. Check to see that shop drawings on all piping systems have been submitted and are approved.
4. Check to see that all piping materials conform to approved shop drawings.
5. Review requirements of plans and specifications and check layouts.
6. A copy of these records shall be kept at the jobsite and shall be available at all times for the Engineer's review.

B. All manufactured items shall be standard commercial products of reputable manufacturers. Where materials are shown on the drawings or listed but not specifically covered by a standard or specification, the Contractor shall furnish best commercial grades of material or articles subject to the approval of the Engineer. When two or more articles of the same material or equipment are required, similar articles of the same size shall be products of a single manufacturer.

C. The Contractor shall furnish the Owner with sufficient copies of the manufacturer's sworn certificates and test results from a reputable testing laboratory showing the results of tests made on all pipe delivered to the project in accordance with the ASTM, AWWA, or ANSI Specifications for the various types of pipe to be furnished. All expenses incidental to the pipe testing shall be considered as included in the prices bid for pipe furnished and installed, and no additional payment will be allowed therefore.

D. The Contractor shall furnish the Engineer with lists, in duplicate, of all pieces of pipe and fittings in each shipment received, and these lists shall give the serial or mark number, weight, class, size and description of each item received at the jobsite.

13.07 MAINTENANCE SERVICE (WARRANTY)

A. The Contractor shall warrant the equipment to be free of material or workmanship defects for a period of one year from the date of substantial completion established by the Owner.

PART 14 PRODUCTS

14.01 MANUFACTURERS

A. PVCO Pipe shall be manufactured by J M Eagle or equal.

B. RJ C900 PVC Pipe shall be manufactured by one of the following:

1. North American Pipe Company, Certa-Lok
2. Diamond Plastics, Lok-21

C. Ductile-Iron Fittings shall be manufactured by one of the following:

1. American Cast Iron Pipe Company.
2. U. S. Pipe and Foundry Company.
3. Griffin Pipe Company.
4. Star Pipe Company.
5. Sigma Corporation.

14.02 PVC PIPE

A. PVCO (molecularly oriented polyvinyl chloride) pipe shall be pressure class 235, slip- joint, meeting AWWA standard C909. Pipe shall conform to requirements of NSF 61 and shall be UL or FM listed.

1. Joints: Push-on type with rubber gaskets.
   a. PVC pipe shall have outside diameter equal to ductile iron pipe. Rubber gaskets shall meet ASTM Specification F477 and shall properly match bell configuration.
   b. For all PVC pipe, additives and fillers, including but not limited to stabilizers, antioxidants, lubricants, colorants, etc. shall not exceed ten (10) parts by weight per one hundred (100) parts of the resin in the compound. Manufacturers will be required to certify that their pipe compound meets this requirement as well as cell classification.
   c. All pipe shall be furnished with a painted ring or other acceptable marking suitable for determining whether or not the pipe has been properly inserted into the coupling. Each pipe shall be clearly marked with the nominal diameter, manufacturer's name, class pressure rating and identification code.

B. RJ C900 pipe shall be pressure class 235, restrained joint, meeting AWWA standard C900. Pipe shall conform to requirements of NSF 61 and shall be UL or FM listed.

1. Joints: Self-restrained with rubber gaskets.
   a. PVC pipe shall have outside diameter equal to ductile iron pipe. Self-restrained joints shall meet ASTM Specification D3139. Rubber gaskets shall meet ASTM Specification F477 and shall properly match bell configuration.
   b. For all PVC pipe, additives and fillers, including but not limited to stabilizers, antioxidants, lubricants, colorants, etc. shall not exceed ten (10) parts by weight per one hundred (100) parts of the resin in the compound. Manufacturers will be required to certify that their pipe compound meets this requirement as well as cell classification.
   c. All pipe shall be furnished with a painted ring or other acceptable marking suitable for determining whether or not the pipe has been properly inserted into the coupling. Each pipe shall be clearly marked with the nominal diameter, manufacturer's name, class pressure rating and identification code.

C. Tracer wire shall be used on all pipe. Wire shall be HDPE insulated single strand # 12 AWG high carbon 1055 grade steel, high strength solid copper clad steel tracer wire. Wire shall be part # 1230B-HS as manufactured by Copperhead Industries or approved equal. Wire splices shall be part # CH10666 as manufactured by Copperhead Industries or approved equal.

D. Blue warning tape shall be non-metallic and shall caution that a buried water line exists below.

14.03 DUCTILE IRON FITTINGS

A. All fittings, which include bends, tees, crosses, plugs and caps, shall be ductile iron, mechanical joint, in accordance with AWWA standard C110 or C153, and shall be epoxy-lined in accordance with AWWA standard C116 or cement lined in accordance with AWWA standard C104. Anchor couplings are permitted at the discretion of Kirkwood Water Department.

B. Restraining Devices shall be Series 2000PV by EBAA Iron Inc.

C. In addition to Megalug joint restraints, all fittings, including bends, tees, crosses, fire hydrants, caps and plugs shall also be restrained with concrete thrust blocks.

D. Couplings shall be ductile iron, **long barrel**, mechanical joint. All T-bolts and nuts shall be thoroughly sprayed with a bituminous coating.

E. All repair clamps shall be full circle stainless steel with ductile iron lugs. They shall be Smith-Blair 226.

F. Polyethylene encasement shall be used on all **ductile** iron pipe, valves and fittings, and any other materials subject to corrosion. Encasement shall be in tube form, shall have natural (clear) color, and shall have a minimum thickness of 12 mils. Flat tube width shall correspond to the diameter of pipe being laid. Polyethylene sheets shall be used for odd shaped appurtenances. Black-colored encasement shall not be permitted.

G. Taps of four inch and larger diameter shall consist of a stainless steel tapping sleeve. The tapping sleeve shall be constructed **entirely** of stainless steel. Carbon steel or ductile iron flanges are not permitted. Approved sleeves include Ford FTSS, Mueller H-304, Power Seal 3490, Romac SST III, or Smith-Blair 665. The tapping valve shall comply with the requirements previously described in the valve section, with the exception of tapping valves shall be flange x mechanical joint. Tapping valves shall be American Flow Control series 2500, Clow Model 2639, Kennedy Ken-Seal II, or Mueller A-2360.

H. Corporation stops shall be ground key AWWA taper "CC" thread by copper flare eighth bend connection and shall be Mueller B-25000.

I. Service saddles shall be bronze body Mueller H-13000 series, bronze body Ford 202BS, or bronze body A. Y. McDonald model 3805.

J. Curb stop valves shall be Mueller 300 ball curb valve B-25154 or A.Y. McDonald NL ball style curb stop 76104 Minneapolis pattern (no alternates) and shall have flare connections. Compression type connections are not permitted.

K. Curb boxes shall be Bingham & Taylor #306 (no alternates). Curb boxes shall thread onto the curb stop valve. If bushings are required to attach the curb box to smaller curb stop valves, bushings shall be PVC or brass. Curb boxes shall be two section telescoping PVC with a cast iron top and bolted lid.

