TECHNICAL SPECIFICATIONS

SECTION 01010 - SUMMARY OF WORK

PART 1 - GENERAL

101.01 GENERAL

A. The WORK to be performed under this Contract shall consist of furnishing all plant, tools, equipment, materials, supplies, and manufactured articles and for furnishing all transportation and services, including fuel, power, water, and essential communications, and for the performance of all labor, WORK, or other operations required for the fulfillment of the Contract in strict accordance with the Contract Documents.

101.02 WORK COVERED BY CONTRACT DOCUMENTS

A. The WORK of this Contract includes furnishing and installing two 36-inch butterfly valves together with appurtenant items in accordance with the drawings and these specifications. Appurtenant items include but are not limited to:

1. Removal and disposal of existing butterfly valves and all associated components.

2. Supply and installation of electrical conduits other electrical components and appurtenances as specified on the project drawings.

101.03 CONTRACT METHOD

A. The WORK, hereunder, will be constructed based on lump sum prices.

101.04 WORK BY OTHERS

A. INTERFERENCE WITH WORK ON UTILITIES:

The CONTRACTOR shall cooperate fully with all utility forces of the OWNER or forces of other public or private agencies engaged in the relocation, altering, or otherwise rearranging of any facilities which interfere with the progress of the WORK, and shall schedule the WORK to minimize interference with said relocation, altering, or other rearranging of facilities.

101.05 WORK SEQUENCE

A. WORK under the Contract shall be scheduled and performed in such a manner as to result in the least possible disruption of water service.

B. The CONTRACTOR shall have all of his materials necessary to make a connection present at the site of WORK prior to interrupting water service, if any interruption becomes necessary.

C. The CONTRACTOR shall give notice to the OWNER of intent to disrupt water service at least fourteen (14) days prior to disrupting water service. The OWNER will then notify the affected parties and assist by turning off any necessary valves. The CONTRACTOR shall not operate any of the OWNER's valves.

D. Work shall be performed in conjunction with plant shutdowns for the JVWTP Filter Upgrades Project. November 3rd, 2025 to February 28th, 2026 or November 2nd, 2026 to February 28th, 2027.

101.06 **CONTRACTOR USE OF PROJECT SITE**

A. The CONTRACTOR's use of the project site shall be limited to its construction operations, including on-site storage of materials, on-site fabrication facilities, and field offices.

B. The CONTRACTOR shall limit construction operations to areas within the public right-of-way of the OWNER's easements described in the drawings and shall maintain public access to driveways.

101.07 **OWNER USE OF THE PROJECT SITE**

A. When the CONTRACTOR's WORK involves rehabilitation of or extension to the existing facilities, the OWNER may utilize all or part of the existing site and existing facilities during the entire period of construction for the conduct of the OWNER's normal operations. The CONTRACTOR shall cooperate with the OWNER to minimize interference with the CONTRACTOR's operations and to facilitate the OWNER's operations. In any event, the OWNER shall be allowed access to the project site during the period of construction.

101.08 **PROJECT MEETINGS**

A. PRECONSTRUCTION CONFERENCE:

Prior to the commencement of WORK at the site, a preconstruction conference will be held at a mutually agreed time and place which shall be attended by the CONTRACTOR, its superintendent, and its subcontractors as appropriate. Other attendees will include OWNER designated project representative, others as requested by CONTRACTOR or OWNER.

The purpose of the conference is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. This agenda will include the following:

1. CONTRACTOR's tentative schedules.

2. Transmittal, review, and distribution of CONTRACTOR's submittals.

3. Processing applications for payment.

4. Maintaining record documents.

5. Critical Work sequencing.

6. Field decisions and Change Orders.

7. Use of project sites, office and storage areas, security, housekeeping, and OWNER's needs.

8. Major equipment deliveries and priorities.

9. CONTRACTOR's assignments for safety and first aid.

B. PROGRESS MEETINGS:

The CONTRACTOR shall schedule and hold regular on-site progress meetings at least bi-weekly and at other times as requested by OWNER or as required by progress of the WORK. The CONTRACTOR and OWNER shall be represented at each meeting. CONTRACTOR may at its discretion request attendance by representatives of its suppliers, manufacturers, and subcontractors.

C. The CONTRACTOR shall conduct the meetings and provide for keeping and distribution of the minutes. The purpose of the meetings will be to review the progress of the WORK, maintain coordination of efforts, discuss changes in scheduling, and resolve other problems which may develop.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

- END OF SECTION -

SECTION 01025 - MEASUREMENT AND PAYMENT

PART 1 - GENERAL

101.01 **GENERAL**

A. All work completed under this contract shall be in accordance with the Drawings and Specifications and will be measured by ENGINEER/OWNER. The quantities appearing on the Bid Schedule or Schedule of Values are approximate only and are prepared for the comparison of bids. Payment to CONTRACTOR on bid items with unit prices other than "Lump Sum" will be made for actual quantities of work performed and accepted, or material furnished in accordance with the Contract. The scheduled quantities of work to be done and materials to be furnished may be increased or decreased in accordance with the General Conditions.

B. The term "Lump Sum" when used as an item of payment will mean complete payment for the work described in the contract. When a complete structure, portion of work, or unit is specified "Lump Sum" as the unit of measurement, the unit will include fittings, accessories, and all work necessary to complete the work as shown on the Drawings and as specified.

C. When the accepted quantities of work vary from the quantities in the bid schedule, CONTRACTOR shall accept as payment in full, so far as contract items are concerned, payment at the original contract unit prices for the work done. OWNER reserves the right to add to or delete from quantities listed in the bid schedule in order to match the total bid with the budgeted money available.

101.02 **BID SCHEDULE**

A. **BID ITEM – "JVWTP BACKWASH OUTLET VALVE REPLACEMENT"**

1. **METHOD OF MEASUREMENT** This Bid Item shall not be measured but shall be paid for on a lump sum basis for the valve replacement, including all of the work shown and specified on the Drawings and these Specifications for the Project.

2. **BASIS OF PAYMENT** Payment shall be made at the contract lump sum bid price. Payment shall be considered complete compensation for all labor, equipment, tools, and materials, mobilization/demobilization, removal of the existing valves, furnishing and installing new valves with associated actuators and fittings, new 1-1/2" conduit, 1" conduit, receptacle outlets, and all other items as shown and/or specified in these documents.

