STANDARD SPECIFICATIONS FOR WATER LINE CONSTRUCTION

UTE WATER CONSERVANCY DISTRICT

REVISED FEBRUARY 2005

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UTE WATER CONSERVANCY DISTRICT

STANDARD SPECIFICATIONS FOR WATER LINE CONSTRUCTION

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SECTION THREE

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Modified February, 1996

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GENERAL CONDITIONS

I GENERAL

GC-l SCOPE:

The following conditions are general in scope and may contain requirements covering conditions that may not be encountered in the performance of the Work under contract. Where any stipulation or requirement set forth herein applies to any such non-existing condition, and is not applicable to the Work under contract, such stipulation or requirement will have no meaning relative to the performance of said Work.

GC-2 DEFINITIONS AND TERMS:

Wherever the following terms are used in these Contract Conditions, or other Contract Documents, the intent and meaning shall apply to both the singular and plural thereof and shall be interpreted as follows:

Addenda: Written or graphic documents issued prior to Bid Opening which clarify, correct or change the Contract Documents.

Agreement: A contract between the Ute Water Conservancy District and the Contractor.

Bid: The offer or proposal of the Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

Bidder: An individual, firm, corporation or other legal entity submitting a proposal for the advertised Work.

Bid Documents: These shall consist of the following forms and documents: Addenda (if any,) Invitation to Bid, Information for Bidders, Instruction to Bidders, Proposal, Bid Bond Forms, Agreement, Conditions of the Contract, Supplemental Specifications, Technical Specifications, and Construction Drawings (not attached.)

Bid Opening: The public opening and reading of all bids prepared and submitted in accordance with the Instructions To Bidders at the time and date set forth in the Invitation to Bid.

Bid Guaranty: The security, as designated in the Instructions To Bidders and furnished with the Bid as a Guaranty that the Bidder will enter into the Contract and furnish the Bonds as required if awarded the Work.

Bid Schedule: A list of Bid Items in the Bid Form which includes a description, approximate quantity and units (if any,) unit price and extended amount or lump sum bid, for each item. The Bid Schedule also includes a line for the Total Bid based on the summation of the extended amounts of all bid items.

Bonds: Bid, Performance and Payment Bonds and other instruments of security.

Calendar Day: Each and every day shown on the calendar, beginning and ending at midnight.

Change Order: A document recommended by the Engineer which is signed by the Contractor and authorized agent of the Ute Water Conservancy District which authorizes an addition, deletion, or revision in the Work, or an adjustment in Contract Price or Contract Time, which is issued on or after the Effective Date of the Contract. Properly executed Change Orders become a part of the Contract Documents.

Claim for Adjustment: A written request issued by the Contractor for an adjustment in Contract Time or Contract Price.

Construction Drawings: The Drawings or Plans, including Standard Drawings, which show the character and scope of the Work to be performed and are referred to in the Contract Documents

Contract: A written agreement between the "Ute Water Conservancy District" and "Contractor" covering the Work to be performed. Other Contract Documents are attached to the Contract and made a part thereof as provided therein.

Contract Documents: Contract Documents include Bidding Requirements, Contract Forms, Conditions of the Contract, Technical Specifications and Drawings, Shop Drawings, Change Orders, amendments, modifications and supplements which have been approved by the Ute Water Conservancy District and the Contractor.

Contract Time: The number of calendar days allowed for the Substantial and/or Final completion of the work specified in the Contract, including authorized time extensions, beginning on the date specified in the Notice to Proceed.

Contractor: The person, firm or corporation with whom the District has entered into a Contract.

Day: Calendar Day.

Defective Work: Work that is unsatisfactory, faulty, or deficient, or does not conform to the Contract Documents or does not meet the requirements of a referenced standard, test, or approval referred to in the Contract Documents, or has been damaged prior to the Engineer's recommendation of Final Payment.

Engineer: The Project Engineer, which may be a Ute Water Conservancy District employee or hired consultant who has been appointed and authorized by the District to oversee the technical aspects of the work and to administer the Contract on behalf of the Ute Water Conservancy District.

Extra or Additional Work: This consists of Work which was not a part of the original Contract Documents at the time the Contract was executed for which extra compensation or time is justified in accordance with conditions set forth in the Contract Documents.

Field Order: A written order issued by the Engineer which directs or allows minor changes in the Work which does not involve a change in the Contract Price or Contract Time.

Inspector: An authorized representative of the Engineer assigned to make any or all necessary inspections and/or tests of materials furnished or Work performed by the Contractor.

Laboratory: Any testing laboratory designated by the Ute Water Conservancy District to make tests of the materials and Work involved in the Contract.

Liquidated Damages: The sum of money the Contractor agrees to pay the Ute Water Conservancy District for each day of delay beyond the date due for the completion of specified stages of Work or the complete Contract, or in delaying the process of obtaining a Contract to perform the Work in the case of Bid Guaranty.

Notice of Award: The written notice by the Ute Water Conservancy District to the apparent Successful Bidder stating that, upon compliance with conditions precedent enumerated therein, within the time specified, the Ute Water Conservancy District will sign and deliver the Contract.

Notice to Proceed: Written notice to the Contractor to proceed with the Contract Work specifying, when applicable, the date of beginning of Contract Time.

Shop Drawings (Work Drawings): All drawings, diagrams, manufacturer specifications, illustrations, schedules, and other data which are specifically prepared by or for the Contractor to illustrate some portion of the Work.

Special Conditions: The part of the Bid Documents which amends or supplements the General Conditions and which are specific to the Work to be performed.

Technical Specifications: Those portions of the Contract Documents consisting of written technical descriptions of materials, equipment, standards and workmanship as applied to the Work. These consist of Standard and Supplemental Specifications, and notes on the Construction Drawings.

Standard Drawings: These consist of the Ute Water Conservancy District's adopted standard drawings and details which pertain to the Work to be performed.

Standard Forms: Forms provided in the Standard Contract Documents For Capital Improvements Construction, which are in the format to be used for the stated or intended purpose.

Subcontractor: An individual firm, corporation, or other legal entity to whom the Contractor sublets part of the Contract.

Substantial Completion: The Work or a specified part thereof has progressed to the point where, in the opinion of the Engineer, as evidenced by Engineer's Letter of Substantial Completion, it is sufficiently complete, in accordance with the Contract Documents, so that the Work or specialized part can be utilized for the purpose for which it is intended.

Superintendent: The Contractor's authorized representative in responsible charge of the Work.

Surety: The corporation, partnership or individual, other than the Contractor, executing a bond furnished by the Contractor.

Work: The furnishing of all labor, materials, equipment and incidentals necessary to successfully complete the project according to all duties and obligations imposed by the Contract.

II LAWS, PERMITS AND LABOR EMPLOYMENT

GC-3 LAWS AND ORDINANCES:

The Contractor shall at all times observe and comply with the provisions of the Ordinances and Regulations of the City of Grand Junction and/or Mesa County, and of the State of Colorado and The United States, together with Rules and Regulations which in any manner limit, control or apply to the actions or operations of the Contractor, his Subcontractors, or his or their employees and agents, engaged upon the Work or affecting the materials supplied to or by them.

GC-4 PERMITS AND LICENSES:

Unless specified otherwise in the Special Conditions, the Contractor will secure and pay for all permits and licenses and will pay all governmental charges and inspection fees necessary for the prosecution of the Work, which are applicable at the time of this Bid.

GC-5 PATENTS:

The Contractor shall perform all Work in compliance with all applicable patent, trademark and copyright laws, rules and regulations and codes of the United States. The Contractor shall not utilize any design, device, material or process, protected by patent, trademark or copyright, in performance of the Work unless the Contractor has obtained proper permission and all releases and other necessary documents. The Contractor shall determine if any material, equipment, process or procedure specified in the Construction Drawings is protected. The Contractor and the Surety shall release, indemnify and save harmless the Ute Water Conservancy District, its officers, agents and employees from any and all claims, damages, suits, costs, expenses, liabilities, actions or proceedings of any kind or nature of or by anyone whomsoever, resulting from infringement of any patent, trademark or copyright and protected by law.

GC-6 AIR AND WATER QUALITY CONTROL:

The Contractor shall comply with the "Colorado Air Quality Control Act," Title 25, Article 7, CRS and regulations promulgated thereunder.

The Contractor shall comply with the "Colorado Water Quality Control Act," Title 25, Article 8, CRS; "Protection of Fishing Streams,", Title 33, Article 5, CRS; "Clean Water Act," 33 USC 1344; and regulations promulgated and certifications issued.

The Contractor shall comply with the requirements of Section 107.25 of the Colorado Department of Transportation Standard Specifications of Road and Bridge Construction.

The cost of controlling pollution shall be included in the Bid item expected to cause same and shall not be the subject of extra payment unless specifically listed as a separate pay item.

Should the Contractor, or his subcontractors, fail to control pollution, the Ute Water Conservancy District shall have the right to employ outside assistance, Ute Water employees and/or a private Contractor to provide control as necessary. Any cost incurred by the Ute Water Conservancy District in controlling pollution caused by this Contractor, including engineering, shall be paid for by the Contractor.

GC-7 EMPLOYMENT OF LABOR:

a) The Contractor shall hold the Ute Water Conservancy District harmless from any violation of any or all provisions of law, both of the State of Colorado and of the United States, affecting or relating to the employment and compensation of workers, laborers, and mechanics requiring time and one-half or other increased compensation for overtime work or other special treatment of employees. The Contractor shall likewise comply with and protect and hold the Ute Water Conservancy District harmless from any violation of all laws and lawful rules and regulations, both of the State of Colorado and of the United States, relating to worker's compensation, unemployment compensation, social security and any and all other expenses and conditions of employment under the Contract.

b) The Contractor and his subcontractors shall comply with the Workmen's Compensation Act of Colorado and shall provide Compensation Insurance to protect the Contractor, his subcontractors and the Ute Water Conservancy District from and against any and all Workmen's Compensation claims arising from performance of the work under the Contract. The Ute Water Conservancy District shall be furnished, prior to undertaking any Work, two (2) copies of the certificate or certificates evidencing such insurance to be in effect.

GC-8 AFFIRMATIVE ACTION/EEO:

The Contractor shall not discriminate against any employee or applicant for employment on account of race, color, religion, sex, national origin or disability.

III INTENT, CORRELATION AND INTERPRETATION OF CONTRACT DOCUMENTS

GC-9 INTENT OF CONTRACT DOCUMENTS:

The intent of the Contract Documents is to provide directions for the construction and completion, in every detail, of the Work described. The Contractor shall furnish all labor, material, equipment, tools, transportation and supplies required to complete the Work in accordance with the Contract Documents.

GC-10 COORDINATION OF CONTRACT DOCUMENTS:

The specifications and Construction Drawings are intended to supplement, but not necessarily duplicate each other, and together constitute one (1) complete set of drawings and specifications, so that any Work exhibited in the one and not in the other shall be executed as if it had been set forth in both, in order that the Work shall be completed according to the complete design or designs as decided and determined by the Engineer. Should anything be omitted from the Construction drawings and Specifications which is necessary for a clear understanding of the Work or should it appear that various instructions are in conflict, then the Contractor shall secure written clarification or instructions from the Engineer before proceeding with the construction affected by such omissions or discrepancies.

In resolving conflicts, errors and discrepancies, the Contract Documents shall be given precedence in the following order: Agreement and Notice to Proceed, Addenda, Special Conditions, Instructions to Bidders, General Conditions, Special Provisions and Supplemental Specifications, Construction Drawings and Standard Specifications. Figure dimensions on Drawings shall govern over scale. Any Work that may reasonably be inferred from the Specifications or Construction Drawings as being required to produce the intended result shall be supplied whether or not it is specifically called for. Work materials or equipment described in words which so applied have a well known technical or trade meaning shall be deemed to refer to such recognized standards.