L. Service line couplings shall be flare by compression. Couplings shall connect new copper using flare connection to existing copper, lead and galvanized service lines using compression connection.

M. Service line couplings shall be manufactured by Ford or equal. Pac fittings and dresser couplings are allowed at the discretion of the Kirkwood Water Department.

14.04 PVC CASING PIPE (EXTERIOR PIPING)

A. At the locations shown on the drawings, pipe lines shall be installed in a PVC casing pipe. The PVC casing pipe shall be RJ C900 as specified in paragraph 2.02.B.

B. Casing pipe diameter shall be such that there is a minimum of 3" clearance between the largest diameter part of the carrying pipe being installed and minimum inside diameter of the casing pipe. To facilitate the installation of the inner pipe, that pipe shall be fitted with at least three casing insulators per pipe length. The casing insulators shall be stainless steel Model 4810 as manufactured by Power Seal Pipeline Products Corporation of Wichita Falls, Texas, Advance Products & Systems Model SSI, or equal.

C. The ends of the casing pipes shall be sealed with link seals. The link seals used in this project shall be rated for corrosive service. The link seals shall be suitable for use over a range of temperature between -40°F and 250°F. The pressure plated shall be glass-reinforced nylon plastic. The bolts and nuts shall be 18-8 stainless steel (type 304). The seating element shall consist of EPDM rubber. The link seals shall be Thunderline Corporation, stainless steel LS model, or equal.

PART 15 EXECUTION

15.01 INSTALLATION

A. See Section 15065 – PIPING INSTALLATION.

END OF SECTION 15060

SECTION 15065
PIPING INSTALLATION

PART 16 GENERAL

16.01 REQUIREMENTS INCLUDE

A. Contractor provide:

1. Installation of the piping systems shown on the plans and specified in Section 15060.

16.02 RELATED WORK

A. Specified elsewhere:

1. Section 01600 - Material and Equipment Shipment, Handling, Storage and Protection
2. Section 02140 - Dewatering
3. Section 02222 - Excavating, Backfilling and Compacting for Utilities
4. Section 15060 - Pipe and Pipe Fittings
5. Section 15271 - General Requirements for Valves and Valve Actuators
6. Section 15272 - Valves for Actuator Control

16.03 SUBMITTALS

A. Shop Drawings

1. The manufacturer's catalog description of all valves, hangers, supports, equipment, and other items shall also be submitted for approval to show conformance with the requirements of these specifications and the contract drawings. The piping shop drawings shall be new drawings prepared by the Contractor, not a mark-up of contract drawings, and the shop drawings shall have a bill of material on each drawing defining all items mentioned above. All catalog and descriptive data shall note where the specific item is to be installed and a cross reference made on the piping shop drawings.

B. Product Data

1. Granular Cradle - Sieve Analysis.
2. Granular Backfill - Sieve Analysis.

C. Samples: Granular Cradle, Granular Backfill.

16.04 QUALITY ASSURANCE

A. Proper and suitable tools and appliances for the safe and convenient handling and placing of the pipes, specials and valves shall be used. All pieces shall be carefully examined for defects and no piece shall be laid which is known to be defective. If any defective piece should be discovered after having been laid, it shall be

removed and replaced with a sound piece, in a satisfactory manner, by the Contractor at his own expense. The pipes, specials, and valves shall be thoroughly cleaned before they are placed, shall be kept clean until they are accepted in the completed work, and when laid shall conform accurately to the lines and elevations given by the Engineer, or as specified.

B. The drawings show the general arrangement for both underground and exposed piping systems. Whenever the Contractor deems it necessary to deviate from the arrangements shown, he shall submit to the Water Superintendent in writing a request for the deviation, along with drawings showing the proposed new arrangement. Deviation shall not be made until approval of new arrangements is obtained. Wherever piping arrangements are shown or required to be modified to accommodate the equipment approved for installation, the Contractor shall prepare and submit for approval detailed shop drawings of the new arrangement. Only new and unused materials shall be installed in the work specified herein.

C. The contract drawings are not intended to show every fitting, offset, or similar item. Piping systems shall include all unions, fittings, flanges, anchors, valves, gaskets, nipples, strainers, hangers, vents, gauges, or other equipment necessary for the proper installation of the various systems, but shall include not less than that shown in the contract drawings. Piping shall be arranged and installed approximately as indicated, straight, plumb, and as direct as possible, and in such manner that right angles or parallel lines are formed with structure walls except where indicated otherwise on the plan sheets. All pipe shall be cut accurately to measurements established at the structures and shall be installed without springing or forcing. All changes in direction of piping shall be made with fittings. Bushings will not be permitted unless specifically detailed on the drawings.

16.05 REGULATORY REQUIREMENTS

A. Perform work in accordance with City of Kirkwood Water Department standard specifications.

B. Perform work in accordance with State of Missouri plumbing code.

C. Perform work in accordance with OSHA safety standards.

16.06 COORDINATION

A. Coordinate crossing of existing piping and/or utilities.

16.07 MAINTENANCE SERVICE (WARRANTY)

A. The work specified herein shall be warranted to be free of material or workmanship defects for a period of one year from the date of putting such work into operation as established by the Owner.

PART 17 PRODUCTS AND MATERIALS

17.01 PIPING MATERIALS AND FITTINGS

A. Piping materials and fittings shall be as specified in Section 15060 and as shown on the plans.

PART 18 EXECUTION

18.01 PREPARATION

A. Erosion and sediment control measures required for compliance with the National Pollutant Discharge Elimination System (NPDES) Storm Water Permit for Construction Site Activities shall be placed prior to or as part of the initial work related to pipe installation.

18.02 INSTALLATION

A. Buried Piping Systems

Excavation and backfill shall include all excavation, backfilling, compacting, disposal of surplus material, and all other work incidental to the construction of trenches, including any additional excavation which may be required for manholes or other structures forming a part of the pipe line.