- END OF SECTION -

SECTION 01300 - CONTRACTOR SUBMITTALS

PART 1 - GENERAL

101.01 REQUIREMENT

A. Wherever submittals are required hereunder, all such submittals by the CONTRACTOR shall be submitted to the OWNER.

B. Within 14 days after the award of Construction Contract, the CONTRACTOR shall submit the following items to the OWNER for review:

1. A preliminary construction schedule indicating the starting and completion dates of the various stages of the WORK.

2. One electronic copy of the manufacturer's technical submittal information for the following items:

a. 36-inch butterfly valve

b. Electric motor valve actuator for 36-inch valve

c. Concrete handhole with cover

d. Receptacles

101.02 CONTRACTOR's SCHEDULES

A. TIME OF SUBMITTALS:

At the preconstruction conference, the CONTRACTOR shall submit for acceptance by the OWNER, a preliminary construction schedule for the WORK, showing its general plan for orderly completion of the WORK, showing its general plan for orderly completion of the WORK and showing in detail its planned mobilization of plant and equipment, sequence of early operations, and timing of procurement of materials and equipment. The construction schedule produced and submitted shall indicate a project completion date on or before the contract completion date. The OWNER within 14 days after receipt of the preliminary construction schedule, shall meet with a representative of the CONTRACTOR to review the preliminary plan and construction schedule. After review by OWNER, revise and resubmit as required.

B. CONSTRUCTION SCHEDULE REVISIONS:

Submit revised schedules with each Application of Payment, reflecting changes since previous submittal.

101.03 PROPOSED SUBSTITUTES OR AS EQUAL ITEMS

SECTION 01300 - CONTRACTOR SUBMITTALS

A. For convenience in designation in the Contract Documents, any material, product, or equipment to be incorporated in the WORK may be designated under a brand or trade name or the name of a manufacturer and its catalog information. The use of any substitute material, product, or equipment which is equal in quality and utility and possesses the required characteristics for the purpose intended will be permitted, subject to the following requirements:

1. The burden of proof as to the quality and utility of any such substitute material, product, or equipment shall be upon the CONTRACTOR.

2. The OWNER will be the sole judge as to the quality and utility of any such substitute decision shall be final.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

- END OF SECTION -

SECTION 01400 - QUALITY CONTROL

PART 1 - GENERAL

101.01 SITE INVESTIGATION AND CONTROL

A. The Contractor shall verify all dimensions the field and shall check field conditions continuously during construction. The Contractor shall be solely responsible for any inaccuracies built into the work due to his failure to comply with this requirement.

B. The Contractor shall inspect related and appurtenant work and shall report in writing to the OWNER any conditions which will prevent proper completion of the work. Failure to report any such condition shall constitute acceptance of all site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor at his sole cost and expense.

101.02 DESCRIPTION OF WORK

A. The work shall be conducted under the general observation and inspection by representatives of the OWNER to ensure strict compliance with the requirements of the Contract Documents. Such inspection may include mill, plant, shop of field inspection, as required. The OWNER shall be permitted access to all parts of the WORK, including plants where materials or equipment are manufactured or fabricated.

B. The presence of any inspector(s), however, shall not relieve the Contractor of the responsibility for the proper execution of the WORK in accordance with all requirements of the Contract Documents. Compliance is a duty of the Contractor and said duty shall not be avoided by any act or omission on the part of any inspector(s).

C. All materials and articles furnished by the Contractor shall be subject to rigid inspection, and no materials or articles shall be used in the WORK until they have been inspected and accepted by the OWNER or his authorized representative. No WORK shall be backfilled, buried, cast in concrete, hidden or otherwise covered until it has been inspected by the OWNER or is authorized representative. Any WORK so covered in the absence of inspection shall be subject to uncovering. Where uninspected WORK cannot be uncovered, such as in concrete cast over reinforcing steel, all such WORK shall be subject to demolition, removal, and reconstruction under proper inspection, and no addition payment will be allowed, therefore.

101.03 **TIME OF INSPECTION AND TESTS**

A. Except as otherwise provided in these specifications, performance of the required tests will be by the OWNER, and all costs therefore will be borne by the OWNER at no cost to the Contractor; except, that the costs of any test which shows unsatisfactory results shall be borne by the Contractor. Whenever the Contractor is ready to backfill, bury, cast in concrete, hide, or otherwise cover any WORK under the contract, he shall notify the OWNER not less than 24 hours in advance to request inspection before beginning any such WORK of covering. Failure of the Contractor to notify the OWNER at least 24 hours in advance of any such inspection shall be reasonable cause for the OWNER to order a sufficient delay in the Contractor's schedule to allow time for such inspections and any remedial or corrective WORK required, and all costs of such delays, including its effect upon other portions of the WORK, shall be borne by the Contractor.

101.04 **RIGHT OF REJECTION**

A. The OWNER shall have the right, at all times and places, to reject any articles or materials to be furnished hereunder which, in any respect, fail to meet the requirements of these specifications, regardless of whether the defects in such articles of materials are detected at the point of manufacture or after completion of the WORK at the site. If the OWNER or inspector, through an oversight or otherwise, as accepted materials or WORK which is defective or which is contrary to the specifications, such material, no matter in what stage or condition of manufacture, delivery, or erection, may be rejected by the OWNER.

B. The Contractor shall promptly remove rejected articles or materials from the site of the WORK after notification of rejection.

C. All costs of removal and replacement of rejected articles or materials as specified herein shall be borne by the Contractor.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

- END OF SECTION -

SECTION 01500 - CONSTRUCTION FACILITIES AND ENVIRONMENTAL CONTROLS

PART 1 - GENERAL

101.01 GENERAL

A. The Contractor shall provide and maintain adequate construction facilities and perform the necessary work to minimize the impact and inconvenience of the construction activities.

101.02 SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures in accordance with Part 1926 of the OSHA Standards for Construction.

101.03 BARRIERS AND ENCLOSURES

A. Provide as required to prevent public entry to construction areas, and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades as required by governing authorities for public rights-of-way and for public access to existing buildings.

C. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, stored materials, dumping, chemically injurious materials, and puddling or continuous running water.

101.04 PROTECTION OF INSTALLED WORK

A. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage. Repair or replace at OWNER's option any installed work damaged by traffic, the public, or Work operations.

B. Prohibit traffic on restored lawn and landscaped areas.

SECTION 01500 - CONSTRUCTION FACILITIES AND ENVIRONMENTAL CONTROLS

101.05 **DUST, WATER AND NOISE CONTROL**

A. Surface Water, Erosion and Sediment Control:

1. Surface water shall be controlled so that the construction area is not allowed to become wet from runoff from adjacent areas. Surface water shall be directed away from these areas but not directed toward adjacent property, buildings, or any improvement that may be damaged by water. Surface water shall not be allowed to enter sanitary sewers.

2. Maintain excavations free of water. Provide and operate pumping equipment.

3. Prevent erosion and sedimentation.

B. DUST CONTROL:

1. Dust control measures shall be implemented by application of water to all work areas, storage areas, haul and access roads, or other areas affected by construction.

2. All work shall be in compliance with the Federal, State, and local air pollution standards, and not cause a hazard or nuisance to personnel and the public in the vicinity of the work.

3. Provide and operate at least one mobile tank sprinkling unit or other positive means to prevent air-borne dust from dispersing into the atmosphere.

4. Other methods of dust control for haul and access roads may include chemical treatment, light bituminous treatment or other methods as approved by the OWNER.