GC-11 SHOP DRAWINGS:

The Construction Drawings will be supplemented by such Shop Drawings prepared by the Contractor as are necessary or required to adequately control the Work. Shop Drawings and/or details must be approved by the Engineer before any Work involving such drawings shall be performed. It is expressly understood that the approval by the Engineer of the Contractor's Shop Drawings will not relieve the Contractor from responsibility for errors in dimensions, use of improper materials or improper quantities of materials provided.

GC-12 ESTIMATED QUANTITIES IN BID SCHEDULES:

The quantities noted in the schedules are approximations for comparing Bids, and no claim shall be made against the Ute Water Conservancy District because of excess or deficiency therein, actual or relative. Payment to the Contractor will be made only for the actual quantities of Work performed and accepted or materials furnished in accordance with the Contract Documents. The scheduled quantities of Work to be done and materials to be furnished may each be increased, decreased, or omitted as hereinafter provided.

IV BONDS, INDEMNIFICATION AND INSURANCE CLAUSE

GC-13 PERFORMANCE, PAYMENT AND OTHER BONDS:

Contractor shall furnish a Performance Bond and a Payment Bond, each in an amount at least equal to that specified in the Contract as security for the faithful performance and payment of all Contractor's obligations under the Contract Documents. These Bonds shall remain in effect for the duration of the Warranty Period (as specified in the Special Conditions.) Contractor shall also furnish other Bonds that may be required by the Special Conditions. All Bonds shall be in the forms prescribed by the Contract Documents and be executed by such Sureties as (1) are licensed to conduct business in the State of Colorado and (2) are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Audit Staff, Bureau of Accounts, US Treasury Department. All Bonds signed by an agent must be accompanied by a certified copy of the Authority to Act. If the Surety on any Bond furnished by the Contractor is declared bankrupt, or becomes insolvent, or its rights to do business in Colorado are terminated, the Contractor shall, within five (5) days thereafter, substitute another bond and Surety, both of which shall be acceptable to the Ute Water Conservancy District.

GC-14 INSURANCE REQUIREMENTS:

1. The Contractor agrees to procure and maintain, at its own cost, a policy or policies of insurance sufficient to insure against all liability, claims, demands, and other obligations assumed by the Contractor pursuant to this Section. Such insurance shall be in addition to any other insurance requirements imposed by this Contract or by law. The Contractor shall not be relieved of any liability, claims, demands, or other obligations assumed pursuant to this Section by reason of its failure to procure or maintain insurance, or by reason of its failure to procure or maintain insurance in sufficient amounts, durations, or types.

2. Contractor shall procure and maintain, and shall cause any Subcontractor of the Contractor to procure and maintain insurance coverage listed in subparagraphs (a)-(c) below. Such coverage shall be procured and maintained with firms and insurers acceptable to the Ute Water Conservancy District. All coverage shall be continuously maintained to cover all liability, claims, demands, and other obligations assumed by the Contractor pursuant to this Section. In the case of any claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage. Minimum coverage limits shall be as indicated below unless specified otherwise in the Special Conditions.

    a) Worker Compensation insurance to cover obligations imposed by applicable laws for any employee engaged in the performance of work under this Contract.

    b) General Liability insurance with minimum combined single limits of ONE MILLION DOLLARS ($1,000,000) each occurrence and ONE MILLION DOLLARS ($1,000,000) per job aggregate. The policy shall be applicable to all premises and operations. The policy shall include coverage for bodily injury, broad form property damage (including completed operations,) personal injury (including coverage for contractual and employee acts,) blanket contractual, products, and completed operations. The policy shall include coverage for

explosion, collapse and underground hazards. The policy shall contain a severability of interests provision.

c) Comprehensive Automobile Liability insurance with minimum combined single limits for bodily injury and property damage of not less than ONE MILLION DOLLARS ($1,000,000) each occurrence and ONE MILLION DOLLARS ($1,000,000) aggregate with respect to each of Contractor's owned, hired or non-owned vehicles assigned to be used in performance of the Work. The policy shall contain a severability of interests provision.

3. The policies required by paragraph (b) above and by paragraph (c) above shall be endorsed to include the Ute Water Conservancy District and the Ute Water Conservancy District's officers and employees as additional insured. Every policy required above shall be primary insurance, and any insurance carried by the Ute Water Conservancy District, its officers, or its employees shall be excess and not contributory insurance to that provided by Contractor. No additional insured endorsement to the policy required by paragraph (b) above shall contain any exclusion for bodily injury or property damage arising from completed operations. The Contractor shall be solely responsible for any deductible losses under any policy required above.

4. The Contractor's insurance agent shall provide three (3) copies of the certificate of insurance to the Engineer as evidence that policies providing the required coverages, conditions, and minimum limits are in full force and effect. The certificate shall identify this Contract and shall provide that the coverages afforded under the policies shall not be canceled, terminated or materially changed until at least thirty (30) days prior written notice has been given to the Ute Water Conservancy District.

5. Failure on the part of the Contractor to procure or maintain policies providing the required coverages, conditions, and minimum limits shall constitute a material breach of this Contract upon which the Ute Water Conservancy District may immediately terminate this Contract or, at its discretion, the Ute Water Conservancy District may procure or renew any such policy or any extended reporting period thereto and may pay any and all premiums in connection therewith, and all moneys so paid by the Ute Water Conservancy District shall be repaid by the Contractor or deducted from moneys due to Contractor.

6. The Ute Water Conservancy District reserves the right to request and receive, at any time(s), a certified copy of any policy and any endorsement thereto.

7. The parties hereto understand and agree that the Ute Water Conservancy District is relying on, and does not waive or intend to waive by any provision of this Contract, the monetary limitations or any other rights, immunities ,and protection provided by the Colorado Governmental Immunity Act, CRS 24-10-101 et seq., as from time to time amended, or otherwise available to the Ute Water Conservancy District, its officers, or its employees.

8. Depending on the nature and scope of the service to be provided under this agreement, additional insurance requirements may be specified by the Ute Water Conservancy District.

GC-15 CONTRACTOR'S INSURANCE:

The Contractor shall not commence work under this Contract until he has obtained all insurance required by this agreement, and the several provisions hereof, nor shall the Contractor allow any Subcontractor to commence work on his Contract until all similar insurance required by the Subcontractor has been so obtained and approved.

GC-16 INDEMNIFICATION:

The Contractor agrees to indemnify and hold harmless the Ute Water Conservancy District, its officers, employees and insurers from and against all liability, claims and demands, on account of injury, loss, or damage, including without limitation, claims arising from bodily injury, personal injury, sickness, disease, death, property loss or damage, or any other loss of any kind whatsoever, which arise out of or are in any manner connected with this Contract, if such injury, loss or damage is caused in whole or in part by, or is claimed to be caused in whole or in part by, the act, omission, error, professional error, mistake, negligence, or other fault of the Contractor, any Subcontractor of the Contractor, or any officer, employee, representative, or agent of the Contractor or of any Subcontractor of the Contractor, or which arise out of any workmen's compensation claim of any employee of the Contractor or of any employee of any Subcontractor of the Contractor. The Contractor agrees to investigate, handle, respond to, and to provide defense for and defend against, any such liability, claims or demands at the sole expense of the Contractor. The Contractor also agrees to bear all other costs and expenses related thereto, including court costs and attorney fees, whether or not any such liability, claims or demands alleged are groundless, false, or fraudulent.

V CONTRACTOR'S RESPONSIBILITIES - SAFETY

GC-17 SAFETY AND PROTECTION:

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. He shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

a) All employees on the Work and other persons who may be affected thereby,

b) All Work and all materials or equipment to be incorporated therein whether in storage on or off site, and

c) Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. The Contractor shall erect and maintain, as required by the conditions and progress of the Work, all necessary safeguards for safety and protection, and in addition, he shall comply with all applicable recommendations of the Manual of Accident Prevention in Construction of the Associated General Contractors of America, Inc. He shall notify owners of adjacent utilities when prosecution of the Work may affect them. All damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the Contractor, any Subcontractor or anyone, directly or indirectly, employed by any of them or anyone for whose acts any of them may be liable, shall be remedied by the Contractor.

In case of injury to persons or property by reason of failure to erect and maintain necessary barricades, safeguards, and signals, or by reason of any act of negligence of the Contractor, his Subcontractors, agents or employees, during the performance of this Contract, the Ute Water Conservancy District may withhold payments due the Contractor so long as shall be reasonably necessary to indemnify the Ute Water Conservancy District on account of any such injuries, but the Ute Water Conservancy District's payments or failure to pay any sum shall not be considered as a waiver of its rights.

The Contractor shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated in writing by the Contractor.

GC-18 BLASTING AND OTHER HAZARDOUS WORK:

No blasting or other hazardous work shall be done by the Contractor or Subcontractors without written permission issued by the Engineer. Before issuance of such permission, the Engineer may require evidence of adequate liability insurance coverage secured at the Contractor's expense for collapse, explosion, blasting, and damage to underground pipes, wiring, conduits and other structures.

GC-19 EXCAVATIONS:

Excavations shall be to the lines and grades as shown on the plans or as modified by the Engineer in the field.

The excavation operations shall adhere to all Federal, State, and local safety regulations that are applicable. The inspection of the Work by the Engineer does not relieve the Contractor from any violations of any safety regulations.

The Contractor shall be conversant with the current rules and regulations governing excavation work as set out by the Industrial Commission of Colorado and OSHA.

All radioactive material (as determined by Colorado State Health Department) to be excavated shall be removed by the Contractor to a site as designated by the Colorado Health Department. Colorado Health Department must inspect radioactive material prior to disposal.

GC-20 TRAFFIC CONTROL, STREET CLOSURES AND DETOURS:

No public street, alley or roadway shall be intentionally closed, blocked or obstructed without first obtaining permission from the proper authorities having jurisdiction over the affected right-of-way.

Prior to closing any roadway or traffic lane, the Contractor shall set up and maintain proper traffic control in accordance with an approved traffic control plan (TCP.) A TCP is a plan for guiding traffic safely through or around a construction work zone or other obstruction. The TCP must provide safe methods for movement of pedestrians and motorists who travel through the work zone, and a safe area for all persons and equipment working within the roadway.

At least twenty-four (24) hours prior to closing any street or roadway or lane thereof, the Contractor shall submit to the Engineer a detailed TCP for review. This plan shall consist of a sketch or drawing showing the information outlined below:

1. The vicinity, street names and specific area within which the project is going to occur. Show all curbs, gutters, sidewalks, driveways, traffic lanes, cross streets, etc., in the vicinity of the Work.

2. Details of all street, sidewalk and lane closures including proposed detour routes. Include the number of days and hours per day that the closures and detours will be in effect.

3. The type, location and spacing of all barricades, warning signs, detour signs, cones and other traffic control devices. The locations and schedules of all flaggers that will be used.

4. The locations and schedules of all flaggers that will be used

5. The name and phone number of the Contractor's designated Traffic Control Supervisor (TCS) and phone numbers of persons who can be reached after working hours and on holidays and weekends for traffic control needs.

At least twenty-four (24) hours prior to closing any street or roadway, the Contractor shall notify the Project Engineer, Police and Fire Departments, the City of Grand Junction's Solid Waste Superintendent, school bus companies, the US Post Office and other affected entities, business managers and residents. The Contractor shall be responsible for additional notifications of those listed above whenever there is a significant change in the traffic control detour or set up. The

Police and Fire Departments shall also be notified in advance of any traffic lane reduction or closure.

The Contractor shall furnish all barricades, advance warning signs, flaggers and other traffic control devices required for implementation of the TCP, and any additional traffic control that the Engineer determines to be necessary for protection of the Work and for the safety of the public.

All traffic control devices shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD) and the approved TCP. All warning signs and barricades shall be constructed and displayed according to standards set forth in the MUTCD.