1. Construction Methods

a. Depth of Pipe Cover

i. Unless otherwise shown on the drawings or directed by the Engineer, all pipe shall be laid to minimum depth of three and one-half (3 1/2) feet and no more than four (4) feet measured from the existing ground surface or established grade to the top of the barrels of the pipe. In areas subject to subsequent excavation or fill, the pipes shall be laid to grades provided by the Engineer.

b. Excavation

i. With the exception of material that is to be used for backfill purposes, all excavated material shall be **immediately** loaded and removed from the job site. Excavated material shall not be deposited on the ground unless it is to be used for backfill material. The trench shall be excavated to a depth of at least six inches below the bottom of the pipe. The trench shall be at least twelve inches wider than the outside diameter of the pipe. The pipe shall be laid in the center of the trench so a minimum distance of six inches is maintained between the outside of the pipe and each trench wall.

ii. Prior to placing the pipe, at least six inches of one-inch clean, crushed limestone bedding shall be placed and leveled in the bottom of the trench. The bedding shall be true and even, and shall provide a uniform and continuous bearing and support for the pipe, except that it will be permissible to disturb the backfill material near the center of each length of pipe to permit the withdrawal of pipe slings and other lifting equipment. Blocking shall never be used to support the pipe. All water main and appurtenances shall be inspected and approved by a Water Department representative prior to covering the new pipe. **Any piping or appurtenances that are covered or otherwise**

hidden from view prior to receiving approval from the Water Department shall be completely uncovered in order to permit a thorough inspection.

iii. After an inspection of the pipe is complete, one-inch clean crushed limestone shall be placed around each side of the pipe (six-inch minimum width on each side), and over the top of the pipe (minimum thickness of twelve inches when pipe is in lawn).

iv. Trench backfill from the top of the granular bedding to the level of existing grade adjacent to the trench shall be in accordance with the policies and procedures established by the City's Public Works Department. Suitable native material previously excavated from trench and/or supplemental borrow material may be used if the trench is not located beneath pavement of any kind (see Trench Material Detail Under Lawn on drawings). Backfill shall be placed in layers of thickness within the compacting ability of the equipment used. Compaction of the trench backfill shall be performed at the proper moisture content of the backfill material to achieve the desired results, and accomplished without inundation. Backfill of native material or soil shall be thoroughly jetted. Under road pavements, sidewalks, driveways and parking lots, one-inch clean backfill shall be compacted to 95 percent of maximum dry density (see "Trench Material Detail Under Pavement" on drawings). In other areas, backfill shall be compacted to the degree necessary to prevent future settlement.

v. The trench shall be dug to the depth and alignment required and only so far in advance of pipe laying as the Engineer shall permit. The trench shall be so braced and drained that workmen may work therein safely and efficiently. The Contractor shall note that excavations shall conform to the latest OSHA requirements for excavations. It is essential that the discharge from temporary construction pumps be led to natural drainage channels or to drains. The Contractor shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures and piping, both known and unknown, may be determined, and he shall be held responsible for the repair of such structures and piping when broken or otherwise damaged by him.

c. Width

i. The trench width may vary with and depend upon the depth of the trench and the nature of the excavated material encountered, but in any case shall be of ample width to permit the pipe to be laid and jointed properly and the backfill to be placed and compacted properly.

d. Thrust Restraint

i. Thrust blocks shall be installed in accordance with the City of

Kirkwood water department requirements and as detailed on the project plans. The thrust blocking shall be sized with a bearing surface such that the soil pressure loads resulting from the pipe's maximum internal operating pressure times a 2.5 multiplier does not exceed 1500 psf unless noted otherwise.

2. Pipe Laying

a. Unless specified herein, installation of PVCO pipe shall comply with the most recent revision of American Water Works Association Standard C605.

b. Pipe and fitting joints shall not be deflected until assembled. Maximum joint deflection shall comply with the applicable AWWA standard for the type and diameter of pipe and fittings. Maximum joint deflection for PVCO pipe is one degree.

c. Carefully examine each pipe immediately prior to installation. All visible foreign material shall be removed from the pipe immediately prior to its installation. If necessary, the Contractor shall rinse the interior surface of the pipe. Pipes shall be installed with the bell end facing the direction in which the pipe is being installed. Install pipelines to grades and alignment indicated. Provide proper facilities for lowering sections of pipe into trenches. Pipe shall not be rolled or dropped into the trench. Immediately prior to installing each pipe section, the previously installed section of pipe must be inspected to ensure that no foreign material has entered the pipe since its installation. If any foreign material is discovered in the previously installed section of pipe, it shall be removed prior to installing the next pipe section. Lubricant shall be applied according to the manufacturer's instructions and shall be in accordance with AWWA C605 or C600, whichever applies. Under no circumstances shall pipe be laid in water and no pipe shall be laid when trench conditions or weather are unsuitable for such work. Full responsibility for diversion of drainage and for dewatering of trenches during construction shall be borne by the Contractor. At times when pipe laying is not in progress, watertight plugs shall close the open ends of the pipe. Foreign material shall be prevented from entering the pipe during and after installation.

d. Mains shall not be tapped for service line connections prior to the installation, disinfection and pressure testing of the water main, unless a tap is needed for flushing and pressure testing purposes.

e. Laying of pipe shall be accomplished to line and grade in the trench only after it has been dewatered and the foundation and/or bedding has been prepared. Mud, silt, gravel and other foreign material shall be kept out of the pipe and off the jointing surface.

f. All pipe laid shall be retained in position so as to maintain alignment and joint closure until sufficient backfill has been completed to adequately hold the pipe in place. All pipe shall be laid to conform to the prescribed lines and grades shown on the plans, within the limits that follow.

3. Miscellaneous Pipe Construction Requirements

a. Braced and Sheeted Trenches

i. Whenever necessary to prevent caving, excavations in sand, gravel, sandy soil or other unstable materials shall be adequately sheeted and braced. Where sheeting and bracing are used, the trench width shall be increased accordingly. Trench sheeting shall remain in place until the pipe has been laid, tested for defects, and repaired if necessary, and the backfill around it compacted to a depth of two feet over the top of the pipe.

b. Trenching by Machine or by Hand

i. The use of trench digging machinery will be permitted except in places where operation of same will cause damage to trees, buildings or existing structures above or below ground, in which case hand methods shall be employed. Locations where hand methods are required will be at the discretion of the Engineer.

c. Flow of Drains and Sewers Maintained

i. Adequate provision shall be made for the flow of sewers, drains and water courses encountered during the construction and the structures which may have been disturbed shall be satisfactorily restored upon completion of the work at no additional cost to the Owner.

d. Property Protection

i. Trees, fences, poles and all other property shall be protected unless the removal is authorized and any property damaged shall be satisfactorily restored by the Contractor.

e. Manner of Handling Pipe and Accessories in the Trench

i. Proper implements, equipment, tools and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient completion of the work. All pipe and pipe fittings, valves, etc. shall be carefully lowered into the trench, piece by piece, by means of derrick, ropes or other suitable tools or equipment and in such manner as to prevent damage to pipe or pipe coating. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

f. Piling Excavated Material

i. All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing roadways or access to the work. Excavated materials from all trench excavation shall be placed on the uphill side of the open trench. Hydrants under pressure, valve pit covers, valve boxes, manholes, electrical vaults, or other utility controls shall be left unobstructed and accessible until the work is completed. Natural watercourses shall not be obstructed. Approved

methods for prevention of erosion of stockpiled materials in accordance with the NPDES Storm Water Permit for construction site activities shall be employed. Surplus material and excavated material unsuitable for backfilling shall be transported and disposed of off the site in disposal areas obtained by the Contractor.