5. Execute work by methods to minimize raising dust from construction operations.

C. NOISE CONTROL:

1. Execute construction between the hours as allowed unless otherwise approved by OWNER.

101.06 **CONSTRUCTION CLEANING**

A. All public and private areas used as haul roads shall be continuously maintained and cleaned of all construction caused debris such as mud, sand, gravel, soils, pavement

fragments, sod, etc. Care shall be taken to prevent spillage on haul routes. Any such spillage shall be removed immediately, and the area cleaned.

B. Public roads should be maintained in accordance with applicable ordinances and regulations.

C. Through all phases of construction, including suspension of work, and until final acceptance of the project, the Contractor shall keep the work site clean and shall remove daily all refuse, dirt, damaged materials, unusable materials, and all other trash or debris that he has created from his construction activities.

D. Materials and equipment shall be removed from the site as soon as they are no longer necessary; and upon completion of the work and before final inspection, the entire work site shall be cleared of equipment, unused materials, and rubbish so as to present a satisfactory clean and neat appearance. All cleanup costs shall be included in the Contractor's Bid.

101.07 PROJECT IDENTIFICATION

A. NOT USED

101.08 **TRAFFIC REGULATION**

A. NOT USED

101.09 **FIELD OFFICE**

A. NOT USED

SECTION 01500 - CONSTRUCTION FACILITIES AND ENVIRONMENTAL CONTROLS

101.10 **REMOVAL**

A. Remove temporary materials, equipment, services, and construction prior to Substantial Completion inspection.

B. Clean and repair damage caused by installation or use of temporary facilities. Remove underground installations to a depth of two feet; grade site as indicated. Restore existing facilities used during construction to specified, or original, condition.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

- END OF SECTION -

SECTION 01600 - MATERIAL AND EQUIPMENT

PART 1 - GENERAL

101.01 GENERAL

A. It is the responsibility of the Contractor to provide products as specified in the Contract Documents free from manufacturer defects or damage from shipping.

101.02 PRODUCTS

A. Products include all material, equipment, and systems.

B. Comply with specifications and referenced standards as minimum requirements.

C. Components required to be supplied in quantity within a specification section shall be the same and shall be interchangeable.

D. Do not use products removed from an existing structure, pipeline, etc., except as specifically required, or allowed, by Contract Documents.

101.03 TRANSPORTATION AND HANDLING

A. Transport products by methods to avoid product damage; deliver in undamaged condition.

B. Provide equipment and personnel to handle products by methods to prevent damage.

C. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

101.04 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

B. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.

C. Store loose granular materials on solid surfaces in a well-drained area; prevent mixing with foreign matter.

D. Arrange storage to provide access for inspection. Periodically inspect to ensure products are undamaged and are maintained under required conditions.

101.05 **PRODUCT OPTIONS**

A. Products Specified by Reference Standards or by Description Only; Any product meeting those standards.

B. Products Specified by Naming One or More Manufacturers with a Provision of Substitutions: Submit a request for substitution for any manufacturer not specifically named.

C. Product Specified by Naming Several Manufacturers: Products of named manufacturers meeting specifications: no options, or substitutions allowed.

D. Products Specified by Naming Only One Manufacturer: No options, no substitutions allowed.

101.06 **PRODUCTS LISTS**

A. Within 10 days after the date of Owner-Contractor Agreement, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number (if applicable) of each product.

101.07 **SUBSTITUTIONS**

A. Only within 15 days after date established in Notice to Proceed will OWNER consider requests from Contractor for substitutions. Subsequently, substitutions will be considered only when a product becomes unavailable due to no fault of Contractor.

B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

C. Request constitutes a representation that Contractor:

1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.

2. Will provide the same warranty for substitution as for specified product.

3. Will coordinate installation and make other changes which may be required for WORK to complete in all respects.

4. Waives claims additional costs which may subsequently become apparent.

D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals without separate written request, or when acceptance will require substantial revision of Contract Documents.

E. OWNER will determine acceptability of proposed substitution and will notify Contractor of acceptance or rejection in writing within a reasonable time.

F. Only one request for substitution will be considered for each product. When substitution is not accepted, Contractor must provide specified product.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

- END OF SECTION -

SECTION 01700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

101.01 CLOSEOUT PROCEDURES

A. Comply with procedures stated in General Conditions of the Contract for issuance of Certificate of Substantial Completion.

B. When Contractor considers WORK has been reached final completion, submit written certification that Contract Documents have been reviewed, WORK has been inspected, and that WORK is complete in accordance with Contract Documents and ready for OWNER's review.

C. In addition to submittals required by the conditions of the Contract, provide submittals required by governing authorities, and submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.

D. OWNER will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order.

101.02 FINAL CLEANING

A. Execute prior to final inspection.

B. Clean and flush drainage systems.

C. Clean site: sweep paved areas, rake clean other surfaces.

D. Remove waste and surplus materials, rubbish, and construction facilities from the Project and from the site.

101.03 PROJECT RECORD DOCUMENTS

A. Provide completed record drawings and other required closeout documents prior to requesting final payment.

B. Store record documents separate from those used for construction.

C. Keep documents current; do not permanently conceal any WORK until required information has been recorded.

D. At Contract closeout, submit documents with transmittal letter containing date, Project title, Contractor's name and address, list of documents, and signature of Contractor.

SECTION 01700 - CONTRACT CLOSEOUT

101.04 OPERATION AND MAINTENANCE DATA

A. Provide data for:

1. Mechanical equipment and controls.

B. Submit PDF set with individual sections bookmarked.

101.05 MAINTENANCE AND GUARANTEE

A. Replacement of earth fill or backfill, where it has settled below the required finish elevations, shall be considered as a part of such required repair work, and any repair or resurfacing constructed by the Contractor which becomes necessary by reason of such settlement shall likewise be considered as a part of such required repair work unless the Contractor shall have obtained a statement in writing from the affected private owner or public agency releasing the OWNER from further responsibility in connection with such repair or resurfacing.

B. The Contractor shall make all repairs and replacements promptly upon receipt of written order from the OWNER. If the Contractor fails to make such repairs or replacements promptly, the OWNER reserves the right to do the WORK and the Contractor and his surety shall be liable to the OWNER for the cost thereof.

C. Comply with General Conditions and ordinances of local jurisdictions having authority.

D. Make periodic inspections during guarantee period and correct defective work or correct defective work as directed by the OWNER or appropriate governing authority.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

- END OF SECTION -

SECTION 01720 - RECORD DRAWINGS

PART 1 - GENERAL

101.01 RECORD DRAWINGS

A. The CONTRACTOR shall keep and maintain, at the job site, one record set of drawings. On these, it shall mark all project conditions, locations, configurations, and any other changes or deviations which may vary from the details represented on the Contract Drawings, including buried or concealed construction and utility features which are revealed during the course of construction. Special attention shall be given to recording the horizontal and vertical location of all buried utilities that differ from the locations indicated, or which were not indicated on the Contract Drawings, said record drawings shall be supplemented by any detailed sketches as necessary or directed to indicate, fully, the WORK as actually constructed. These master record drawings of the CONTRACTOR's representation of as-built conditions, including all revisions made necessary by addenda, change orders, and the like shall be maintained up-to-date during the progress of the WORK.