The Contractor should consider subcontracting the traffic control work to a qualified company that provides such services. Should the Contractor decide to rent equipment and do the traffic control work himself, he shall designate a Traffic Control Supervisor (TCS) who will be responsible for the set up, maintenance and removal of all traffic control devices. This supervisor shall be certified by the American Traffic Safety Services Association (ATSSA.) The TCS shall have in possession at all times a copy of the MUTCD or a copy of the ATSSA Guide for Work Area Traffic Control.

In any case, no work shall be done until all advance warning signs and traffic control devices are in place. The Engineer or Inspector shall have the authority to require the Contractor to provide additional signs or barricades for those locations he deems to be inadequate.

At times, it may be necessary for the Contractor to provide flaggers to direct traffic. All flaggers provided by the Contractor shall be certified by the Colorado Department of Transportation or ATSSA and shall be wearing the proper safety attire while performing the duties of a flagger.

Wherever detours are routed over areas other than established roadways, it shall be the Contractor's responsibility to secure permission from all affected property owners prior to setting up the detours. Traffic shall not be placed on any detour route until it has been graded and delineated in such a way that it is safe for use by the traveling public. The Contractor shall maintain and provide dust control as needed on all unpaved detour routes.

The Contractor's operations shall cause no unnecessary inconvenience. The access rights of the public shall be considered at all times.

The Contractor shall cooperate with the various parties involved in the delivery of mail and the collection and removal of trash and garbage to maintain existing schedules for these services.

The Contractor shall maintain access to all properties at all times unless otherwise approved by the Engineer. Residents and property owners shall be notified by the Contractor at least twenty-four (24) hours prior to temporary closure or relocation of driveway access. Access to property in construction areas shall be kept graded and maintained with a gravel surface.

There shall be no separate payment for maintaining property access, which shall be considered incidental to the construction and shall be included in the unit prices bid for various items of Work in the Bid Schedule.

GC-21 PAYMENT FOR TRAFFIC CONTROL:

Payment for traffic control shall be in accordance with the pay item or items listed in the Bid Schedule. If not specifically listed, then it shall be considered incidental to the Work and will not be measured if paid for separately.

VI CONTRACTOR'S RESPONSIBILITIES - GENERAL

GC-22 SCHEDULES:

At least five (5) Working Days prior to beginning the work, the Contractor shall submit to the Engineer a written estimated construction schedule indicating the relative starting and completion dates of the various stages of the Work, including Work to be performed by utility companies, and a schedule of Shop Drawing submissions.

Before starting the Work, a preconstruction meeting may be held to review the above schedules, to establish procedures for handling Shop Drawings, applications for payment, and to discuss other project related issues. Attendance of the preconstruction meeting is requested for the Contractor's Project Manager and Superintendent, Traffic Control Supervisor (if specifically requested,) the Project Engineer, Inspector, and representatives of affected utility companies.

When, during the progress of the project, significant adjustments to the estimated progress schedule become necessary, the Contractor shall promptly submit pertinent revisions to the Engineer to assist in planning required coordination.

The Contractor shall keep the Engineer informed of any delays or changes in the construction schedule.

GC-23 EXAMINATION OF CONTRACT DOCUMENTS AND WORK:

Before undertaking the Work, the Contractor shall carefully study the Contract Documents, check all figures shown thereon and all field measurements. He will at once report in writing to the Engineer any conflict, error or discrepancy which he may discover. The Contractor assumes full responsibility for having familiarized himself with the nature and extent of the Contract Documents, Work, locality, and local conditions that may in any manner affect work to be done.

GC-24 SUBSURFACE CONDITIONS:

The existence and location of subsurface structures and utilities indicated on the Construction Drawings are not guaranteed. It is the responsibility of the Contractor to investigate and verify in the field the exact location of any such utilities or underground structures.

GC-25 SHOP DRAWINGS AND SAMPLES:

After checking and verifying all field measurements, the Contractor shall submit to the Engineer for approval, in accordance with the accepted schedule of Shop Drawing submissions, all Shop Drawings, which shall have been checked by and stamped with the approval of the Contractor and identified as the Engineer may require. The data shown on the Shop Drawings shall be complete with respect to dimensions, design criteria, materials of construction and the like, to enable the Engineer to review the information as required.

The Contractor shall also submit to the Engineer for approval with such promptness as to cause no delay in Work, all samples required. All samples will have been checked by and stamped with the approval of the Contractor, identified clearly as to material, manufacturer, any pertinent catalog numbers and the use for which they are intended.

At the time of each submission, the Contractor shall in writing call the Engineer's attention to any deviations that the Shop Drawing or sample may have from the requirements of the Contract Documents.

The Engineer will review and approve, with reasonable promptness, Shop Drawings and samples submitted by the Contractor, but his review and approval shall be only for conformance with the design concept of the project and for compliance with the information given in the Contract Documents. The approval of a separate item as such will not indicate approval of the assembly in which the item functions. The Contractor shall make any corrections required by the Engineer and will return the required number of corrected copies of Shop Drawings and resubmit new samples until approved. The Contractor shall direct specific attention in writing or on resubmitted Shop Drawings to revisions other than the corrections called for by the Engineer on previous submissions. The Contractor's stamp of approval on any work drawing or sample constitutes a representation that the Contractor has either determined and verified all quantities, dimensions, field construction criteria, materials, catalog number and similar data or he assumes full responsibility for doing so, and that he has reviewed or coordinated each Shop Drawing or sample with the requirements of the Work and the Contract Documents.

No Work requiring a Shop Drawing or sample submission shall be commenced until the submission has been approved by the Engineer. A copy of each approved work drawing and each approved sample shall be kept in good order by the Contractor at the site and shall be available to the Engineer.

The Engineer's approval of Shop Drawings or samples shall not relieve the Contractor from his responsibility for any deviations from the requirements of the Contract Documents unless the Contractor has in writing called the Engineer's attention to such deviation at the time of submission and the Engineer has given written approval to the specific deviation, nor shall any approval by the Engineer relieve the Contractor from responsibility for errors or omissions in the Shop Drawings.

GC-26 SUBSTITUTIONS: Whenever a material article or piece of equipment is identified on the Drawings or Specifications by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The Contractor may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the Contract Documents by reference to brand name or catalogue number, and if, in the opinion of the Engineer, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer may approve its substitution and use by the Contractor. Any cost differential shall be deductible from the Contract price and the Contract Documents shall be appropriately modified by Chang Order. The Contractor warrants that if substitutes are approved, no major changes in the function or general design of the Project will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the Contractor without a change in the Contract Price or Contract Time.

GC-27 RECORD DRAWINGS:

The Contractor shall keep one record copy of all Construction Drawings, and Shop Drawings at the site in good order and annotated to show all changes made during the construction process. These shall be available to the Engineer and shall be delivered to him upon completion of the project.

GC-28 SUPERVISION AND SUPERINTENDENCE:

The Contractor shall supervise and direct the Work efficiently and with his best skill and attention. He will be solely responsible for the means, methods, techniques, sequences and procedures of the construction. The Contractor shall be responsible to see that the finished Work complies accurately with the Contract Documents, and is also solely responsible for Quality Control.

During all construction activities, the Contractor shall have at the job site, as his agent, a competent superintendent, who shall not be replaced without written notice to the Engineer. The superintendent will be the Contractor's representative at the site and shall have authority to act on behalf of the Contractor. All communications given to the superintendent shall be as binding as if given to the Contractor.

GC-29 WORKING DAYS AND HOURS:

No work shall be done on Saturdays, Sundays or Holidays without the written consent of the Engineer. No work, other than preparation and clean-up, shall be done outside the hours between 7:30 a.m. and 5:00 p.m. without the written consent of the Engineer. Request for such work shall be made a minimum of twenty-four (24) hours prior to the day or days for which the request is being made. Emergency work may be done without prior consent provided the Contractor notifies the Inspector or Project Engineer prior to beginning the work.

GC-30 PROTECTING AND RELOCATING UTILITIES:

It is the responsibility of the Contractor to provide for the protection of all structures and utilities including pipes, fences or similar items.

In the event of a break in an existing water main, gas main, sewer or underground cable, the Contractor shall immediately notify the responsible official of the organization operating the utility interrupted and shall lend all possible assistance in restoring services.

The Contractor shall bear the entire expense of repairing or replacing any utilities or structures disturbed or damaged during construction.

Unless otherwise specified in the Contract Documents, all utility relocations will be the responsibility of the utility companies; the Contractor shall be responsible for coordinating the relocation work with the Utility Companies.

GC-31 LABOR, MATERIALS AND EQUIPMENT:

The Contractor shall provide competent, suitably qualified personnel to lay out the Work and perform construction as required by the Contract Documents. He shall at all times maintain good discipline and order at the site.

The Contractor will furnish all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water and sanitary facilities and all other facilities and incidentals necessary for the execution, testing, initial operation and completion of the Work.

All installed materials and equipment will be new, except as otherwise provided in the Contract Documents. If required by the Engineer, the Contractor will furnish satisfactory evidence as to the kind and quality of materials and equipment.

All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with the instructions of the applicable manufacturer, fabricator or processors, except as otherwise provided in the Contract Documents.

GC-32 CHARACTER OF WORKERS:

The Contractor shall at all times employ sufficient labor and equipment for prosecuting the several classes of Work to full completion in the manner and time required by these specifications.

All workers shall have sufficient skill and experience to perform properly the Work assigned to them. Workers engaged in special Work or skilled Work shall have sufficient experience in such Work and in the operation of the equipment required to perform all Work properly and satisfactorily.

Any person employed by the Contractor or by any Subcontractor who, as determined by the Engineer, does not perform his Work in a proper and skillful manner or is intemperate or disorderly shall, at the written request of the Engineer, be removed forthwith by the Contractor or Subcontractor employing such person, and shall not be employed again in any portion of the Work without the approval of the Engineer.

Should the Contractor fail to remove such person or persons as required above or fail to furnish suitable and sufficient personnel for the proper prosecution of the Work, the Engineer may suspend the Work by written notice until such orders are complied with.

GC-33 CONSTRUCTION EQUIPMENT:

All equipment which is proposed to be used on the Project shall be of sufficient size and in such mechanical condition as to meet requirements of the Work and to produce a satisfactory quality of work. Equipment used on any portion of the project shall be such that no injury to the roadway, adjacent property, or other facilities will result from its use. Any damage caused by the equipment shall be repaired or replaced at the Contractor's expense.

When the methods and equipment to be used by the Contractor in accomplishing the construction are not prescribed in the Contract, the Contractor is free to use any methods or equipment that he demonstrates, to the satisfaction of the Engineer, will accomplish the Work in conformity with the requirements of the Contract.

GC-34 METHODS OF OPERATION:

The Contractor shall give to the Engineer full information in advance as to his plans for carrying out any part of the Work. If, at any time before the beginning or during the progress of the Work, any part of the Contractor's plant or equipment or any of his methods of executing the Work appear to the Engineer to be unsafe, inefficient, or inadequate to insure the required quality, rate of progress or safety of the workers, he may order the Contractor to increase or improve his facilities or methods, and the Contractor shall promptly comply with such orders; but neither compliance with such orders nor failure of the Engineer to issue such orders shall relieve the Contractor from his obligation to secure the degree of safety, the quality of work, and the rate of progress required by this Contract. The approval by the Engineer of any plan or method of work proposed by the Contractor shall not be considered as an assumption by the Ute Water Conservancy District, or any officer, agent or employee thereof, of a risk or liability, and the Contractor shall have no claim under this Contract on account of the failure or inefficiency of any plan or method so approved. Such approval shall be considered and shall mean that the

Engineer has no objection to the Contractor's use or adoption, at his own risk and responsibility, of the plan or method so proposed by the Contractor.

Any plan or method of work suggested by the Engineer, or any other representative of the Ute Water Conservancy District, to the Contractor, if adopted or followed by the Contractor in whole or in part, shall be used at the risk and responsibility of the Contractor; and the Engineer and the Ute Water Conservancy District will assume no responsibility therefore.