g. Removal of Water

i. The Contractor shall at all times during construction provide and maintain ample means and devices with which to promptly remove and properly dispose of all water entering the excavations or other parts of the work until all work to be performed therein has been completed. Where possible, surface runoff should be prevented from entering the excavation. No water containing settleable solids shall be discharged into storm sewers. The proposed method for controls of groundwater shall be submitted to the Engineer for approval.

h. Pipe Kept Clean

i. All foreign matter or dirt shall be removed from the inside of the pipe before it is lowered in its position in the trench, and it shall be kept clean by approved means during and after laying. If, in the opinion of the Engineer, the pipe contains dirt that will not be removed during the flushing operation, the interior of the pipe shall be cleaned and swabbed, as necessary, with a bactericidal solution made up with calcium hypochlorite, chlorinated lime or sodium hypochlorite.

i. Preventing Trench Water From Entering Pipe

i. At times when the pipe laying is not in progress, the open ends of the pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe.

j. Cutting Pipe

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

k. Permissible Deflections of Joints

i. Whenever necessary to deflect pipe from a straight line either in a vertical or horizontal plane to avoid obstructions, to plumb stems, or where long radius curves are permitted, the degree of deflection shall be no greater than recommended by the pipe manufacturer and shall be approved by the Engineer.

l. Plugging Dead Ends

i. Plugs shall be inserted into the joints of all dead end pipes, tees or crosses.

m. Barricades, Guards and Safety Provisions

i. To protect persons from injury and to avoid property damage, adequate barricades, construction signs, lights and guards as required shall be placed and maintained by the Contractor at his expense during the progress of the construction work and until it is safe for traffic to use the roadways. All material piles, equipment and pipe which 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. The rules and regulations of OSHA and the appropriate authorities respecting safety provisions shall be observed.

n. Structure Protection

i. Temporary support, adequate protection and maintenance of all underground and surface structures, drains, piping and other obstructions encountered in the progress of the work shall be furnished by the Contractor at his expense. The structures which may have been disturbed shall be restored upon completion of the work.

o. Cleaning Up

i. Surplus pipe line materials, tools and temporary structures shall be removed by the Contractor; and all dirt, rubbish and excess earth from excavation shall be hauled to a landfill by the Contractor, and the construction site shall be left clean, to the satisfaction of the Engineer and the Owner.

p. Compaction Limits

i. All granular backfill and structural backfill materials shall be compacted with portable, hand operated type compactors when the backfilling is within 3 feet of a structure wall or up to a minimum of 2 feet above the top of the pipe in the trench. In other areas, where accessible larger compaction equipment may be utilized.

4. Polyethylene Encasement

a. All valves and fittings, threaded rods, restraint systems, washers, nuts and all other ductile, cast or steel appurtenances shall be protected with clear polyethylene encasement. The encasement shall prevent contact between the wrapped items and the surrounding backfill and bedding material. Encasement shall be secured with duct tape.

5. Tracer Wire

a. Wire shall be installed directly on top of PVCO pipe and shall be duct taped to the pipe every five feet. Wire shall extend to tops of all valve boxes, with a minimum of two feet tucked neatly in the box. The ends of the wires, which are buried, shall be bonded together so as to form a continuous length of wire between the fittings. Wire shall be spliced underground using only 3M Corporation Direct Bury Splice Kit No. 054007-0-9053.

6. Warning Tape

   a. Warning tape shall be installed directly over the pipe and 12 inches above the pipe.

7. Fittings

   a. All fittings including bends, tees, crosses, valves, fire hydrants, caps and plugs installed on PVCO pipe shall include EBAA Iron Megalug joint restraints series 2000PV.

8. Tapping Sleeves and Valves

   a. Immediately prior to installation, the following surfaces shall be sprayed with household bleach until thoroughly wet:

      i. The interior of the tapping sleeve branch

      ii. The interior of the tapping valve, including both sides of the gate.

      iii. The pilot drill bit and the shell cutter of the tap machine

9. Corporation Stops

   a. Corporation stops shall be installed only after the water main has been installed and has been placed into service. They shall be installed on the water main at 10 o'clock or two o'clock positions on the water main diameter. Corporation stops shall be attached to PVCO water main with service saddles.

   b. Connections between the service line and the corporation stop shall be supported with blocking, with the uppermost layer of blocking being of wood.

10. Service Line Transfers

   a. When the Contractor connects any existing water service to the new tap, he **must** coordinate with Water Department personnel to enable Department personnel to remove the water meter from the service line before the new corporation stop is turned on. Once the meter is removed, the Contractor shall turn the corporation stop fully on. Department personnel will flush the service line into the meter box and replace the meter. **If the contractor fails to properly coordinate this process with Department personnel, and failure to do so causes plugging of the resident's plumbing fixtures, the contractor shall be responsible for cleaning and/or replacing the resident's fixtures.**

   b. Service Line Procedure:

      i. Notify the customer of service being turned off.

      ii. Turn water off at outside meter before trying to disconnect service. This only applies when meter is outside.

      iii. Expose corporation and shut off.

      iv. If corporation is not exposed, crimp line off. Only applies to

copper and lead services. Galvanized services will have to be shut off at the corporation or stop valve.

v. City crews will then remove outside meters for flushing.

vi. Make new tap and flush new corporation to remove shavings.

vii. Install new copper to existing service. Pressurize service to check for leaks.

viii. City crews will reinstall meter in outside pit and then turn on to house after opening hose spigot to flush.

11. Fire Hydrants

a. Hydrants shall stand plumb with pumper nozzles facing the curb. They shall be installed so the top of the traffic flange is no less than two inches and no more than six inches above finished grade. Hydrant supply branches shall be controlled by an independent resilient seat gate valve.

b. Valves shall be mechanical joint and shall be restrained to mechanical joint tees using EBAA Iron Megalug joint restraints series 2000PV, to allow shut-off when the hydrant is to be removed. Hydrants shall be restrained to valves using the same method. In addition to this joint restraint, thrust blocks shall be poured between the back of the hydrant bowl and undisturbed earth.

c. Hydrants shall be installed between the street curb and the sidewalk, 24-32 inches from back of street curb. No part of a hydrant shall protrude into the area above a sidewalk. Hydrants shall be located no closer than six feet to any driveway.

d. Once final landscaping has been completed, the contractor shall remove all nozzle cap chains, thoroughly clean and remove all rust, dirt, grease and loose paint from the hydrant, and apply two coats of paint to the hydrant body by brush with a gloss finish safety yellow color oil-based alkyd enamel coating. The contractor shall apply two coats of paint to the hydrant bonnet by brush with a gloss finish oil-based alkyd enamel coating. Bonnet color to be determined by the Water Department.