B. In the case of those drawings which depict the detail requirement for equipment to be assembled and wired in the factory, such as motor control centers and the like, the record drawings shall be updated by indicating those portions which are superseded by change order drawings or final shop drawings, and by including appropriate reference information describing the change orders by number and the shop drawings by manufacturer, drawing, and revision numbers.

C. Record drawings shall be always accessible to the OWNER during the construction period and shall be delivered to the OWNER upon completion of the WORK.

D. Requests for partial payments will not be approved if the record drawings are not kept current, and not until the completed record drawings, showing all variations between the WORK as actually constructed and as originally shown on the Contract Drawings or other Contract Documents, have been inspected by the OWNER.

E. Final payment will not be approved until the CONTRACTOR-prepared record drawings have been delivered to the OWNER. Said up-to-date, record drawings may be in the form of a set of prints with carefully plotted information overlaid in pencil.

F. Upon substantial completion of the WORK and prior to final acceptance, the CONTRACTOR shall complete and deliver a complete set of record drawings to the OWNER, conforming to the construction records of the CONTRACTOR. This set of drawings shall consist of corrected plans showing the reported location of the WORK. The information submitted by the CONTRACTOR into the Record Drawings will be assumed to be reliable, and the OWNER will not be responsible for the accuracy of such information, nor for any error or omissions which may appear on the Record Drawings as a result.

SECTION 01720 - RECORD DRAWINGS

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

- END OF SECTION -

SECTION 02100 - SITE PREPARATION

PART 1 - GENERAL

101.01 DESCRIPTION

This section specifies site preparation which consists of clearing, grubbing and demolition.

101.02 JOB CONDITIONS

A. EXISTING CONDITIONS:

The Contractor shall determine the actual condition of the site as it affects this portion of WORK. Contractor shall coordinate site preparation with OWNER's administration and operation staff.

B. PROTECTION:

Site preparation shall not damage structures, landscaping, or vegetation adjacent to the site. The Contractor shall repair or replace any damaged property.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

303.01 GENERAL

The Contractor shall notify the Project Representative when site preparation is complete.

SECTION 02100 - SITE PREPARATION

303.02 PERFORMANCE

A. CLEARING AND GRUBBING:

Unless otherwise specified, the Contractor shall remove obstructions such as brush, trees, logs, stumps, roots, heavy sod, vegetation, rock, stones larger than 6 inches in any dimension, broken or old concrete and pavement, debris, structures, and piping where the completion of the work requires their removal.

Material that is removed and is not to be incorporated in the work shall be disposed of off the site, or as directed by the OWNER.

B. DEMOLITION AND REMOVAL:

1. Structures:

Demolition and removal of structures consist of removal of structures interfering with construction of this contract as shown on the Contract Drawings or as directed by the Project Representative. Excavations caused by structure removal shall be cleared of waste, debris, and loose soil, and refilled as specified.

2. Pavement:

When portions of concrete pads are to be removed and replaced, edges shall be saw cut, on a neat line at right angles to the curb face.

3. Piping:

Piping shall be removed where indicated on the drawings and disposed of as directed by the Project Representative.

4. Salvage:

The OWNER has the right to salvage any items scheduled for removal. The Contractor shall notify the Project Representative 5 days prior to any salvage or demolition work to determine the disposition of items to salvaged. Such items shall be properly disconnected, removed from their foundations, cleaned, and stored at a location on the plant site as specified.

C. UTILITY INTERFERENCE:

Where existing utilities interference with the prosecution of the WORK, the Contractor shall relocate them in accordance with the General Conditions of the contract.

SECTION 02590 - PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS

- END OF SECTION -

SECTION 02590 - PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS

PART 1 - GENERAL

101.01 GENERAL

A. The WORK of this section includes the restoration of all existing improvements damaged or altered by the construction of the project.

B. Existing improvements shall include but are not limited to permanent surfacing, curbs, gutters, sidewalks, planted areas, ditches, driveways, culverts, fences, walls, signs, mailboxes, and sprinkling appurtenances. All improvements shall be reconstructed to equal or better, in all respects, the existing improvements removed. Said existing improvements shall be reconstructed in accordance with the notes and details shown on the drawings and/or the applicable provision of these Specifications.

101.02 **QUALITY ASSURANCE**

A. Use adequate numbers of skilled workmen who are trained and experienced in the type of construction required.

B. The quality of the finished restored improvement, as determined by the OWNER, shall be of equal or better quality than was said improvement prior to being damaged or removed.

PART 2 - PRODUCTS

202.01 MATERIALS - GENERAL

A. As required to complete the restoration of existing improvements and shall be at least equal to original improvement at the time of damage or removal, as determined by the OWNER of said improvement, and shall match original construction in finish and dimension.

B. Shall be in accordance with requirements of local jurisdiction having authority. Obtain approval of all materials from local jurisdiction having authority prior to ordering or delivering.

PART 3 - EXECUTION

303.01 PREPARATION

A. Obtain all permits necessary for the restoration of existing surface improvements.

B. Protect all public and private property adjacent to the WORK. Exercise due caution to avoid damage to such property.

303.02 GENERAL RESTORATION REQUIREMENTS

A. All improvements damaged or removed shall be restored in accordance with local jurisdiction having authority. In case of conflict between these specifications and local authority specifications, the local authority shall govern.

B. Repair or replace all existing surface improvements, which were damaged or removed as a result of operations of WORK under this contract. Restoration shall be of at least equal quality and identical in dimension to original improvement unless specifically specified otherwise.

303.03 EXISTING UTILITIES AND IMPROVEMENTS

A. GENERAL:

SECTION 02590 - PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS

The Contractor shall protect all utilities and other improvements which may be impaired during construction operations. It shall be the Contractor's responsibility to ascertain the actual location of all existing utilities and other improvements indicated by utility owners that will be encountered in his construction operations, and to see that such utilities or other improvements are adequately protected from damage due to such operations. The Contractor shall take all possible precautions for the protection of unforeseen utility lines to provide for uninterrupted service and to provide such special protection as may be directed by the OWNER.

B. UTILITIES TO BE MOVED:

In case it shall be necessary to move the property of any public utility or franchise holder, such utility company or franchise holder will, upon proper application by the Contractor, be notified by the OWNER to move such property within a specified reasonable time, and the Contractor shall not interfere with said property until after the expiration of the time stipulated.

C. OWNER'S RIGHT OF ACCESS:

The right is reserved to the OWNER and to the owners of public utilities and franchises to enter at any time upon any public street, alley, right-of-way, or easement for the purpose of making changes in their property made necessary by the WORK of this Contract.

D. KNOWN UTILITIES:

Existing utility lines, the locations of which are made known to the Contractor prior to excavation that are to be retained, and all utility lines that are constructed during excavation operations shall be protected from damage during excavation and backfilling and, if damaged, shall be immediately repaired by the Contractor at his expense.