Where equipment, materials or articles are referred to in the Specifications as "equal to" any particular standard or product, the Engineer shall decide the questions of equality. The Contractor shall furnish to the Engineer for his approval the name of the manufacturer of the equipment or materials which he contemplates installing, together with their performance history and other pertinent information. When required by the Specifications, or when called for by the Engineer, the Contractor shall furnish the Engineer for approval full information concerning the equipment, materials or articles which he contemplates incorporating in the Work. Samples of materials shall be submitted for approval when so requested. Equipment, materials, and articles installed or used without such approval shall be at the risk of subsequent rejection.

GC-35 NEGLECTED OR DEFECTIVE WORK:

If the Contractor should neglect to prosecute the Work in accordance with the Contract Documents, including any requirements of the progress schedule, the Engineer, after ten (10) days written notice to the Contractor, may without prejudice to any other remedy he may have, make good such deficiencies and the cost thereof shall be charged against the Contractor.

The Engineer will have authority to disapprove or reject Defective Work. If required by the Engineer prior to approval of final payment, the Contractor will promptly, without cost to the Ute Water Conservancy District and as specified by the Engineer, either correct any Defective Work, whether or not fabricated, installed or competed, or if Work has been rejected by the Engineer, remove it from the site and replace it with non-Defective Work. If the Contractor does not correct such Defective Work or remove and replace such rejected work within a reasonable time, all as specified in a written notice from the Engineer, the Ute Water Conservancy District may have the deficiency corrected or the rejected Work removed and replaced. All direct or indirect costs of such correction or removal and replacement shall be at the Contractor's expense, and an appropriate deductive Change Order Shall be issued. The Contractor will also bear the expenses of making good all Work of others destroyed or damaged by his correction, removal or replacement of his Defective Work.

If, instead of requiring correction or removal and replacement of Defective Work, the Ute Water Conservancy District prefers to accept it, it may do so. In such case, if acceptance occurs prior to approval of final payment, a Change Order shall be issued incorporating the necessary revisions in the Contract Documents, including the appropriate reduction in the Contract price; or, if the acceptance occurs after approval of final payment, an appropriate amount shall be paid by the Contractor to the Ute Water Conservancy District.

GC-36 WORK BY OTHERS:

The Ute Water Conservancy District reserves the right at any time to contract for and perform other or Additional Work on or near the Work covered by the Contract.

The Contractor shall make allowances in the Bid for scheduling and pursuing Work in such manner as will facilitate coordination with other possible concurrent construction operations.

GC-37 PAYMENT FOR LABOR AND MATERIALS:

The Contractor agrees that he will pay promptly for Work, services and labor of subcontractors and equipment employed on the Work and for all materials that he may use in the Work and for all labor and materials incidental to the completion of the Work. If evidence is produced before final settlement that the Contractor has at any time failed to pay for work or services of subcontractors or equipment employed on this Work or failed to pay for the materials used therein, or if the Ute Water Conservancy District has reason to suspect that such payments have not been made, the Ute Water Conservancy District may withhold from payments due sufficient moneys to cover these items. Upon satisfactory evidence to the Ute Water Conservancy District as to the amount due for such labor and materials used therein, the Ute Water Conservancy District may settle and pay for them, and charge the amount to the Contractor, or deduct them from any balance or balances due the Contractor. The production of receipts showing payment for labor and materials and payment of subcontractors may be required by the Ute Water Conservancy District before any partial or final payment is allowed or made.

GC-38 PUBLIC RELATIONS AND NOTIFICATIONS:

The Contractor shall carry on the Work in such manner as to cause as little inconvenience as possible to the public, particularly to occupants of property along the project, as is consistent with good workmanship. He shall notify occupants at least twenty-four (24) hours in advance of proposed Work that may block entrances or otherwise cause undue difficulty to occupants of property affected and shall restore such entrances to usable condition as soon as possible. The Contractor, Subcontractors and employees shall at all times be courteous to the public while engaged upon this Work.

The Contractor shall notify all business managers and residents affected by the interruption of utilities and other services caused by his operations. Such notice shall be given at least forty-eight (48) hours prior to the interruption of service. Notice shall be given for the interruption of domestic water, irrigation water, sewer, trash pickup, mail delivery and changes in access to property. Prior to interruption of domestic water service, a second notice shall be given no less than one (1) hour and nor more than four (4) hours prior to discontinuation of service.

Notifications may be verbal or in written form if the business manager or resident cannot be located. Water services shall not be discontinued for more than two (2) consecutive hours without special written permission from the Engineer.

Where trees, hedges, shrubs, or other ornamental plantings or structures within the construction limits are not designated to be protected or saved, the Contractor shall notify the owner of the property fronting the plantings or structures in question, not less than ten (10) Calendar Days prior to their removal. This notification shall include allowing the property owner the option to transplant the plantings or relocate structures fronting his property onto his property instead of having the Contractor remote them. The Contractor shall bid the project based on assuming responsibility for all removals.

All notifications described and required in this section are considered as incidental to the Work and will not be measured or paid for separately.

GC-39 PROTECTION AND RESTORATION OF PROPERTY AND LANDSCAPE:

The Contractor shall be responsible for the preservation of all public and private property and shall protect carefully from disturbance or damage all land monuments and property marks until

the Engineer has witnessed or otherwise referenced their location and shall not move them until directed.

The Contractor shall be responsible for all damage or injury to property of any character during the prosecution of the Work resulting from any act, omission, neglect, or misconduct in his manner of method of executing the Work, or any time due to Defective Work or materials, and said responsibility will not be released until the project shall have been completed and accepted or until any applicable warranty periods have expired, whichever is later.

When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct by the Contractor in the execution of the Work, or in consequence of the non-execution thereof by the Contractor, he shall restore, at his own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring as may be directed, or he shall make good such damage or injury in an acceptable manner.

The Contractor shall assume full responsibility and expense for the protection of all public and private property, structures, water mains, sewers, utilities, etc., both above and below ground, at or near the site or sites of the Work being performed under the Contract or which are in any manner affected by the prosecution of the Work or the transportation of men and materials in connection therewith. The Contractor shall give the required written notice in advance to owners of public and private property or utilities when they will be affected by the Work to be performed under the Contract and shall make all necessary arrangements with such owners for the removal and replacement or protection of such property or utilities.

Track equipment used on paved areas shall be fitted with pavement tracks, or other means shall be provided to protect the pavement. Such equipment shall be approved by the Engineer prior to use.

GC-40 CLEANING UP:

The Contractor shall be responsible for clean up and containment operations on a daily basis to prevent rubbish, debris, or other materials from blowing or spreading offsite. The Contractor shall remove and clean up all rubbish, debris, excess material, temporary structures, tools and equipment from streets, alleys, parkways and adjacent property, that may have been used or worked on by the Contractor in connection with the project, promptly as each section or portion is completed and ready for use, leaving the same in a neat and presentable condition. Payment of monthly or partial estimates may be withheld until this has been done to the satisfaction of the Engineer. Final acceptance and payment for the entire project will not be made until the clean up has been fully completed. In the event of failure to do so on the part of the Contractor, the clean up will be completed by the Ute Water Conservancy District at the expense of the Contractor.

The Contractor shall conduct his operations so as to not have equipment tracking excessive amounts of mud, gravel and earth onto the adjacent public streets. Upon notification by the Engineer, the Contractor may be required to clean from public streets mud and/or earth tracked by his equipment or that of material suppliers to the project. This authority will be exercised only where the amount of tracked mud and/or earth is considered excessive in the judgment of the Engineer. A certain amount of trackout from the project area is reasonably expected to occur. The extent of this condition is directed only at “excessive” trackout which would constitute a nuisance or hazard to motorists on public streets.

GC-41 ASSIGNMENT OR SUBLETTING:

The Contractor shall not assign or sublet the whole or any part of the Contract without the prior written consent of the Engineer. In no case shall the Contractor be permitted to sublet more than thirty percent (30%) of the total amount of the Contract, unless otherwise specified in the Special Conditions.

The Contractor will not employ any Subcontractor against whom the Ute Water Conservancy District may have reasonable objection, nor will the Contractor be required to employ any Subcontractor against whom he has reasonable objection. The Contractor shall not make any substitution for any Subcontractor who has been accepted by the Engineer, unless the Engineer determines that there is good cause for doing so.

The Contractor will be fully responsible for all acts and omissions of his Subcontractors and of persons directly or indirectly employed by them and of persons for whose acts any of them may be liable to the same extent that he is responsible for the acts and omissions of persons directly employed by him. Nothing in the Contract Documents shall create any contractual relationship between any Subcontractor and the Ute Water Conservancy District or any obligation on the part of the Ute Water Conservancy District to pay or to see the payment of any moneys due any Subcontractor, except as may otherwise be required by law. The Ute Water Conservancy District will furnish to any Subcontractor, to the extent practicable, evidence of amounts paid to the Contractor on account of specific work done.

GC-42 EXCESS MATERIAL:

Unless otherwise specified or directed by the Engineer, all excess excavated material, including miscellaneous concrete and bituminous pavement, shall become the property of the Contractor and shall be removed by him to a location approved by the Engineer.

Any radioactive material (as determined by the Colorado Department of Health) to be excavated, shall be removed by the Contractor to a site designated by the Colorado Department of Health. The Contractor shall make all arrangements for removing and disposing of this material.

Unless otherwise provided in the Bid Schedule, these operations will be considered incidental to the Work and will not be measured or paid for separately.

GC-43 STOCKPILING MATERIALS AND EQUIPMENT:

When approved by the Engineer, the Contractor may stockpile and store materials and equipment within public right-of-way so long as it does not obstruct pedestrian and traffic movement. All materials and equipment left at the end of the day shall be moved as far as possible from the traveled roadway and intersections. Should it not be possible to move equipment and materials from the shoulder of the roadway, such obstruction shall at least be marked with lit vertical panels in accordance with the Manual of Uniform Traffic Control Devices. The Contractor shall be responsible for obtaining, in writing, permission to use private property for storage of materials and equipment. Copies of these agreements shall be submitted to the Engineer.

GC-44 SURVEY REFERENCE POINTS:

All Work done under this Contract shall be done to the lines, grades and elevations shown on the plans or established by the Engineer.

The Contractor shall be held responsible for the proper preservation of all monuments, bench marks, reference points, and stakes. If any of them are disturbed or destroyed by the Contractor

or his employees, the cost of replacing them will be charged against the Contractor who will not be granted an extension of time or allowed any damages for delays resulting from such disturbance or destruction.

GC-45 CONSTRUCTION SURVEYING:

The Contractor shall be responsible for engaging the services of a qualified surveyor who is experienced and competent in construction surveying to perform calculations, layouts and staking for the Work. It shall be the responsibility of Contractor's Surveyor to provide the Contractor with all construction staking, cut/fill sheets and any other information required to construct the project.

The Ute Water Conservancy District will provide the necessary information for the Contractor's surveyor to determine proper horizontal and vertical control necessary to reference and stake the improvements.

Construction surveying, including surveying for "As Built" drawings, will be paid for in accordance with the items and prices established in the Bid Schedule.

GC-46 TRASH COLLECTION:

Prior to beginning any work which interferes with the collection of trash, the contractor shall notify the respective trash collection entity to have the dumpsters relocated out of the construction area. After construction is completed, the Contractor shall again notify the respective trash collection entities to have the dumpsters reset to their normal collection points.

VII DISTRICT'S RESPONSIBILITIES

GC-47 CLARIFICATIONS AND INTERPRETATIONS:

The Engineer shall issue, with reasonable promptness, such written clarifications or interpretations of the Contract Documents (in the form of drawings or otherwise) as he may determine necessary, which shall be consistent with or reasonably inferable from the overall intent of the Contract Documents. If the Contractor believes that a written clarification and interpretation entitles him to an increase in the Contract price, he may make a claim therefore, as provided.