B. Horizontal Directional Drilling System

1. General Requirements

a. The Contractor shall assume all responsibility for his methods of construction, the stability and accuracy of the installation, and all costs for damages resulting from any failure thereof. The Contractor shall be solely responsible for the safety of the pits and related structures, and personnel engaged in underground construction throughout the duration of the work.

b. The Contractor's methods and schedule shall consider the overall project requirements and anticipated ground condition and water conditions. Contractor's selection of inadequate, inappropriate, or

inefficient equipment and methods will not be cause for adjustments to the Contract Price or Contract Time.

c. The general dimensions, arrangement and details for the drilled hole and pits to be constructed shall be confined to the available project easements as shown on the Drawings.

d. Methods of excavation, equipment and procedures for the horizontal directional drilling operation and pits shall be selected by the Contractor to provide adequate working space and clearances for the work to be performed.

e. Pit excavation methods, ground water control and pit support techniques shall be in selected by the Contractor, provided they are in accordance with the Contract Documents.

f. Where installation is required under a Missouri Department of Transportation road, installation shall be conducted in accordance with the Missouri Department of Transportation Standard Specifications.

2. Inspection and Control

a. The Contractor will supply copies of drilling logs, drill head location plots, mud logs and a log of equipment operating parameters taken during drilling, reaming and pipeline installation. The Contractor will supply "as build" drawings of the installation verified by well logging equipment along with proof of logging equipment calibration. The Owner reserves the right to hire an independent inspector to verify the location of the installed pipeline and to recover the cost of the inspection from the Contractor if the inspection reveals the pipeline to be out of specification.

3. Qualifications

a. The Contractor's supervisor assigned to this project must be experienced in work of this nature and must have successfully completed similar projects in the last three (3) years. As part of the bid submission, the Contractor shall submit a description of such project(s) which shall include, at a minimum, a listing of the location(s), date of project(s), owner, pipe type and size, length of installation, type and manufacturer of equipment used and other information relevant to the successful completion of the project.

4. Submittals

a. Contractor shall submit to the Engineer for review the following items if requested:

i. Technical specifications and manufacturer of drilling system, fluid handling system, guidance and control system. Detailed descriptions of projects on which this equipment has been used including names and phone numbers of Owner's representatives for these projects.

ii. A work plan showing details of the proposed method of

construction, sequence of operations to be performed, number and size of construction crew, hours to be worked, pilot hole drilling procedure, reaming procedure, pull back procedure, drilling fluid handling procedure, method of monitoring the drilling head and method of verifying pipe location for "as built" drawing.

5. Requirements

a. General

i. Where shown on the Drawings, the pipeline crossing shall be installed by Guided Horizontal Drilling, a technique for installing pipes below ground using a surface -mounted drill rig that launches and places a drill string at a shallow angle to the surface and has tracking and steering capabilities.

ii. The drill string creates a pilot bore hole in an essentially horizontal path or shallow arc which may subsequently be enlarged to a larger diameter during a secondary operation. Subsequent operations could include multiple hole enlargements in steps and pullback of the product pipe. Tracking of the initial bore path is accomplished by a manually operated overhead receiver of a remote tracking system or by other electronic guidance system located in the drill head and transmitting location information through a wire to the drill operators console. Steering is achieved by controlling the orientation of the drill head which has a directional bias and pushing the drill string forward, without rotation, with the drill head to drill a straight path. The procedure uses fluid jets or mechanical cutting or both with a low, controlled flow rate of drilling fluid to minimize the creation of voids during the pilot hole drilling and back reaming operations. The drilling fluid cools the drill bit and electronics and lubricates the hole for the drill bit, drill string and product pipe. The resultant slurry surrounds the pipe, typically fitting the annulus between the pipe and the drilled hole.

b. Utility Protection

i. Utility lines and structures indicted on the Drawings which are to remain in service shall be protected by the Contractor from any damage as a result of his operations. Where utility lines or structures not shown on the Drawings are encountered, the Contractor shall report them to the Owner and Engineer before proceeding with the Work. The Contractor shall bear the cost of repair or replacement of any utility lines or structures which are broken or damaged by his operations.

ii. All utilities in close proximity to the bore, must be exposed through a "pot-hole" or other opening, in accordance with state utility locate laws and regulations, to ensure, through visual inspection, that the installation has caused no damage to the utility and maintains adequate clearance.

c. Applicable Regulations and Codes

i. All work covered by this section shall be performed in accordance with the applicable federal and state codes and laws which pertain to such work and supplemental regulations which are contained in these specifications.

6. Materials

a. Drilling Fluids

i. The Contractor must use high quality bentonite drilling fluid or equivalent to ensure hole stabilization, cuttings transport, bit and electronics cooling and hole lubrication to reduce drag on the drill pipe and the product pipe. Oil based drilling fluids or fluids containing additives that can contaminate the soil or ground water will not be considered acceptable substitutes. Composition of the fluid must comply with all federal and local environmental regulations.

ii. Drilling fluids must be mixed with potable water to ensure no contamination is introduced into the soil during the drilling, reaming or the pipe installation process. Recycled gray water, if approved for use by the State Department of Natural Resources or other controlling agency, is an acceptable alternative to potable water.

iii. Disposal of drilling fluids shall be the responsibility of the Contractor and shall be conducted in compliance with all relative environmental regulations, right of way and workspace agreements and permit requirements.

iv. Drilling fluid returns can be collected in the entrance pit, exit pit or spoils recovery pit. The Contractor shall immediately clean up any drilling fluid spills or overflows from these pits.

b. Product Pipe

i. The pipe material shall be as shown on the drawings or as described in the specifications.

ii. Pipe shall be of sufficient dimension ratio to ensure adequate strength to withstand operation and installation loads as a result of the installation method, procedure, equipment and practices used by the Contractor. The Contractor shall be responsible for installation or construction load calculations. Transition fittings to connect to piping on each end shall be included.

c. Backfill Soil

i. Pit and "pot hole" backfill material must comply with Division 2.

7. Construction Methods

a. Drilling

i. Directional Drilling Alignment

1. The pipeline profile is indicated on the Drawings. The Contractor may submit an alternate profile for this project provided at least eighteen inch (18") clearance is maintained with crossing any utility and forty-two inch (42") minimum cover is provided on product pipe.

ii. Drill Set-Up Area

1. Contractor shall plan and restrict his operations of the drill and ancillary equipment to the easement and right of way spaces shown on the Drawings.

iii. Drill Entrance and Exit Pits

1. Contractor will be responsible for design and construction of the drill entrance and exit pits. Supports will be required to maintain safe working conditions, ensure stability of the pit, minimize loosening, and minimize soil deterioration and disturbance of the surrounding ground.