E. UNKNOWN UTILITIES:

In the event that the Contractor damages any existing utility lines, the locations of which are not made known to the Contractor prior to excavation, a written report thereof shall be made immediately to the OWNER. If directed by the OWNER, repairs shall be made by the Contractor under the provision for changes and extra WORK contained in Article 10 of the General Conditions.

F. COSTS BORNE BY OTHERS:

All costs of locating, repairing damage not due to failure of the Contractor to exercise reasonable care, and removing or relocating such utility facilities not indicated by the utility owner with reasonable accuracy, will be paid for as extra WORK in accordance with the provisions of Article 10 of the General Conditions if the OWNER requires the Contractor to man such costs; or such repair WORK may be performed by the utility owner.

G. UTILITIES TO BE REMOVED:

When utility lines that are to be removed are encountered within the area of operations, the Contractor shall notify the OWNER a sufficient time in advance for the necessary measures to be taken to prevent interruption of the service.

H. APPROVAL OF REPAIRS:

All repairs to a damaged improvement shall be inspected and approved by an authorized representative of the improvement OWNER before being concealed by backfill or other WORK.

I. RELOCATION OF UTILITIES:

Where the proper completion of the WORK requires the temporary or permanent removal and/or relocation of an existing utility or other improvement which is shown on the drawings, the Contractor shall at his own expense, remove and, without unnecessary delay, temporarily replace or relocate such utility or improvement in a manner satisfactory to the ENGINEER and the OWNER of the facility. In all cases of such temporary removal or relocation, restoration to former location shall be accomplished by the Contractor in a manner that will restore or replace the utility or improvement as nearly as possible to its former locations and to as good or better condition than found prior to removal.

303.04 NOTIFICATION BY THE CONTRACTOR

A. Prior to any excavation in the vicinity of any existing underground facilities, including all water, sewer, storm drain, gas, petroleum products, or other pipeline; all buried electric power, communications or television cables; all traffic signal and street lighting facilities; and all roadway and state highway right-of-way the Contractor shall notify the respective authorities representing the OWNERS or agencies responsible for such facilities not less than three working days nor more than five working days prior to excavation so that a representative of said OWNERS or agencies can be present during such work if they so desire.

SECTION 02590 - PROTECTION AND RESTORATION OF EXISTING IMPROVEMENTS

- END OF SECTION -

SECTION 09900 - PAINTING AND FINISHES

PART 1 - GENERAL

101.01 DESCRIPTION

A. The WORK included in this section includes surface preparation, furnishing and applying paints and coatings to the exterior surfaces of piping, valves, and fittings located in vaults, or as indicated on the drawings.

101.02 REFERENCES AND STANDARDS

A. Work covered by this specification shall meet or exceed the provisions of the latest editions of the following codes and standards in effect at the time of award of the contract:

1. OSHA Occupation Safety and Health Act: State of Utah and Federal

101.03 SUBMITTALS

A. CONTRACTOR shall supply shop drawings for approval on all paint materials prior to installation.

PART 2 - PRODUCTS

201.01 PAINT, SEALERS AND SURFACE FINISH MATERIALS

A. Paint for Exposed Piping: Exposed metal piping, fittings and valves shall be coated with a high solids two component epoxy coating system. The epoxy coating shall be Ameron, Amerlock 400, BL-4 Light Blue or approved equal.

PART 3 - EXECUTION

301.01 SURFACE PREPARATION

A. All surfaces which receive paint or other coatings shall be prepared in accordance with the recommendations of the manufacturer of the material being used. Any loose coating, or corrosion scale on existing piping shall be completely removed with wire brushing, sand blasting, water blasting or other approved methods.

301.02 APPLICATION

SECTION 09900 - PAINTING AND FINISHES

A. Exposed metal piping, fittings and valves shall be painted in accordance with the manufacturer's recommendation and the resulting coating dry film thickness shall be not less than 7 mils.

B. Each coat shall be free of runs, skips or "holidays". All excess paint and/or drips on floors, walls, and other surfaces which are not designated for paint shall be removed.

C. All work shall be done in accordance with the manufacturer's recommendation.

- END OF SECTION -

SECTION 15061 - STEEL PIPING, FABRICATED SPECIALS

PART 1 - GENERAL

101.01 THE REQUIREMENT

A. When required, the Contractor shall fabricate, install, and test all bends, reducers, wyes, tees, crosses, outlets, manifolds, and other steel plate specials, complete in place all in accordance with the requirements of the Contract Documents.

101.02 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Without limiting the generality of other requirements of these specifications, all work specified herein shall conform to or exceed the applicable requirements of the referenced portions of the following documents to the extent that the requirements therein are not in conflict with the provisions of this Section.

1. Commercial Standards:

ANSI/AWWA C200-80	Steel Water Pipe 6 inches and larger
ANSI/AWWA C208-83	Fabricated Steel Water Pipe Fittings, Dimensions for.
ASTM A234/A234M-84a	Specification for Piping Fittings of Wrought Carbon Steel and Allow Steel for Moderate and Elevated Temperatures
AWWA M-11	Steel Water Pipe-A Guide for Design and Installation.

101.03 CONTRACTOR SUBMITTALS

A. Shop Drawings

1. The Contractor shall submit shop drawings and laying diagrams of all pipe, joints, bends, reducers, wyes, tees crosses, outlets, manifolds, and other steel plate specials in accordance with the requirements in Section entitled Contractor Submittals, 01300.

B. Design calculations shall be submitted to the OWNER for review prior to manufacture of pipe specials.

C. Certifications

1. A certified affidavit of compliance shall be furnished for all steel plate specials and other products or materials furnished under this section of the specifications.

SECTION 15061 - STEEL PIPING, FABRICATED SPECIALS

101.04 QUALITY ASSURANCE

A. Shop Testing of Steel Plate Specials

1. Upon completion of the welding, but prior to lining and coating, each steel plate special shall be bulkheaded and tested under a hydrostatic pressure of 1 2 times the design pressure; provided, that if straight pipe used in fabricating the specials has been previously tested and meets the requirements of the applicable piping Section, no further hydrostatic testing will be required; or provided, that all other welded seams are tested by the liquid penetrant inspection procedure conforming to ASTM 3 165, under Method AB and Leak Testing or where applicable by the soap and compressed air method at an air pressure of 25 psi. Any pin holes or porous welds which may be revealed by the test shall be chipped out and rewelded and the pipe or fitting retested.

B. Not outside mortar shall be applied over a seam prior to testing; however, mortar lining may be applied over a seam prior to hydrostatic testing, bud under such conditions said pressure test shall be held on the pipe or fitting for a period of not less than 30 minutes.

PART 2 - PRODUCTS

201.01 GENERAL

A. Specials are defined as fittings, closure pieces, bends, reducers, wyes, tees, crosses, outlets, manifolds, and other steel plate specials located above ground or in structures.