GC-48 ORDERS TO CONTRACTOR'S AGENT:

When the Contractor is not present on any part of the Work where it may desired to give directions, orders may be given by the Engineer or his representative to, and shall be received and obeyed by, the Superintendent or Foreman who may have charge of the particular part of the Work in reference to which such orders are given.

GC-49 AUTHORITY AND DUTIES OF INSPECTORS:

Inspectors will be assigned by the Ute Water Conservancy District as authorized representatives to inspect all materials used and all Work done under the Contact. Such inspections may extend to all or any part of the Work and to the preparation or manufacture of the materials to be used. The inspectors will not be authorized to revoke, alter, enlarge or relax the provisions of the Contract Documents, nor to delay the fulfillment of the Contract by failure to inspect materials and Work with reasonable promptness. An inspector is assigned on the work to keep the Engineer informed as to the progress of the Work and the manner in which it is being done; also to call the attention of the Contractor to any infringement upon the Contract Documents and not to act as a foreman for the Contractor. The Inspector will have full authority to reject defective materials and Work subject to the final decision of the Engineer.

GC-50 INSPECTION OF WORK:

The Engineer and Inspectors shall, at all times, have the right and access to inspect the Work and materials. The Contractor shall furnish all reasonable aid and assistance required by the Engineer or Inspectors for the proper examining of the Work and all parts thereof. No Work shall be done or materials used without suitable supervision or inspections by the Engineer or the Inspector, and no Work shall be covered up or backfilled without the approval or consent of the Engineer or Inspector after inspections are completed.

Observations, inspections and tests by the Engineer, Inspector, or others, are for the express purpose of providing quality assurance. Such activities shall not relieve the Contractor from his obligations to perform the Work in accordance with the requirements of the Contract Documents.

All material and workmanship (if not otherwise designated by the Specifications) shall be subject to inspection, during manufacture and/or construction, and at any and all places where such manufacture and/or construction is carried on. The Ute Water Conservancy District shall have the right to reject defective material and workmanship or require its correction.

The Contractor shall promptly furnish, without additional charge, all reasonable facilities, labor, and materials necessary for quality assurance inspections or tests that may be required by the Inspectors. All inspections and tests by the Ute Water Conservancy District shall be performed in

such a manner as not to unnecessarily delay the Work. The type, quantity and minimum or acceptable range of results of performance tests shall be as described in the Specifications.

Only materials conforming to the requirements of these Specifications and approved by the Engineer shall be used in the Work. All materials proposed to be used may be tested at any time during their preparation and use. If, after trial, it is found that the sources of supply do not furnish a uniform product, or if the product from any source proves unacceptable at any time, the Contractor shall furnish approved materials from another approved source.

VIII CHANGES IN WORK OR CONTRACT PRICE

GC-51 ALLOWANCE FOR CHANGE:

Emergencies: In emergencies affecting the safety of persons, the Work or property at the site or adjacent thereto, the Contractor, without special instruction or authorization from the Ute Water Conservancy District, is obligated to act at his discretion to prevent threatened damage, injury or loss. He will give the Engineer prompt written notice of any significant changes in the Work or deviations from the Contract Documents caused thereby. If the Contractor believes that Additional Work done by him in an emergency which arose from causes beyond his control entities him to an increase in the Contract Price or an extension of the Contract Time, he may make a claim for equitable compensation.

Changed Conditions: Should the Contractor encounter, or the Ute Water Conservancy District discover, during the progress of the work subsurface or latent physical conditions at the site differing materially from those indicated in the Contract Documents; or unknown physical conditions at the site of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract, the Engineer shall be promptly notified in writing of such conditions. The Engineer will thereupon promptly investigate the conditions and, if he finds they do materially differ and merit an increase or decrease in the cost, or the time required. for performance of the Contract, an equitable adjustment will be made and the Contract modified in writing accordingly.

GC-52 LIMITATIONS AND CONDITIONS OF CHANGE:

Validity: Contract changes and directives which are initiated or approved by the Engineer shall not invalidate the Contract nor release the surety. The Contractor shall perform the Work as altered, the same as if it had been a part of the original Contract. Such approved changes become a part of the Contract Documents.

Limitations: The Ute Water Conservancy District may find it advisable and has the right to omit portions of the Work, to increase or decrease quantities, and reserves the right to add to or take from any items as may be deemed necessary or desirable. provided that such increase or decrease does not exceed twenty-five percent (25%) of the total monetary value of the original Contract, claim made by the Contractor for any loss of anticipated profits because of any such alteration, or by reason of any variation between the approximate quantities and the quantities of Work as done, will not be accepted. Should such changes be in excess of the twenty-five percent (25%) specified above, and if any claim is made because of increased or decreased cost of doing the Work occasioned by such excess, the Contractor shall file a complete cost statement showing, in detail, all costs in connection of such Work. Then if, in the opinion of the Engineer, an adjustment is warranted, it shall be made only on that portion of the work involved in the excess of the twenty-five percent (25%) increase or decrease.

Bond Changes: It is the Contractor's responsibility to notify his Surety of any changes affecting the general scope of the Work or changes in the Contract Price and the amount of the applicable Bonds shall be adjusted accordingly. The Contractor shall furnish proof of such adjustment to the Ute Water Conservancy District within ten (10) Working Days of the Executed Change Order which authorized the change.

Approval: With the exception of emergencies as described in GC-551 any Extra or Additional Work that is performed by the Contractor before receiving written directives and approved from

the Engineer as contained in the Standard Contract Documents for Capital Improvements Construction shall be at his own expense, and payment therefore shall not be made, nor shall the Contractor have claim for reimbursement thereof.

Field Order: The Engineer may authorize an option to, or direct minor variations in, the Work specified in the Contract Documents as amended, modified, or supplemented, which do not involve an adjustment in the Contract Price or the Contract Time and are consistent with the overall intent of the Contract Documents. These may be accomplished by a Field Order and will be binding on the Ute Water Conservancy District and also on the Contractor who shall perform the Work involved. If the Contractor believes that a Field Order justifies an increase in the Contract Price or an extension of the Contract Time, the Contractor may make a claim therefor within five (5) Working Days of the date of issuance of the Field Order.

Change Order Request: The Engineer may desire to make a change in the work or request additional work to that described in the Contract Documents. A Change Order Request shall be used to inform the Contractor of desired proposed changes, and to request the Contractor to submit a price for the proposed changes in the Work. The Engineer will review the costs and either direct the Contractor to proceed with the Work changes or withdraw the request. If the time required for preparation and execution of a formal Change Order would result in a delay or stoppage of the Work, or would allow a hazardous conditions to exist, the Engineer may authorize and direct the Contractor to proceed with the Changes described prior to the Change Order price or time extension being agreed upon. In this case, the Contractor must proceed with the Work Changes. The Change Order will be finalized following negotiations by the parties as to the increase or decrease in Contract price and/or extension in time.

Claim For Adjustments: Prior to or during the course of construction, Additional Work may be required which the Contractor believes provides justification for a change of Contract Price or Contract Time. These may include, but are not limited to: emergencies, changed conditions from those indicated in the Contract Documents and which would not ordinarily be encountered in the Work being performed or, an Engineer's interpretations or directives provided on a request for changes. Claims For Adjustment shall not be valid unless they are submitted to the Engineer:

1. Within two (2) Working Days of the Emergency or discovery of changed conditions which has resulted or may result in Additional work; or

2. Within five (5) Working Days after the issuance of a Field Order or request for changes or additional work, or other event occurs which causes the Contractor to believe that an adjustment is merited.

Method of Payment: A total price and/or time extension must be established and agreed upon for every Change Order that changes the Contract Price.

The four Methods of Payment for Change Orders allowed under this Contract are described as follows:

1. By unit prices for the same class Work included in the Contract; or

2. By agreed unit prices; or

3. By agreed lump sum; or

4. The Contractor shall be paid the “Actual Cost” of the Work plus fifteen percent (15%).

Where Extra Work is paid for under Method 4, the term “Actual Cost” of such Extra Work is hereby defined to be and shall include the following only with respect to the Extra Work:(a)The cost of all workmen such as foremen, timekeepers, mechanics and laborers; (b) All materials and supplies; (c) All trucks and rentals on machinery and equipment for the time actually employed or used in the performance of the said Extra Work; (d) Any transportation charges necessarily incurred in connection with any equipment authorized by the Engineer for use on said Extra Work which is not already on the job; (e) All power, fuel, lubricants, water and similar operating expenses. The Engineer may direct the form in which accounts of the actual field costs shall be kept and may also specify in writing before the Work commences the method of doing the Work and the type and kind of machinery and equipment, if required, which shall be used in the performance of Extra Work under Method “D”. In the event that machinery and heavy construction equipment be required for such Extra Work, the authorization and basis of payment for the use thereof shall be stipulated in the written Extra Work order. The fifteen percent (15%) of the actual field cost to be paid to the Contractor shall cover and be full compensation for the Contractor’s profit, overhead, general superintendence and field office expense and all other elements of cost not embraced within the “Actual Cost” as herein defined.

IX CHANGES IN CONTRACT TIME

GC-53 EXTENSION OF CONTRACT TIME:

The Contract Time may only be changed by a Change Order. Any Claim For Adjustment of the Contract Time shall be in writing delivered to the Engineer within the time limit as stipulated for changes in Contract Price. Any change in the Contract Time resulting from any such claim shall be incorporated in a Change Order.

The Contractor shall be considered as having taken account when submitting his Bid, which becomes a part of the Contract, all hindrances and delays incident to such work whether growing out of delays in securing materials or workers, or otherwise, and will not be granted an extension of time on account thereof. An extension of time will be granted for delays caused by inclement weather if, in the opinion of the Engineer, such delay was unavoidable. The amount of Contract Time allowed for such extension shall be determined from the Inspector's daily inspection reports.

The right of the Contractor to proceed shall not be terminated, nor will the Contractor be charged with Liquidated Damages because of any delays in the completion of the Work due to other causes that are beyond the control of the Contractor and which the Engineer shall decide could not have been anticipated or avoided, but an extension of time shall be granted by the Engineer, the amount of such extension of time to be determined by the Engineer, provided, however, that the Contractor shall give the Engineer notice in writing in the time frame stipulated of such delay and the cause thereof.

GC-54 DELAYS:

If the Contractor refuses or fails to prosecute the Work, or any inseparable part thereof, with such diligence as will insure its completion within the time specified in the Special Conditions or any extension thereof or fails to complete said Work within such time, the Ute Water Conservancy District may, by ten (10) Working Days written notice to the Contractor and his Sureties, terminate his right to proceed with the Work or such part of the Work as to which there has been a delay.

In such event, the Ute Water Conservancy District may take over the Work and prosecute the same to completion, by contract or otherwise, and the Contractor and his Sureties shall be liable to the Ute Water Conservancy District for any excess cost occasioned the Ute Water Conservancy District thereby. If the Contractor's right to proceed is so terminated, the Ute Water Conservancy District may take possession of and utilize in completing the Work such materials, appliances and plants as may be on the site of the Work and necessary therefore, provided that the right of the Contractor to proceed shall not be terminated because of any delays in the completion of the Work due to causes beyond the control and without the fault or negligence of the Contractor, such as acts of God or of the public enemy, acts of the Ute Water Conservancy District, freight embargoes, strikes, or delays of other contractors due to such causes, provided further that the Contractor shall, within five (5) days from the beginning of any such delay, notify the Engineer in writing of the causes of delay. The Engineer shall thereupon ascertain the facts and the extent of the delay and extent of time for completing the Work when, in his judgment, the finding of facts justify such an extension and his finding of facts thereon shall be final and conclusive on the parties hereto.