2. Drill entrance and exit pits will be required and must be maintained at minimum size to allow only the minimum amount of drilling fluid storage prior to transfer to mud recycling or processing system or for removal from the site. Drilling mud will not be allowed to flow freely on the site or around the entrance or exit pits. Mud spilled must be removed as soon as possible and the ground restored to original conditions. Pits must be shored to OSHA standards if workers are required to enter the pits for any reason.

iv. Drill Entrance and Exit Angle

1. Entrance and exit angles for the drill can be whatever the Contractor desires such that the elevation profile maintains adequate ground cover to ensure no drilling fluid breakout occurs and that ground exit occurs within the designated right of way. Contractor will be responsible for ensuring that entrance and exit angles ensure pull back forces do not exceed 5% strain on the product pipe.

v. Depth of Pipe

1. At least forty-two inches (42") of soil cover between the future dredging depth and top of pipe must be maintained to ensure drilling fluid breakout does not occur.

vi. Pilot Hole

1. The direction tolerance of the pilot hole will be as follows:

   a. Vertical tolerance - Plus one foot (1') (deeper or additional ground cover) or minus half foot (0.5') from the centerline of the product pipe.

   b. Horizontal tolerance - Plus or minus one foot (1') from the centerline of the product pipe.

c. Curve radius - No curves will be accepted with a radius less than the manufacturer's recommended minimum radius for the product pipe.

vii. Drill Size

1. A directional drill, midi directional drill, or guided horizontal drill is acceptable for this project. If a drill of smaller size is proposed justification by two methods must be established as follows.

a. Contractor must provide installation load calculations that support the use of a smaller drill with adequate margin of safety to perform the installation.

b. Documented experience in comparable soils, depths, length of installation and pipe diameter must be supplied along with customer verification of satisfactory performance on this comparable project.

viii. Documentation

1. The Contractor shall be responsible for maintaining the drilling logs that provide drill bit location at least every ten feet (10') along the drill path.

2. The Contractor shall be required to provide "as built" drawings in the form of a plot of the pipe installation with reference dimensions to locations on the Drawings.

3. All such documentation shall be available for inspection by Owner and Engineer at any time during construction.

8. Carrier Pipe Installation

a. When installation of carrier pipe via horizontal directional drill is called for on the drawings, the curvature of the casing pipe shall be kept at a minimum to facilitate installation of the carrier pipe with casing spacers. Carrier pipe, casing spacers and end seals shall be as shown on the drawings and as described in the specifications.

9. Utility Locates

a. Contractor will be required to locate all utilities prior to the start of excavation or boring. All utilities crossed or approached within twenty-four inches (24") in a lateral direction must be exposed to verify location. In addition, visual verification will be required that the installation has missed the utility as it passes.

b. Damage to utilities shall be the responsibility of the Contractor. Utilities that become damaged as a result of the work shall be repaired immediately.

10. Cleanup

a. Immediately upon completion of the work, all rubbish and debris shall be removed from the job site. All construction equipment and implements of service shall be removed and the entire area involved shall be left in a neat, clean and acceptable condition.

b. "Blow holes" or "breakouts" of drilling fluid to the surface must be cleaned up immediately and the surface area washed and returned to original condition. All drilling fluids, spoils and separated material will be disposed of in compliance with federal and local environmental regulations.

18.03 WATERMAIN SANITARY AND STORM SEWER SEPARATION

A. Water mains installed parallel to any sanitary sewer pipe line shall be installed with no less than 10 feet of horizontal separation between the outside of the water main and the outside of the sewer. Where 10 feet of separation is not possible, the entire water main located 10 feet or less from the sanitary sewer shall be mechanical joint ductile iron pipe.

B. Water mains crossing sanitary sewer pipelines shall be installed to provide no less than 18 inches of vertical clearance between the two pipelines and a full length of water main shall be installed so both joints will be as far from the sewer as possible.

C. No water main shall be located closer than 10 feet to any part of a sanitary sewer manhole. Where 10 feet of separation is not possible, the entire water main located 10 feet or less from the sanitary manhole shall be mechanical joint ductile iron pipe and shall be encased. Concrete encasement shall not be permitted.

D. Water mains crossing storm sewers shall be installed to provide a minimum vertical clear distance of 18 inches between the outside of the water main and the outside of the storm sewer.

E. If necessary, the contractor shall install four 45° bends to achieve the minimum clearance between the water main and sanitary or storm sewers.

18.04 DISINFECTION AND TESTING

Each water main shall meet the requirements of the following acceptance tests. All defects shall be repaired to the satisfaction of the Kirkwood Water Department. The Contractor shall furnish, at no additional cost to the owner, all necessary equipment and appurtenances to perform the acceptance tests and shall minimize the use of water.

A. Disinfection: All piping shall be disinfected in accordance with AWWA standard C651 (latest version) prior to being placed in service. Disinfection shall be by chlorine injection method. All filling and flushing procedures which require the operation of system valves shall be performed by Water Department personnel only. When a hydrant is not being installed along the new water main, the contractor shall install a one-inch diameter corporation stop at the highest elevation on the new main and on top of the pipe for flushing, sampling, and pressure testing. When all testing is complete, the Contractor shall remove the tap and replace it with a bronze plug, unless it is in a suitable location to supply an existing home, in which case the Contractor may use it for such a purpose.

B. Chlorine Test: The Contractor shall fill the system with a chlorine solution in the presence of Water Department personnel. The chlorine solution shall be supplied at one end of the main as water is being withdrawn from the other end, resulting in Twenty-five (25) ppm or greater of free chlorine throughout the main. The solution shall remain in the pipe for twenty-four (24) hours, at which time it shall have a free chlorine residual concentration of at least ten (10) ppm throughout the main, or the process shall be repeated.

C. Bacteriological Test: The line will then be flushed until the chlorine content at the extremity of the new system matches the chlorine concentration of the public water supply being used for flushing. To prevent any possibility of contaminated water flowing back into the existing system, all water flowing into the new main shall pass through an approved backflow device. Again, the system will be isolated for 24-hours. At the end of the required 24-hours, after being filled with system water by Water Department personnel, the City of Kirkwood's Water Department will verify that the chlorine residual is within acceptable limits. There will be no additional flushing of the system prior to completion of bacteriological sampling. Contractor shall record the size of nozzle used for flushing and length in minutes that the water main was flushed.

Water Department personnel shall then collect a minimum of 2 sets of samples at least 24 hours apart after completion of the final flushing as indicated above. Samples shall be taken at a minimum of one every 1200-feet, one on every branch, and one at the end. If these samples are not good then the disinfection process must be repeated. Two (2) consecutive acceptable bacteriological samples must be collected. These samples shall be taken to Kirkwood Water's MoDNR certified laboratory, for the analysis of Total Coliform. Again, there will be no flushing of the system during the sampling period. The lab reports shall be performed by certified Kirkwood Water personnel. The Contractor may use a private MoDNR certified laboratory for bacteriological sampling at their own expense. Appropriate chain of custody protocol shall be followed from the collection of the sample to the laboratory. Results must be sent directly to Kirkwood Water Department. These reports shall include the free chlorine residual value, as well as results for total fecal and non-coliform bacteria. The Contractor shall be responsible for directing the flow of flushing water into a suitable storm drain. If there is the possibility that high concentrations of chlorine may enter a wetland or other body of water during the flushing operation, the Contractor shall provide for the dechlorination of all discharged water. If bacteria analyses fail to produce acceptable results, Water Department personnel will repeat the flushing, sampling and bacterial analyses procedure a second time. The Contractor shall be billed to cover any excess fees for laboratory use, materials, and employee wages for any bacteriological tests required beyond the second test. Following acceptable bacteria test results, the Contractor shall remove the tap and replace it with a bronze plug, unless it is in a suitable location to supply an existing home, in which case the Contractor may use it for such a purpose.