201.02 DESIGN

A. Except as otherwise provided herein, materials, fabrication and shop testing of straight pipe shall conform to the requirements of ANSI/AWWA C200, and shall conform to the dimensions of ANSI/AWWA C208. The minimum thickness of plate for pipe from which specials are to be fabricated shall be the greater of that determined by the following two formulas:

(1) $T = \frac{P_w D/2}{Y/S_W}$ (2) $T = \frac{P_t D/2}{Y/S_t}$

where T =Plate thickness in inches

D = Outside diameter of steel cylinder in inches

P_w = Design working pressure = 200 psi

P_t = Design transient pressure for piping = (250 psi)

Y = Yield point of steel in psi

S_w = Safety factor of 2.5 at design working pressure

S_t = Safety factor of 1.875 at design transient pressure

B. In no case shall the design stress at design work pressure (Y/S_w) for steel pipe exceed 16,500 psi or 22,000 psi at design transient pressure (Y/S_t), nor shall plate thickness be less than the thickness of adjacent mainline pipe or the following:

Nominal Pipe Diameter (inches)	Piping above Ground Piping in Structures
12	0.206 inch

C. Pipe installed on saddle support shall be design to limit the longitudinal bending stress to a maximum of 10,000 psi. Design shall be in accordance with the provisions of Chapter 7 of AWWA M-11.

201.04 FABRICATION AND MATERIALS

A. General

1. Reinforcement for wyes, tees, outlets, and nozzles shall be designed in accordance with AWWA Manual M-11. Reinforcement shall be designed for the design pressure specified or shown and shall be in accordance with the details shown on the Drawings. Specials and fittings shall be equal in pressure design strength and shall have the same coating as the adjoining pipe. Unless otherwise shown on the Drawings, the minimum radius of elbows shall be 2.5 times the pipe diameter and the maximum miter angle on each section of the elbow shall no exceed 11 1/4 degrees.

B. Specials and fittings that cannot be mechanically lined and coated shall be lined and coated by hand-application, using the same materials as are used for the pipe and in accordance with the applicable AWWA or ASTM Standards. Coating and lining applied in this manner shall provide protection equal to that specified for the pipe. Fittings may be fabricated from pipe that has been mechanically lined and/or coated. Areas of lining and coating that have been damaged by such fabrication shall be repaired by hand-applications in accordance with applicable AWWA or ASTM Standards.

C. Access manholes with covers shall be as detailed on the Drawings. All threaded outlets shall be forged steel suitable for 3000 psi service, Vogt or equal.

D. Moderate deflections and long radius curves may be made by means of beveled joint rings, by pulling standard joints, by using short lengths of pipe, or a combination of these methods; provided that pulled joints shall not be used in combination with bevels. The maximum total allowable angle for beveled joints shall be 5 degrees per pipe joint. The maximum allowable angle for recommendations or the angle which results from a 3/4-inch pull out from normal joint closure, whichever is less. All horizontal deflections or fabricated angles shall fall on the alignment. All vertical deflections shall fall on the alignment and at locations adjacent to underground obstructions, points of minimum earth cover, and pipeline outlets and structures, the pipe angle points shall meet the angle points shown on the Drawings.

E. Outlets, Tees, Wyes, and Crosses

1. Outlets 12-inch and smaller may be fabricated from Schedule 30 or heavier steel pipe in the standard outside diameters, i.e., 12-3/4 inch, 10-3/4 inch, 8-5/8 inch, 6-5/8 inch, and 4-1/2 inch.

F. The design of outlet reinforcement shall be in accordance with the procedures given in Chapter 13 of AWWA Manual M-11, except that the design pressure P, used in the M-11 procedure shall equal the greater of 1.25 P_w or 0.9375 P_t. Unless otherwise shown on the Drawings, outlets 2 inches in diameter and smaller need not be reinforced.

G. In lieu of saddle or wrapper reinforcement as proved by the design procedure in Manual M-11, pipe or specials with outlets may be fabricated in their entirety of steel plate having a thickness equal to the sum of the pipe wall plus the required reinforcement.

H. Where required by the M-11 design procedure, crotch plate reinforcement shall be furnished.

I. Steel Welding Fittings

1. Steel welding fittings shall conform to ASTM A 234.

J. Flanges

1. Flanges shall conform to AWWA C207 Class D flange.

K. Lining

1. Fusion Bonded Epoxy Lining

a. All interior fittings/specials shall be lined with a Polyamide Epoxy system, fusion bonded epoxy system, or cement mortar in accordance with AWWA C205.

L. Coating

1. All requirements pertaining to thickness, application and curing of coating specified for straight pipe shall apply to specials. Coating system shall be in accordance with Section 09900.

M. A mark indicating the true vertical axis of the special shall be placed in the top and bottom of the special.

PART 3 - EXECUTION

301.01 GENERAL

A. Unless otherwise provided, the Contractor shall furnish and install all fittings, closure pieces, bends, reducers, wyes, tees, crosses, outlets, manifolds, and other steel plate specials, bolts, nuts, gaskets, jointing materials, and all other appurtenances as shown and as required to provide a complete and workable installation. Where pipe support details are shown, the supports shall conform thereto and shall be placed as indicated; provided, that the support for all exposed piping shall be complete and adequate regardless of whether or not supporting devices are specifically shown. Where shown, concrete thrust blocks and welded joints shall be provided. At all times when the Work of installing pipe is not in progress, all openings into the pipe and at the ends of the pipe in trenches or structures shall be kept tightly closed to prevent entrance of animals and foreign materials. The Contractor shall maintain the inside of the pipe free from foreign materials and in a clean and sanitary condition until its acceptance by the Owner.

- END OF SECTION -

SECTION 15085 - PIPING SYSTEMS AND CONNECTIONS

PART 1 - GENERAL

101.01 SECTION INCLUDES

This section includes the pipe materials, connection methods and related work.

101.02 REFERENCES

This section contains references to the following documents. Al work specified herein shall conform to or exceed the applicable requirements of the referenced portions. In case of conflict between the requirements of this section and the listed documents, the requirements for this section shall prevail.

Reference	Title
ANSI BI.1	Unified Inch Screw Threads (UN and UNR Thread Form)
ANSI BI.20.1	Pipe Threads, General Purpose (Inch)
ANSI B16.1	Cast Iron Pipe Flanges and Flanged Fittings Class 25, 125, 250, and 800
ANSI B18.2.1	Square and Hex Bolts and Screws Inch Series including Hex Cap Screws and Lag Screws
ANSI B18.2.2	Square and Hex Nuts
ANSI/AWWA C110/A21.10	Ductile Iron and Gray Iron Fittings
ANSI/AWWA C104/A21.4	Cement Mortar Lining for Ductile Iron Pipe and Fittings
ANSI/AWWA C115/A21.15	Flanged Ductile Iron Pipe

PART 2 - PRODUCTS

201.01 FLANGED ASSEMBLIES

A. DUCTILE IRON PIPE AND FITTINGS

1. NOT USED

B. STEEL PIPE AND FITTINGS

1. When pipe and fittings are designated on the drawings as steel, it shall be in accordance with section 15061 - Steel Piping, Fabricated Specials.