X WARRANTY AND GUARANTEE

GC-55 CONTRACTOR'S WARRANTY AND GUARANTEE:

The Contractor warrants and guarantees to the Ute Water Conservancy District that all materials and equipment will be new unless otherwise specified and that all work will be of good quality and free from faults or defects and in accordance with the requirements of the Contract Documents and of any inspections, tests or approvals required.

After approval of final payment and prior to the expiration of the Warranty Period, which is one year after the date of Substantial Completion unless specified otherwise in the Special Conditions, if any Work is found to be defective, the Contractor will promptly, without cost to the Ute Water Conservancy District and in accordance with the Engineer's written instructions, either correct such Defective Work or, if it has been rejected by the Ute Water Conservancy District, remove it from the site and replace it with non-Defective Work.

If, within ten (10) days after written notice by the Engineer to the Contractor or his agent requesting such repairs or replacement, the Contractor shall neglect to make or undertake with due diligence to the same, the Ute Water Conservancy District may make such repairs or replacement in accordance to the terms of the Contractor's Performance Bond at the Contractor's and/or Surety's expense, provided, however, that in the case of the emergency where, in the judgment of the Engineer, delay would cause serious loss or damage, repairs or replacement may be made without notice being sent to the Contractor.

The duties and obligations imposed by these General Contract Conditions and the rights and remedies available hereunder and, in particular but without limitation, the warranties, guarantees and obligations imposed upon the Contractor and the remedies available to the Ute Water Conservancy District thereunder, shall be in addition to and not a limitation of any otherwise imposed or available by law, by special guarantee or other provisions of the Contract Documents.

XI MEASUREMENT PAYMENT AND ACCEPTANCE

GC-56 GENERAL MEASUREMENT AND PAYMENT ISSUES:
Bid Schedule Quantities. Quantities listed in Bid Schedules will not govern final payment. Payment to the Contractor will only be made for actual quantities of Contract and Change Order items constructed and installed in accordance with Contract Documents.

Unauthorized and Non-Conforming Materials and Work. Payment will not be made for materials wasted, placed or installed in a manner not called for under the Contract. This includes rejected material not unloaded from vehicles, material rejected after it has been unloaded or placed, and material placed outside of the plan lines. Compensation will not be made for disposing of rejected or excess material, nor for Defective Work.

Limitations of Payment. Payment shall not relieve the Contractor from contractual obligations, nor shall such payment be construed to be acceptance of any of the Work. payment shall not be construed as the transfer of ownership of any equipment or materials to the Ute Water Conservancy District. Responsibility of ownership shall remain with the Contractor who shall be obligated to store, protect, repair, replace, rebuild or otherwise restore any fully or partially completed Work or structure for which payment has been made or replace any materials or equipment required to be provided under the Contract which may be damaged, lost, stolen or otherwise degraded in any way prior to acceptance of the Work under the Contract.

Extra or Changed Work. Unless a written Change Order is approved, extra or changed Work, or Work due to unforeseen circumstances, or Work requiring blasting, rock excavation, or other severe conditions, will not be paid for, and shall be at the Contractor's expense.

GC-57 PARTIAL PAYMENTS:
Partial payments will be based upon estimates, prepared by the Contractor, of the value of Work performed and materials placed in accordance with the Contract Documents. Said payments will be made no more than once each month.

Estimates for partial payment shall be prepared on, or in the format requested by, the Ute Water Conservancy District.

The Engineer may establish a closure date for the purpose of receiving monthly applications for payment from the Contractor. The Contractor may, at any time, request in writing that the monthly closure date be changed. The Engineer may approve such request when it is compatible with the Ute Water Conservancy District's payment policy and procedures.

The processing of applications for payment which are received after the specified closure date may be delayed until the closure date of the following month.

Applications for payment shall be completed according to the pay items, pay units, and unit prices listed in the Bid Schedule. Lump sum pay items may be estimated according to the percentage of each item completed.

All applications for payment are subject to review and approval by the Engineer. Pay estimates which exceed the value of Work performed and/or materials installed for the pay period may be reduced or rejected.

If payment is requested on the basis of materials and equipment delivered, but not incorporated in the Work, the application shall be included on the Request For Payment form. This form shall be accompanied by an invoice, proof of payment and other documentation for each item as required to establish the Ute Water Conservancy District's title to the material or equipment and protect its interest therein, including appropriate insurance.

After each application for payment has been certified by the Engineer and approved by the Board of Directors of the Ute Water Conservancy District, the District shall pay to the Contractor partial payment minus retainage as specified herein.

Partial payments will normally be made within ten (10) days after the second Wednesday of each month. If the Ute Water Conservancy District shall, at any time, fail to make the Contractor a payment at the time herein specified, such failure shall not be held to invalidate or void this Contract.

GC-58 RETAINAGE:

The Ute Water Conservancy District will deduct money from the partial payments in amounts considered necessary to protect its interest and ill retain this money until after completion of the entire Contract.

The amount to be retained from partial payments will be ten percent (10%) of the value of the completed work, but not greater than five percent (5%) of the amount of the Contract. When the retainage has reached five percent (5%) of the amount of the Contract, no further retainage will be made and this amount will be retained until such time as final payment is made.

GC-59 FINAL ESTIMATE AND PAYMENT:

After the Engineer has accepted the Work, he will prepare a final estimate of the Work done under the Contract and the value thereof, including all Extra Work properly authorized and performed in connection therewith. All prior estimates and payments shall be subject to correction in the final estimate and payment. but, in the absence of error or manifest mistake, it shall be understood that all estimates shall be conclusive evidence of the Work done and materials furnished. From the total amount of the final estimate, there shall be deducted first, all previous payments made to the Contractor under the Contract, and second, all damages and other charges properly chargeable to the Contractor under the terms of the Contract, and the balance, if any, shall be paid to the Contractor; provided, however, that prior to delivery to the Contractor of the final payment, the Contractor shall first furnish the Ute Water Conservancy District proof in documentary form that all claims, liens, or other obligations incurred by him and all of his Subcontractors in connection with performance of the Work have been properly paid and settled. This information shall be in affidavit form and shall bear the authorization of the Surety on the Performance Bond for the Ute Water Conservancy District to make final settlement with the Contractor.

The Contractor should understand that, in the event there are, at the time set for final settlement, outstanding claims against the Contractor, or his Subcontractors, or for any other reason the Contractor is unable to give a proper affidavit that liens or other obligations have been properly paid and settled, that the Ute Water Conservancy District may waive the requirement of the said affidavit provided the Surety on the Performance Bond will agree to the Ute Water Conservancy District making final settlement without in any way lessening or modifying the Surety's liability under such Performance Bond. In any event, when final settlement is made, it should be further

understood by the Contractor that the Ute Water Conservancy District shall withhold from payment any funds it may be required by law to withhold, and final payment shall not be made until, in the determination of the Ute Water Conservancy District, all conditions of law have been met.

Final settlement cannot be made by the Ute Water Conservancy District until any and all public legal advertisements have been made.

GC-60 ACCEPTANCE OF WORK:

1. Partial Acceptance. If, at any time during the prosecution of the project, the Contractor substantially completes a unit or portion of the project, and if the Engineer finds it to the Ute Water Conservancy District's benefit to place that unit into service, the Engineer may make an inspection of that unit. If the Engineer finds upon inspection that the unit has been satisfactorily completed in compliance with the Contract, he may issue a written notice of Substantial Completion accepting that unit or portion of the Work. Such partial acceptance shall in no way void or alter any of the terms of the Contract.

2. Final Acceptance. Upon due notice from the Contractor of presumptive completion of the entire project, the Engineer will make an inspection. If all construction provided for and contemplated by the Contract is found completed to his satisfaction, that inspection shall constitute the final inspection and the Engineer will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of the final inspection.

   If, however, the inspection discloses any Work, in whole or in part, as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of same, and the Contractor shall immediately comply with and execute such instructions. Upon correction of the Work, another inspection will be made which shall constitute final inspection provided the Work has been satisfactorily completed. In such event, the Engineer will make the final acceptance and notify the Contractor in writing of this acceptance as of the date of final inspection.

   The Contractor's obligation to perform the Work and complete the project in accordance with the Contract Documents shall be absolute. Neither approval of any partial or final payment by the Engineer, nor the payment by the Ute Water Conservancy District to the Contractor under the Contract Documents, nor any use or occupancy of the project or any part thereof by the Ute Water Conservancy District, nor any act of acceptance by the Ute Water Conservancy District, nor any failure to do so, nor any correction of Defective Work by the Ute Water Conservancy District shall constitute an acceptance of Work not in accordance with the Contract Documents.

XII SUSPENSION OF WORK AND TERMINATION

GC-61 SUSPENSION OF WORK:

The Ute Water Conservancy District may, at any time and without cause, suspend the work or any portion thereof for a period of not more than ninety days by notice in writing to the Contractor by the Engineer which shall fix the date on which Work shall be resumed. The Contractor will be allowed an increase in the Contract Price or an extension of the Contract Time, or both, directly attributable to any suspension if he makes a claim therefore as provided.

Such order by the Engineer shall not otherwise modify or invalidate in any way any of the provisions of the Contract.

GC-62 TERMINATION OF CONTRACT:

If the Work to be performed under the Contract is assigned by the Contractor other than provided for herein; if the Contractor should be adjudged as bankrupt; if a general assignment of his assets be made for the benefit of his creditors; if a receiver should be appointed for the Contractor or any of his property: if at any time the Engineer shall certify in writing to the Ute Water Conservancy District that the performance of the Work under the Contract is being unnecessarily delayed or that the Contractor is willfully violating any of the conditions, provisions, or covenants of the Contract, or that he is executing the same in bad faith or otherwise not in accordance with the terms of the Contract; if the work be not fully completed within the time named for its completion or within the time to which such completion date may be extended; or if other just causes exist, then the Ute Water Conservancy District may serve ten (10) days written notice upon the Contractor of the intent to terminate the Contract and, if the Contractor shall not, prior to the effective date of termination set forth in such notice, take such measures as will, in the judgment of the Ute Water Conservancy District, insure the satisfactory performance of the Work, the Ute Water Conservancy District may declare the Contract terminated on the Effective Date specified in such notice, or any date subsequent thereto. In the event of such termination, the Engineer shall notify the Contractor to discontinue all Work under the Contract and the Contractor shall immediately respect such notice and stop work and cease to have any right to the possession of the ground and shall forfeit his Contract. Upon such termination, the Engineer for the Ute Water Conservancy District may take possession of all such materials, equipment, tools and plants as may be on the site of the Work and required or necessary for completion of the Work and take over the Work and prosecute the same to completion, by Contract or otherwise, for the account and at the expense of the Contractor and the Contractor and his Surety shall be liable to the Ute Water Conservancy District for any and all costs and expenses in excess of the Contract price or prices sustained by the Ute Water Conservancy District by reason of such prosecution and completion, including all administrative costs in connection therewith.

Where the Contractor's services have been so terminated by the Ute Water Conservancy District, said terminations shall not affect any rights of the Ute Water Conservancy District against the Contractor then existing or which may thereafter accrue. Any retention or payment of moneys by the Ute Water Conservancy District due the Contractor will not release the Contractor from liability.

XIII CLAIMS AND DISPUTES

GC-63 CLAIMS FOR ADDITIONAL COMPENSATION:

If, in any case, the Contractor deems that additional compensation is due him for work or material not clearly covered in the Contract or not ordered by the Engineer as Extra Work, as defined herein, the Contractor shall notify the Engineer in writing of his intention to make claim for such additional compensation before he begins the work on which he bases the claim. If such notification is not given and the Engineer is not afforded proper facilities by the Contractor for keeping strict account of actual cost as required, then the Contractor hereby agrees to waive any claim for such additional compensation. Such notice by the Contractor, and the fact that the Engineer has kept account of the cost as aforesaid, shall not in any way be construed as proving or substantiating the validity of the claim. If the claim, after consideration by the Engineer, is found to be just, it will be paid as Extra Work as provided herein.