D. Hydrostatic Water Testing: Unless specified herein, all underground piping shall be tested hydrostatically by the contractor in accordance with AWWA standard C605. Test pressure shall not be less than 1.5 times the working pressure at the point of testing, or not less than 125 PSI, whichever is greater. The duration of the test shall be a minimum of two hours. Test pressure shall not vary by more than

+/- 5 PSI for the test duration. The contractor may use a fire hydrant on the new main to conduct the pressure test, or may install a corporation stop for a test connection.

Leakage is defined as that quantity of makeup water that must be supplied to maintain, within 5 psi, the specified test pressure for the entire two-hour test duration. Pressure drops shall not be used to measure leakage. If the new main does not pass the pressure test and a leak cannot be found, it will be the contractor's responsibility to disconnect the new main from the existing main, cap the new main at those connections, and perform another pressure test to eliminate the possibility of leakage through the valves at the connections to the existing mains.

Maximum allowable leakage shall not exceed 0.1 gallons per hour for every 10 joints in length of pipeline tested. All visible leaks are to be repaired, regardless of the amount of leakage. Testing and replacement of any section of pipe, valve or fitting shall be performed by the contractor at his expense.

Hydrostatic testing shall be observed by and approved by a Water Department representative.

18.05 FINAL CONNECTIONS

A. If the contractor connects the new main to an existing main **after** the new main has successfully passed the bacteriological testing, the interior of all new materials used to make the final connection shall be thoroughly sprayed with household bleach immediately prior to their installation. If the contractor connects the new main to an existing main **after** the new main has successfully passed the pressure test, water to all portions of the new connection(s) must be turned on and the new connection(s) pressurized. These connections shall be left under full system pressure for a minimum of twenty-four (24) hours, at which time they will be inspected for leaks by Water Department personnel.

18.06 SHUTDOWNS OF EXISTING MAINS

A. When water service to existing customers must be interrupted to sections of mains to enable the contractor to disconnect and abandon water mains, or for any other scheduled reason, the contractor shall provide the Water Department with a 24-hour minimum notice. Water Department personnel will notify those customers to be affected by door hanger notices on the day prior to the scheduled shutdown. Scheduled shutdowns shall not begin prior to 9:00am or extend beyond 3:00 pm for residential areas. If the contractor encounters unforeseen difficulties, he must continue working until service has been restored. When transferring individual single-family residential services to the new main, the contractor shall be responsible for delivering notice to the occupant. Twenty-four hour notice and door hangers are not required for individual single-family residential service transfers.

END OF SECTION 15065

SECTION 15271
GENERAL REQUIREMENTS FOR VALVES AND VALVE ACTUATORS

PART 19 GENERAL

19.01 SECTION INCLUDES

A. This section includes the general requirements for all valves and actuators for process piping and equipment under this contract.

B. Related Sections:

1. Section 15272 – Valves for Actuator Control

19.02 GENERAL

A. Like items of equipment provided hereunder, although for different services, shall be the end products of one manufacturer in order to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturers service, unless specifically specified otherwise.

B. See Conditions of the Contract and Division 1 - General Requirements, which contain information and requirements that apply to the work specified herein and are mandatory for this project.

19.03 QUALIFICATIONS

A. The valves and valve actuators supplied under the related sections shall be manufactured by firms that have at least 10 years' experience in the design manufacturing and testing similar products.

19.04 REGULATORY REQUIREMENTS

A. All equipment furnished, and equipment installation, under this section shall meet requirements of the Federal Occupation Safety and Health Act of 1970 (OSHA), latest edition.

19.05 QUALITY ASSURANCE

A. The manufacturer shall have established an on-going program of quality assurance and shall, upon request, provide auditable records to the Owner and/or Engineer of quality control documentation for the specified materials and equipment through its manufacturing process.

19.06 SUBMITTALS

A. Submittals for valves, valve actuators and associated equipment shall be as specified in this and the referenced sections.

B. Submit product information for valve name tags.

C. Submit evidence of Quality Assurance Program.

D. Submit certification that the manufacturer meets the applicable manufacturer's qualifications stated in Part 1 Paragraph 1.03 of this section.

19.07 DELIVERY, STORAGE AND HANDLING

A. All valves/actuator assemblies shall be delivered in the manufacturer's cartons and shall be stored inside, away from construction until just prior to installation. Under no circumstances shall the valves/actuator assemblies be stored outdoors or subject to the weather.

B. To prevent damage and eliminate dirt and moisture from entering valves, the manufacturer shall be provided and installed end caps. The end caps shall not be removed until installation.

C. Maintain manufacturer's coatings at all times.

19.08 MANUFACTURER'S SERVICE

A. A manufacturer's factory representative for the equipment specified shall be present at the jobsite for installation assistance, inspection and certification of the installation, equipment testing, startup assistance, and training of Owner's personnel.

19.09 MAINTENANCE SERVICE (WARRANTY)

A. The Manufacturer/Contractor shall warrant the equipment to be free of material or workmanship defects for a period of one (1) year from the date of substantial completion established by the Owner.

PART 20 PRODUCTS

20.01 PRODUCT DESCRIPTION, MANUFACTURER, MODEL

A. The product description, manufacturer and model number for the valves and valve actuators furnished, will be specified in the related sections.

20.02 VALVE COMPATIBILITY

A. For purpose of standardization of spare parts as well as familiarity with repair techniques, all valves and manual valve actuators of a similar type (i.e.: ball; butterfly; gate; etc.) Shall be made by a single manufacturer.

20.03 VALVE MARKINGS

A. The manufacturer's name and pressure rating shall be clearly marked on the outside of the valve body.

20.04 VALVE AND ACTUATOR NAME TAGS – NOT USED

20.05 END CAPS

A. The manufacturer shall provide and install protective end caps on each valve.

20.06 LIMIT SWITCHES – NOT USED

20.07 VALVE BOXES

A. Valve boxes shall be provided for all valves installed. They shall have suitable bases to fit around the valve bodies without bearing on them, and shall have a minimum inside diameter of five inches. They shall be designed for the depth of trench specified. The top section shall have a flange for holding it in position. Covers shall be recessed flush with the top and marked "water" in raised letters.

Threaded valve box tops and bottoms shall be permitted under certain circumstances at the discretion of Kirkwood Water Department.

B. Finishes: Valve boxes supplied under this section shall receive finishes that are in accordance with Paragraph 3.08, FINISHES of this section.