C. GASKETS:

1. Gasket material shall be as specified in paragraph 15085-2.03.

2. Gaskets for plain faced flanges shall be the full-face type. Thickness shall be 1/16-inch for pipe 10 inches and less in diameter and 1/8-inch for pipe 12 inches and larger in diameter. Unless otherwise specified, gaskets for raised face flanges shall match the raised face and shall be 1/16-inch thick for pipe 3-1/2 inches and less in diameter and 1/8-inch thick for pipe 4 inches and larger.

D. BOLTS AND NUTS

Flange assembly bolts shall be ANSI B18.2.1 standard hexagon head stainless steel machine bolts with aluminum bronze hexagon nuts. Threads shall be ANSI BI.1, standard coarse thread series; bolts shall be Class 2A, nuts shall be Class 2B. Bolt length shall conform to ANSI B16.5. Bolts and nuts shall be cadmium plated.

201.02 GASKETS

A. Gaskets shall be as follows:

1. EPDM: ethylene-propylene-diene-terpolymer.

2. Neoprene: neoprene.

3. Nitrile: nitrile (Buna-N)

4. Neoprene, CI.I.: Neoprene with cloth inserts.

5. Neoprene, oil resistant: neoprene with oil-resisting characteristics.

6. TFE: noncreeping tatrafluoroethylenet (TFE) with insert filler.

7. Compressed gasketing consisting of organic fibers (kevlar), rillers and styrene butadiene rubber (SBR) binder.

8. TFE bonded EPDM: TFE bonded to EPDM in full-face gasket having concentric convex molded rings.

201.03 THREAD

A. A pipe thread dimensions and size limits shall conform to ANSI BI.20.1.

201.04 COATINGS

A. Flange assemblies and fittings shall be coated in accordance with Section 09900.

SECTION 15085 - PIPING SYSTEMS AND CONNECTIONS

- END OF SECTION -

SECTION 15100 - VALVES AND ACTUATORS

PART 1 - GENERAL

101.01 THE REQUIREMENT

A. The Contractor shall provide all tools, supplies, materials, equipment, and all labor necessary for furnishing, coating, installing, adjusting, and testing of all valves, actuators, and appurtenant work, complete and operable, all in accordance with the requirements of the Contract Documents. This section includes butterfly valves with electronic mechanical actuators..

B. All valves shall be furnished with pressure classes equal to or better than the pressure class of the pipe with which the valves are to be used. Unless otherwise specified, each valve body shall be tested under a test pressure equal to twice its design water-working pressure.

101.02 RELATED WORK SPECIFIED ELSEWHERE (NOT USED)

101.01 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

A. Codes

The Building Code, as referenced herein, shall be the Uniform Building Code (UBC), as specified in Section entitled, Reference Standards. 01071

ANSI/NFPA 70-1984 National Electric Code

B. Commercial Standards:

ANSI B16.7-75	Cast Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250, and 800.
ANSI B16.5-81	Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys.
ASTM A 48-83	Specification for Gray Iron Castings

ASTM B 62-82a	Specification for Composition Bronze or Ounce Metal Castings.
ASTM A 536-84	Specification for Ductile Iron Castings.

101.02 CONTRACTOR SUBMITTALS

A. Shop drawings of all valves and actuators shall be furnished as specified in Section entitled, Contractor Submittals 01300

B. The Contractor shall submit a schedule of valves to be labeled indicating in each case the valve location and the proposed working for the label.

PART 2 - PRODUCTS

201.01 BUTTERFLY VALVES

A. General: The butterfly valve shall be designed expressly for waterworks applications and shall be of the zero offset design. Valves shall meet or exceed the requirements of AWWA C504-15. Valves shall be of the size and class indicated in the Valve Schedule. All valves shall be of the AWWA C504-15 "B" Designation, bubble tight and sized for bi-directional water service, full rated pressure, and a line velocity of 16 feet per second. The valve build data shall be made available upon request by the Owner and shall be retained by the Valve Manufacturer for no less than 50 years unless noted longer. Actuators shall be sized for conditions given in Valve Schedule.

B. Pressure Class: Butterfly valves shall conform to ANSI/AWWA C504 Class 150B.

C. Flanges: Flanges shall be in conformance with ASME B16.1 Class 125. Flange faces shall be coated in accordance with Section 2.A.(18) Paint and Coatings. Flanges shall also have machined groves to improve gasket sealing.

D. Body: Valve bodies shall be cast iron or ductile iron, ASTM A536 65-45-12.

E. The entire valve body, excluding shaft bores, shall be coated for corrosion protection.

F. Valve Tags: Valves shall be equipped with mechanically fastened stainless steel stamped or engraved tags as detailed in Section 2.A.(19) Marking. Painted lettering on tags will not be accepted.

G. Disc: The disc shall be ductile iron ASTM A536 65-45-12 or ASTM A536 60-40-18. Unless stainless steel, the entire disc and all its wetted surfaces shall be coated, without exception, in accordance with Section 2.A.(18) Paint and Coatings. Disc pins shall extend completely through the valve and shall be

mechanically fastened, and O-Ring sealed and shall be ASTM A240 Type 2205 Duplex Stainless Steel. Carbon steel is not an acceptable material for the valve disc.

H. Shaft: Shafts shall meet or exceed the requirements of AWWA C504-15 and the following:

a. Valve shafts shall be type 316 or type 304 stainless steel

I. Elastomeric Seat: Valve seats shall be field replaceable and shall be secured to the valve disc by a 316-stainless steel seat retainer ring and secured by 316 stainless steel fasteners. Bronze and carbon steel seat retainer rings are not acceptable. Elastomeric valve seats shall be field replaceable in-line without having to remove the valves from service. The elastomeric seat material shall be EPDM. The valve shall be bi- directionally leak free in accordance with AWWA C504-15.The field replaceable seat shall not require special skills or tools to replace the seal. Elastomeric seat methods which use either irreplaceable vulcanized seats or which use hardened epoxy or grout in a dovetailed groove are not acceptable. Elastomeric seats with seams are not allowed.

J. Metallic Seating Surface: The metallic seating surface shall be located in the valve body. Seating surfaces shall be a highly wear resistant, double overlay welded 316 Stainless Steel in accordance with AWWA C504-15. The seat shall be applied through a high alloy weld overlay process and shall have a final surface minimum thickness of no less than 7 mils (0.18mm) in accordance with AWWA C504-10. Replaceable metallic seating surfaces in the body are not acceptable.

K. Shaft Seals: Shaft seals shall be appropriate for service specified. Shaft seals shall be composed of a minimum of 8 O-ring seals protecting both the OD and ID of the shaft bearings Elastomer packing material shall be EPDM. Shaft Seals shall be clearly shown on submittal drawings. Packing will not be allowed.

L. Shaft Bearings: Valve shaft bearings or radial shaft bushings shall meet or exceed the requirements of AWWA C504-15 and be corrosion resistant, self- lubricating sleeve type made of lead-free bronze.