GC-64 DISPUTES WITH THE ENGINEER:

If the Contractor considers any work demanded of him to be outside the requirements of the Contract, or considers any record or ruling of the Engineer or of the Inspectors to be unfair, he shall immediately upon such work being demanded or such record or ruling being made, ask in writing for written instruction or decision, whereupon he shall proceed without delay to perform the work or to conform to the record or ruling, and within ten (10) days after date of receipt of the written instructions or decision, he shall file a written protest with the Engineer stating clearly and in detail the basis of his objection. The dispute will then be put to the attention of the Board of Directors of the Ute Water Conservancy District and their decision shall be a final decision for the purpose of appeal.

Except for such protests or objections as are made of record in the manner herein specified and within the limit stated, the records, rulings, instruction, or decisions of the Engineer shall be final and conclusive. Instructions and decisions to the Contractor shall be considered as written instructions or decisions subject to protest or objections as herein provided.

GC-65 UNRESOLVED DISPUTES:

If disputes remain unresolved, the Contractor and the Ute Water Conservancy District shall submit to arbitration. If arbitration is unsuccessful, the Contractor and/or the Ute Water Conservancy District expressly reserve(s) the right to file a cause of action pursuant to the Colorado Rules of Civil Procedure. A final determination from said arbitration shall be a precondition to other action being taken.

XIV TAXES

GC-66 MATERIALS:

The Ute Water Conservancy District is exempt from sales and use tax on construction materials to be incorporated as an integral and inseparable part of the finished project, which then becomes the property of the Ute Water Conservancy District.

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SECTION FOUR

TECHNICAL SPECIFICATIONS

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DIVISION 1

GENERAL REQUIREMENTS

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SECTION 01040
MOBILIZATION, BONDS, PERMITS AND INSURANCE

PART 1: GENERAL

1.01 SCOPE

a. This section includes but is not limited to work necessary to move in personnel and equipment, set up all offices and facilities and prepare for construction and provide necessary permits, licenses, construction bonds and required insurance.

PART 2: PRODUCTS

None

PART 3: EXECUTION

3.01 GENERAL

a. Set up construction facilities in a neat and orderly manner within designated or approved work area. Supply all labor and equipment necessary to accomplish the work as specified. Conform to applicable requirements of these Contract Documents, including but not limited to:

1) Required notifications
2) Protection of surveying monuments and other markers
3) Temporary traffic control
4) Temporary utility connections
5) Protection of property
6) Dust control

b. Move personnel, equipment, supplies, and incidentals to the project site. Establish offices, buildings, and other facilities necessary for work required.

c. Provide required bonds and insurance prior to issuance of the Notice to Proceed.

d. The Contractor shall coordinate the procurement all permits, and procure performance bonds and licenses required by all approving agencies and pay all associated fees.

e. Contractor to conform to all permit requirements, including providing forty-eight (48) hours notice to approving agencies, and all utilities prior to the start of construction.

f. When the agencies with an interest in the project require the posting of signs for public notification, the Contractor shall post such signs in conformance with the requirements of the respective agencies. The Owner will provide the sign placards, and the Contractor shall be responsible for supplying the materials necessary to post the signs and notifications.

PART 4: SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

a. When not listed in the proposal, all "MOBILIZATION, BONDS, PERMITS AND INSURANCE" costs will be considered incidental work for which no separate payment will be made.

b. When listed in the proposal, payment for "Mobilization, Bond and Insurance" to be made at the lump sum price named in the Proposal in accordance with the following schedule:

% of Contract Earned**	% Mobilization, Bonds, Permits, Insurance Paid
10	50
15	75
20	100

**Exclusive of payment for "Materials on Hand."

c. No bid will be accepted for "Mobilization, Bonds, Permits and Insurance" when listed as a separate pay item in the Proposal and is more than 20 percent (20%) of the total original contract price bid.

END OF SECTION

SECTION 01043
COORDINATION AND CONTROL OF THE WORK

PART 1: GENERAL

1.01 SCOPE

a. This section includes coordination and control of the work.

PART 2: PRODUCTS

None

PART 3: EXECUTION

3.01 FIELD RECORD PLANS

a. Contractor shall maintain one complete set of plans at the construction site whereon he will record any approved deviations in construction from the approved plans. Prior to final payment, the Contractor shall provide the following record information on a clean set of blue-line drawings which shall be submitted to the Engineer or Ute Water District:

1. Water Mainline - Station and depth of all fittings, valves and service taps.

2. Water Services - Length from mainline and side tie to property pin.

3. Existing Utilities - Station locations and depth at crossings.

3.02 CONFORMITY WITH DRAWINGS AND ALLOWABLE DEVIATIONS

a. Finished surfaces in all cases shall conform with lines, grades, cross sections and dimensions shown on the approved drawings. Deviations from the approved drawings and working drawings will in all cases be determined by the Engineer and authorized in writing.

3.03 PROTECTION OF EXISTING FACILITIES

a. The Contractor shall protect from damage due to his operations, all existing facilities including but not limited to survey monuments, fence lines, trees, underground utilities, drainage facilities, landscaping, roadway surfaces etc., which are not specifically designated for removal or alteration. The locations of these facilities as shown on the plans were derived from the best information available. However, the completeness and accuracy of these locations as shown is not guaranteed. It shall be the responsibility of the Contractor to verify the existence and locations of underground facilities in advance of construction. Any existing facilities not designated for removal or alteration, which are damaged by the Contractor's operations shall be restored or replaced to an "in kind" or better condition at the expense of the Contractor. The Contractor shall notify all public and private utility companies serving in the area in advance of construction, so underground utility locations can be confirmed and existing facilities relocated if necessary to facilitate construction. Make excavations and borings ahead of work, as necessary, to determine the exact location of interfering utilities or underground utilities.

3.04 PROTECTION OF PROPERTY

a. Protect all public and private property, insofar as it may be endangered by operations and take every reasonable precaution to avoid damage to such property.

b. Restore and bear the cost of any public or private improvement, facility, or structure within the right-of-way or easement which is damaged or injured directly or indirectly by or on account of any act, omission, or neglect in the execution of the work and which is not designated for removal but visibly evident or correctly shown on the plans. Restore to a condition substantially equivalent to that existing before such damage or injury occurred, by repairing, rebuilding, or otherwise affecting restoration thereof, or if this is not feasible, make a suitable settlement with the Owner of the damaged property, all at no expense to the Owner.

c. Give reasonable notice to occupants of buildings on property adjacent to the work to permit the occupants to remove vehicles, trailers, and other possessions as well as salvage or relocate plants, trees, fences, sprinkler systems, or other improvements in the right-of-way which are designated for removal or which might be destroyed or damaged by work operations.

d. Review with Engineer the location, limits and methods to be used prior to clearing work. Clearing and grubbing shall be performed in strict compliance with all local, State and Federal laws.

e. The Contractor shall be responsible for the protection of public and private property adjacent to the work and shall exercise due caution to avoid damage to such property.

f. Trees, lawns, and shrubbery that are not to be removed shall be protected from damage or injury. If damaged or removed because of the Contractor's operations, they shall be restored or replaced in as nearly the original condition and location as is reasonably possible. Lawns shall be reseeded after replacement of topsoil and covered with suitable mulch except as noted otherwise.

g. The costs to the Contractor for protecting, repairing, removing, replacing, or restoring existing improvements not required as a part of this work shall be incidental to other bid items.

3.05 REMOVAL OF DEFECTIVE OR UNAUTHORIZED WORK

a. All work which does not conform to the requirements of these Contract Documents shall be considered as unacceptable. Immediately remove unacceptable and defective work found to exist prior to acceptance of or final payment for the work. Replace with work and materials which conform to the Contract Documents, or remedy otherwise in an approved manner. This provision shall have full effect regardless of the fact that the unacceptable work may have been done or the defective materials used with the full knowledge of the Inspector.

3.06 HOURS OF WORK

a. Construction working hours shall be from 7:00 A.M. to 6:00 P.M. local time, Monday through Friday, excluding Federal, State and local holidays, unless otherwise approved by the Owner and Engineer.

3.07 RESTORATION AND CLEANUP

a. Periodically, or as directed by the Engineer, as the work progresses, and immediately after completion of the work, clean up and remove all refuse, debris, equipment, and unused materials of any kind resulting from the work. Upon failure to do so within 72 hours after directed, the work may be done by the Owner or third party and the cost thereof be deducted from any payment due the Contractor.

b. As a condition precedent to final acceptance of the project, remove all equipment and temporary structures, and all rubbish, waste and general clean up the right-of-way and premises to conform substantially to conditions as they existed before the commencement of work, as approved.

3.08 FINAL INSPECTION

a. When all construction work on the project is complete and all extra work bills, forms and documents required under the Contract are submitted, notify the Engineer in writing. Engineer will make an inspection of the project and project records within 15 days of receiving said notice. If, at such inspection, all construction provided for and ordered under the Contract is found completed and satisfactory and all certificates, bills, forms, and documents have been properly submitted, such inspection shall constitute final inspection.

b. If work is found unsatisfactory, or if all certificates, bills, forms and documents have not been properly submitted, the Engineer will so notify the Contractor. After corrections are made, or all certificates, bills, forms, or documents are properly submitted, notify the Engineer in writing. Engineer will make another inspection within five (5) days after such notice, and if all work is satisfactory, then this inspection shall constitute the final inspection.

3.09 WARRANTY BOND

a. The Contractor shall be responsible for a period of one year after written acceptance of improvements by Approving Agencies for all workmanship and materials furnished for the improvements. Prior to final payment, Contractor shall provide a one-year warranty bond. One-year period to begin upon Approving Agencies final acceptance of all work. The bond shall be in a form acceptable to Owner and Approving Agency.

3.10 VERBAL AGREEMENTS

a. No verbal agreement or conversation with any officer, agent or employee of the Owner, either before or after execution of the Agreement, shall affect or modify any of the terms or obligations contained in any of the documents comprising the Agreement. Any such verbal agreement or conversation shall be considered as unofficial information and in no way binding upon the Owner.

3.11 COOPERATION OF CONTRACTOR

a. The Contractor shall conduct his operations so as to interfere as little as possible with those of the Owner, other Contractors, utilities, or any public authority on or near the work. The Owner reserves the right to perform other work by Contract or otherwise; to permit other public bodies, public utility companies and others to do work on or near the project during progress of the work. If a conflict arises, the Owner shall determine when and how the work shall proceed.

Claims for delay or inconvenience due to operations of such other parties on work indicated or shown on the drawings will not be allowed.

3.12 MANDATORY PROJECT SUPERINTENDENT

a. The Contractor shall designate one person as primary project superintendent to oversee and coordinate construction. The superintendent shall be capable of reading and thoroughly understanding the plans and specifications, thoroughly experienced in the type of work being performed. If the Contractor is a joint venture, designate one person from the joint venture organization, with these qualifications, to act as project superintendent. This person's work time shall be devoted exclusively to this project to ensure that work coordination, quality and time lines are met.

b. For short periods of time during the performance of minor or incidental portions of the work, the Contractor may designate another person to act for the superintendent. This designation shall be in writing, stating the person's name, duration of appointment and scope of authority. The acting superintendent shall be available to the Engineer at all times for contact by telephone or radio.

c. Failure to provide the superintendence required by these provisions is sufficient cause for termination of the Contract, or other action the Engineer may deem to be appropriate.

3.13 EMERGENCY MAINTENANCE SUPERVISOR

a. The Contractor shall submit to the Owner/Engineer the names, addresses and telephone numbers of two employees responsible for performing emergency maintenance and repairs when the Contractor is not working. These employees shall be designated, in writing by the Contractor, to act as his representatives and shall have full authority to act on his behalf.