20.08 EXTENSION STEMS FOR VALVE OPERATORS – NOT USED

20.09 EXTENSION BONNETS FOR VALVE OPERATORS - NOT USED

20.10 FLOOR STANDS - NOT USED

20.11 EXTENSION STEMS/TORQUE TUBES - NOT USED

20.12 STEM GUIDES – NOT USED

PART 21 EXECUTION

21.01 VALVE ACTUATORS

A. Unless otherwise specified on the drawings, or referenced sections, valve actuators shall be furnished and factory installed by the valve manufacturer.

21.02 VALVE INSTALLATION

A. Valves shall be installed in a horizontal position with the operating nut vertical and centered in the box.

21.03 3.03 VALVE STEM ORIENTATION – NOT USED

21.04 VALVE LOCATIONS

A. Locate valves as shown on the drawings.

21.05 VALVE INSULATION – NOT USED

21.06 RELIEF VALVE OUTLETS – NOT USED

21.07 TESTING

A. Valves shall be tested at the same time that the adjacent pipeline is tested. Joints and valve stem packing shall show no visible leakage under test. Tighten or repack stem packing, and repair joints that show signs of leaking prior to final acceptance. If there are any special parts of control systems or operators that might be damaged by the pipeline test, they shall be properly protected. The Contractor will be held responsible for any damage caused by the testing.

21.08 FINISHES

A. Buried Valves – Manufacturer's standard coatings shall be NSF approved for use with potable water.

B. Valve Boxes

1. Exterior and Interior Surfaces - All exterior and interior surfaces shall be shop coated with an asphalt bituminous coating per AWWA C504-84.

END OF SECTION 15271

SECTION 15272
VALVES FOR ACTUATOR CONTROL

PART 22 GENERAL

22.01 SECTION INCLUDES

A. This section consists of the requirements for valves with manual actuation.

B. The specific valve types covered by this section are as follows:

Valve Type	Valve Type
Ball – Not Used	Globe – Not Used
Butterfly – Not Used	Knife Gate – Not Used
Diaphragm – Not Used	Plug - Not Used
Eccentric Plug – Not Used	Ball – Not Used
Gate	Vented Ball – Not Used
Pinch - Not Used	**EZ Valve**

22.02 GENERAL

A. Like items of equipment provided hereunder, although for different services, shall be the end products of one manufacturer (i.e. butterfly; plug; gate; etc.) in order to achieve standardization for appearance, operation, maintenance, spare parts, and manufacturer's service, unless specifically specified otherwise.

22.03 RELATED SECTIONS

A. See Conditions of the Contract, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

B. See Division 15, Section 15271 – General Requirements for Valves and Actuators, which contains information and requirements that apply to the work specified herein and are mandatory for this project.

22.04 REFERENCE TO STANDARDS

A. American Water Works Association (AWWA).

1. C509, Resilient-Seated Gate Valves for Water Supply Service, current version.

22.05 SUBMITTALS

A. The manufacturer shall furnish certified shop drawings, installation, operation and maintenance manuals, in accordance with the latest revision of AWWA C500 thru C540 as applicable.

B. An affidavit of compliance in accordance with the latest revision of AWWA C500 thru 540 as applicable, and certification of performance testing of each valve shall be furnished to the Engineer.

C. The shop drawings shall include:

1. Valve torques used to size the operator.
2. Materials of construction.
3. For manual actuators, provide force requirements for hand wheels, cranks, etc.
4. Valve seating/unseating torque, maximum required torque, valve stem diameter at actuator mounting, and maximum allowable torque.
5. Rated WOG temperature and pressure.
6. Full open Cv values.
7. Quality control procedure and system documents.
8. Certification that the manufacturer has been actually engaged in the design, and manufacture of the specified valves for a minimum of ten (10) years.

PART 23 PRODUCTS

23.01 AWWA GATE VALVES

A. Valves shall be ductile iron body, resilient wedge gate, non-rising stem type, O-ring seals, and mechanical joint connections (tapping valves shall be flange x mechanical joint). The valves shall be suitable for cold water, non-shock, bi-directional flow operation, and working pressure of 200 PSI. They shall be of such design as to maintain the full area of the pipe through the valve when open and shall be designed to take full pressure on either face. They shall be opened by turning counter-clockwise and shall have two-inch square cast iron operating nuts with an arrow cast in the nut indicating the direction of opening. Valve shall have Type 304 stainless steel bonnet bolts and nuts and type 304 stainless steel O-ring gland bolts and nuts. Valves shall have the manufacturer's name or initials and the pressure rating cast on the body. All gate valves shall be restrained utilizing Foster Adapters.

B. Manufacturers and Model/Style/Series:

1. American Flow Control Series 2500
2. Clow Model 2639
3. Kennedy Ken-Seal II
4. Mueller Co. - A-2360

23.02 EZ VALVES

A. The EZ Valve shall be capable of pressure-tight assembly to exterior of the pipe in which flow is to be stopped at a working pressure not to exceed 250 psi.

B. The assembly shall be designed as to be easily rotated 120 degrees, perpendicular across the top of the pipe, while riding on two (2) separate rubber gaskets, constructed of EPDM, by using a perpendicular rotary feed mechanism, driven by a chain.

C. The EZ Valve shall be constructed of two (2) piece, ductile iron casting (top and bottom) to be bolted together using ductile iron bolts with zine alloy anodes for corrosion protection, manufactured to the ductile iron specification of ASTM 536 65-45-12.

D. The EZ Valve shall meet or exceed AWWA Specification C509 for Resilient Seal Valves suitable for Potable water service.

E. The Ductile Iron Gate shall have a resilient rubber seal 360 degrees around the gate and is expandable to the ID (Inside Diameter) of the pipe.

F. The valve stem shall be made of Stainless Steel 1 CR 12, with a tensile strength of 60,000psi.

G. The valve body shall have an epoxy coating of no less than 8 mils.

H. The EZ Valve shall use Stainless Steel fasteners joining the Valve Bonnet to the Valve top casting, unless otherwise noted.

I. The final Restraint Fasteners (360 Degree) around the Valve Casting shall be constructed of Stainless Steel 304.

J. Design of valve shall be such that the valve shall have a satisfactory seal against the pipe exteriors.

K. Manufacturers and Model/Style/Series:

1. Advanced Valve Technologies, LLC, EZ Valve Technology

PART 24 EXECUTION

24.01 GENERAL

A. Refer to Section 15271 – General Requirements for Valves and Valve Actuators for installation, orientation, location, painting, and field testing requirements.

24.02 SHOP TESTING

A. All valves shall be hydro-tested in accordance with AWWA specifications by the valve manufacturer.

24.03 VALVE AND ACTUATOR ASSEMBLY

A. The valve and actuators shall be completely factory assembled and shipped as a unit. The assemblies shall be packaged and tagged in a manner that will protect the equipment from damage and facilitate the final identification in the field.

24.04 WELDING

A. All shop welding shall be in accordance with AWS D1.1.

B. Welding symbols on shop drawings shall be per AWS A2.0.

END OF SECTION 15272