M. Thrust Bearings: Valve thrust bearings shall be provided and shall meet or exceed the requirements of AWWA C504-15.

N. Hardware:

a. All fasteners and hardware shall be type 316 stainless steel.

b. Bolt sizes for all tapped holes shall be identified.

O. Paint and Coatings:

a. All valves shall be NSF/ANSI 61 certified.

b. All sharp edges to be coated shall have the necessary beveling or long

radius to assure consistent coating thickness.

c. Any damage found after shipping shall be noted to the carrier and the Valve Supplier. Coating damaged in shipping shall be noted and properly field repaired by the Valve Manufacturer's Representative to the satisfaction of the Owner.

d. The Valve Manufacturer is required to have and follow a system of valve preparation and coating which assures a quality holiday free application and shall comply with the requirements of AWWA C550. The coating system shall be submitted for approval.

e. Coatings shall be either of the following:

i. An Owner approved 390-degree F plus, heat bonded fusion coated to a final dry film thickness no less than 8 mils.

ii. An Owner approved two-part liquid epoxy. A minimum of two separate 4 mill coats to a final dry film thickness DFT of no less than 8 mils.

P. Marking:

a. All parts subject to disassembly prior to shipment shall be marked for identification and match marked. Match marking information shall be submitted in the O&M manual.

b. Casting markings shall conform to the appropriate section of MSS-SP-25 each valve shall be marked with the Valve Manufacturer's name, valve size, body material, and pressure rating cast into the body of the valve. Lettering shall be a minimum of ½ inch tall and project a minimum of 1/10 inch from the body.

c. Each individual piece of equipment shall bear a stainless-steel nameplate attached with stainless steel screws or rivets, upon which there shall be engraved or stamped the following minimal information. Painted lettering on tags shall not be accepted.

i. Valve Manufacturer's name or trademark

ii. Valve Manufacturer's serial number

iii. Valve Size

iv. Valve Pressure Rating

Q. Approved Valve Manufacturers

a. Av-Tek Inc. – Double Flanged Industrial Butterfly Series 120

b. VAG - EKN

c. DeZurik - BAW

d. or approved equal

R. Valve Manufacturer Warranty:

a. The Valve Manufacturer shall warrant all valves against material and workmanship defects for a period not less than 12 months. The warranty period shall start at installation or at no more than two months from delivery; whichever comes first. Any valve component failure during the warranty period shall be corrected by the Valve Manufacturer.

b. The Valve Manufacturer shall have an authorized warranty service center within the continental United States of America.

201.02 ELECTRIC MOTOR VALVE ACTUATORS

A. The actuator for the flow control valve shall be suitable for on/off service. The actuator for the new 36-inch butterfly valves shall be suitable for OPEN/CLOSE operation of a quarter turn valve and be rated for 10 starts per hour, as a minimum.

B. The actuators shall be self-contained units consisting of electric motor, integral reversing contractor starter, gearbox, limit switches, torque switches, manual override handwheel with declutching level, and other devices as specified. The gearbox shall be rated for continuous submersion at a depth of 15’ of water or greater.

C. The actuator for the valve shall be furnished and sized by the valve supplier and shall be factory mounted. The actuator for the existing butterfly valve shall be sized assuming the torque requirements of the existing valve are two times a standard AWWA butterfly valve.

D. The actuators shall be sized to produce at least 1.5 times the operating torque required. Stall torque of motor shall not exceed the torque capacity of the valve.

E. The actuators shall comply with AWWA C540. Manufacturer shall provide certified drawings and affidavit of compliance as specified in AWWA C540.

F. Operating time for both actuators shall be a minimum of one (1) minute, maximum four (4) minutes from FULLY OPEN to FULLY CLOSED, or the reverse.

G. The actuator motor and all electrical enclosures shall be NEMA 6P, as a minimum. The control enclosure shall include a space heater.

H. Motor:

1. Motors shall be specifically designed for valve actuator service and shall be high starting torque, totally enclosed, nonventilated construction.

2. Motors shall operate on 480-volt, 3-phase, 60-Hz power.

3. Motor insulation shall be NEMA Class F, as a minimum.

4. Motors shall be equipped with internal temperature relay to protect against motor overheating.

I. Gearing:

1. All gearings shall be of steel construction.

2. Actuators shall be permanently lubricated at the factory. Lubrication shall be suitable for operation at any angle and in ambient temperatures of -20 degrees F to 140 degrees F.

J. The drive shall include a lost motion device with hammer blow effect to allow the motor to reach full speed before engaging the valve load.

K. The actuators shall include a LOCAL/OFF/REMOTE weatherproof selector switch or pushbutton and an OPEN/STOP/CLOSE weatherproof selector switch or pushbutton.

1. In the LOCAL position, the actuator shall be controlled by the OPEN/ STOP/CLOSE switch. Motor shall drive the valve to its fully OPEN or CLOSED position when the pushbutton is momentarily depressed. Motor shall stop in mid-travel when the stop button is depressed.

2. In the REMOTE position, the actuator shall accept a momentary contact OPEN/CLOSE control signal and drive the valve to its fully OPEN or CLOSED position.

L. Provide a Form C dry contact for remote indication of the REMOTE status of the selector switch.

M. Provide Form C dry contacts to remotely indicate if the valve is in either the FULLY OPENED or FULLY CLOSED position.

N. The actuators shall be equipped with automatic double-acting limit switches capable of being field adjusted to trip at any point between FULLY OPENED and FULLY CLOSED valve positions.

O. The actuators shall be equipped with automatic double-acting torque switches. Torque switches shall operate during the complete valve cycle to protect the valve and actuator from excessive loads caused by obstructions in either direction of travel.

P. The actuators shall be equipped with handwheels for manual operation and shall include an automatic clutch to positively disengage the handwheel at any time the drive motor control is energized. Handwheel operator shall be designed in such a way that failure of the motorized gearing shall not prevent hand operation of the valves.

Q. Actuators shall include a mechanical indicator that will provide continuous visual indication of valve position. In addition, actuators shall be equipped with replaceable LED indicating lights that will indicate if the valve is in either the FULLY OPENED or FULLY CLOSED position.

R. Actuators shall be supplied with a control power transformer.

S. Failure Position: Valve actuators shall fail in the last position on loss of power or control signal.

T. Manufacturer:

1. AUMA

2. Rotork

PART 3 - EXECUTION

301.01 VALVE INSTALLATION

A. All valves, operating units, stem extensions, valve boxes, and accessories shall be installed as shown and specified.

B. All valves shall be installed to provide easy access for operation and maintenance and to avoid conflicts between valve operators and structural members or handrails.

C. Where combinations of valves, sensors, switches, and controls are specified, it shall be the responsibility of the Contractor to properly assemble and install these various items so that all systems are compatible and operating properly. The relationship between interrelated items shall be clearly noted on shop drawing submittals.

- END OF SECTION -

SECTION 16421 - UTILITY SERVICE ENTRANCE