3.14 CONDUCT

a. The Contractor and his men shall at all times be civil and courteous around private citizens and property owners. If ever directed to leave private property by the property owner or his representative, the Contractor and his personnel shall do so immediately. If any property owner or his representative makes demands, the Contractor is to remain courteous and report the matter to the Engineer. No foul language, obscene gestures, or rudeness directed to private citizens will be tolerated. Radios and personal stereos (including walkmans) will not be permitted. If, in the Engineer's opinion, the Contractor or any of his men fail to conduct themselves as stipulated or follow the direction of the

Engineer, the Engineer shall bar the offending individual from the project. His order shall be final.

3.15 TRESPASS

a. The Contractor will be solely responsible for any trespass upon private property or injury thereto resulting from or in connection with his operations. He will be liable for any claims made because of his trespass or his deposit of debris of any kind on private property.

3.16 USE OR POSSESSION PRIOR TO FINAL COMPLETION

a. The Owner or his agents shall have the right to take possession of or use for his own benefit any completed or partially completed part of the work. Such possession or use shall not be deemed an acceptance of the occupied portion of the project. While the Owner is in such possession, the Contractor shall be relieved of the responsibility for injury or damage to the said completed portion of the work other than that resulting from the Contractor's fault or negligence. Continued operation or use of facilities being rehabilitated shall not be construed as use or possession prior to final completion.

b. Prior to the Owner or his agents taking possession of or using any completed or partially completed part of the work, written notice shall be given by the Engineer to the Contractor at least 24 hours in advance of the Owner actually assuming possession.

3.17 UNAUTHORIZED WORK

a. Work done beyond the lines shown on the drawings or ordered, work done without required inspection, except as herein provided, or any extra work done without authority will be considered as unauthorized and will not be paid for under the

provisions of these Contract Documents. Work so done may be ordered removed at the Contractor's expense. Work done without lines and grades being given may also be considered as unauthorized and will be subject to rejection.

3.18 SUBSURFACE DATA

a. All information obtained by Engineer regarding subsurface conditions and groundwater elevations will be available for inspection at the office of the Engineer upon request.

b. Logs of test holes, test pits, soils reports, groundwater levels, and other supplementary subsurface information are offered as the best available information of underlying materials and conditions at the locations actually tested. The Owner will not be liable for any loss sustained by the Contractor as a result of any variance between conditions contained in or interpretations of test reports and the actual conditions encountered during progress of the work.

c. Contractor shall examine the site and available records. The submission of a Proposal shall be conclusive evidence that the Bidder has investigated and is satisfied as to the subsurface conditions to be encountered as to the character, quality, and quantities of work to be performed and materials to be furnished, and as to the requirements of the Contract Documents.

3.20 TEMPORARY WATER,

a. The Contractor shall provide all water, required to construct and protect the work until the work is placed in service by the Owner for beneficial use of the Owner. The source for temporary water shall be from the Owner's distribution system.

3.21 BARRICADES

a. The Contractor must provide and maintain proper barricades, fences, signal lights, flares or watchmen to properly protect the work, equipment, persons, animals and property against injury.

b. In areas of public travel and/or on all approaches leading to this work, all barricades and obstructions shall be illuminated at night. All lights for this purpose shall be kept burning from sunset to sunrise.

c. Temporary traffic control devices and facilities shall be furnished, erected and maintained in accordance with all Local and State requirements.

3.22 MAINTAINING TRAFFIC

a. Where Contract work is within streets or other public thoroughfares, the Contractor shall so plan and schedule his work as to cause as little interference with general public traffic. Street surfaces shall be maintained and kept clean where construction work under this Contract has been performed until inspection and acceptance of all such work.

b. Access of fire, police and ambulance vehicles to property abutting and adjacent to such thoroughfares shall be maintained whether or not permission has been granted to restrict other traffic. The Contractor shall obtain all permits from Municipal, County, State or other authority having jurisdiction over traffic in thoroughfares, and shall comply with all regulations and directions of such authority concerning erecting barricades and detouring movement of traffic.

c. The Contractor shall maintain the roads for operating personnel, deliveries of operating supplies, normal maintenance vehicles and other equipment incidental to the operation and maintenance of the Owner's facility.

3.23 DISPOSAL OF DEBRIS

a. All debris resulting from construction operations, i.e., packaging, waste materials, damaged equipment, etc., shall be trucked from the site by the Contractor and disposed of at an approved off site location.

b. The Contractor shall police the hauling of debris to ensure that all spillage from haul trucks is promptly and completely removed.

c. All debris shall be disposed of in accordance with Federal, State and City rules and regulations.

d. Excavated materials not suitable or not required for backfill or embankment shall be deposited on one or both of the following waste sites:

    1. Waste sites designated in the Contract Documents.

    2. Waste sites provided by the Contractor.

e. All costs for disposing of this excess material shall be incidental to other items of work contained in the Proposal unless otherwise specified.

f. Either type of waste site shall be operated in such a manner as to meet all safety and health requirements of State and local agencies. Sites, operations, or the result of

such operations, which create a nuisance problem, or which result in damage to public or private properties will not be permitted.

g. Permits for dumping on sites designated in the Contract Documents will be provided by the Owner. Contractor shall obtain permits for other sites at no expense to Owner. Furnish copies of issued permits to Engineer prior to commencing filling operations.

3.24 SANITARY REGULATIONS

a. Toilet accommodations shall also be maintained for the use of the employees on the work. The accommodations shall be in approved locations, properly screened from public observance and shall be maintained in a strictly sanitary manner. The Contractor shall obey and enforce all other sanitary regulations and orders and shall take precautions against infectious diseases. The Contractor shall maintain at all times, satisfactory sanitary conditions around all all parts of the work all in accordance with all Federal, State and Local ordinances, regulations and requirements.

3.25 DUST CONTROL

a. The Contractor shall apply water or dust palliative, or both, for the alleviation or prevention of dust nuisance caused by his operations. Dust control operations shall be performed by the Contractor at the time(s) as required or as ordered by the Owner. Failure of the Owner to issue such order will not relieve the Contractor of this responsibility. Unless otherwise specified, no direct payment will be made for any such work performed or material used to control dust under these Contract Documents. The Contractor shall comply with all Federal, State and Local ordinances, regulations and requirements.

3.26 SMOKE PREVENTION

a. Strict compliance with all ordinances regulating the production and emission of smoke will be required and the Contractor shall accept full responsibility for all damage that may occur to property as a result of negligence in providing required control. The Contractor shall comply with all Federal, State and local regulations.

3.27 CONTROL OF NOISE

a. The Contractor shall eliminate noise to as great an extent as possible at all times. Air compressors shall be equipped with silencers and the exhaust of all gasoline motors and other power equipment shall be provided with mufflers. In the vicinity of hospitals, libraries and schools, precautions shall be taken to avoid noise and

other nuisance. The Contractor shall require strict observances of all pertinent ordinances and regulations.

3.28 USE OF EXPLOSIVES

a. The use of explosives shall not be permitted.

3.29 WEATHER CONDITIONS

a. In the event of temporary suspension of the work or during inclement weather, or whenever the Engineer shall direct, the Contractor shall carefully protect (and cause his Subcontractors to similarly protect) all work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any work or materials have been damaged by reason of failure on the part of the Contractor or any of his Subcontractors to so protect his work, such materials shall be removed and replaced at the expense of the Contractor.

3.31 FAIR EMPLOYMENT PRACTICES ACT

a. The Contractor agrees that neither he nor his Subcontractors will discriminate against any employee or applicant for employment, to be employed in the performance of this Contract, with respect to his hire, tenure, terms, conditions or privileges of employment, or any matter directly or indirectly related to employment, because of his race, color, religion, national origin or ancestry. Breach of this covenant shall be regarded as a material breach of this Contract.

3.32 CONSTRUCTION ACCESS

a. The Contractor shall be responsible for design, construction and maintenance of any and all structures required for access to the site for construction or delivery of materials, including but not limited to construction access roads. The Owner's responsibility to provide access easements or right-of-ways to the construction site shall not be interpreted as relieving the Contractor of his responsibilities under this section.

PART 4: SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

a. When not listed in the proposal, all "COORDINATION AND CONTROL OF THE WORK" costs will be considered incidental work for which no separate payment will be made.

4.02 COORDINATION OF WORK

a. The Contractor shall cooperate with the Owner's field representative for coordination and expeditious execution of his work in relation to total project work required.

4.03 TECHNICAL REQUIREMENTS

a. All materials and workmanship shall conform to all Federal, State and Local codes and the technical specifications contained herein.

b. All materials and workmanship for facilities in street right-of-way or easements shall conform to approving agencies' construction specifications. The Contractor must review the construction specifications and take these requirements into consideration in the preparation of his bid.

END OF SECTION

SECTION 01090
REFERENCE STANDARDS

PART 1: GENERAL

1.01 SCOPE

This Section includes reference standards.

1.02 DESIGNATION OF ASSOCIATIONS, INSTITUTIONS, SOCIETIES AND STANDARDS

a. Whenever in these Specifications reference is made to Associations, Institutions, Societies or Standards, they will be designated as follows:

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADA	American Disability Act
AGA	American Gas Association
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWS	American Welding Society
AWWA	American Water Works Association
BLIS	Bureau of Labor and Industries Standards
BLM	Bureau of Land Management
CDOT	Colorado Department of Transportation
CISPI	Cast Iron Soil Pipe Institute
COE	Corps of Engineers
CRSI	Concrete Reinforcing Steel Institute
DEQ	Department of Environmental Quality
CDPHE	Colorado Department of Public Health and the Environment
EPA	Environmental Protection Agency

FHWA	Federal Highway Administration
FS	Federal Standards
IRI	Industrial Risk Insurance
ISA	Instrument Society of America
ISO	Insurance Service Office
ITE	Institute of Traffic Engineers
MUTCD	Manual of Uniform Traffic Control Devices
NBS	National Bureau of Standards
NEC	National Electrical Code
NESC	National Electric Safety Code
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NLMA	National Lumber Manufacturer's Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
SSPC	Steel Structures Painting Council
UBC	Uniform Building Code
UFC	Uniform Fire Code
UL	Underwriter's Laboratories, Inc.
UPC	Uniform Plumbing Code
USBM	United States Bureau of Mines
WWPA	Western Wood Products Association

Wherever specific standard numbers are indicated, i.e., ASTM C-150, it shall be understood to mean the latest revision thereof.

PART 2: PRODUCTS

None

PART 3: EXECUTION

None

PART 4: SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

a. When not listed in the proposal, all "REFERENCE STANDARDS" costs will be considered incidental work for which no separate payment will be made.

END OF SECTION

SECTION 01300
CONSTRUCTION SUBMITTALS

PART 1: GENERAL

1.01 SCOPE

a. This section includes requirements for construction submittals.

1.02 COORDINATION OF SUBMITTALS

a. All submittals to the Owner's Representative, with the exception of the laboratory test certificates, shall be made only by the Contractor. Direct submittals from subcontractor or suppliers will not be accepted.

b. All submittals shall reference the Specification item that it covers, the Contractor's name, the Contract title and location, and the date of submission. Submittal shall also indicate whether the information is for the Owner's Representative's review and approval, for record purposes or for the fulfillment of the operation and maintenance requirements.

c. Prior to Submitting Information to the Engineer:

1) The Contractor shall carefully review the correctness and thoroughness of the material, verify all field measurements, and coordinate all aspects of each item being submitted.

2) The Contractor shall verify his review by affixing his stamp of approval and signature to each page of each required copy of the submittal.

PART 2: PRODUCTS

2.01 GENERAL

a. Three Categories of Information Are Normally Required:

1) Information for record.
2) Information for the Engineer's review and approval
3) Operation and maintenance information.

b. All submittals shall be tailored to the project by highlighting appropriate information and/or deleting or crossing out non-applicable information. All options furnished shall be so indicated.

c. Manufacturers submitting proposals for equipment which will require changes to the design shown on the drawings or specified herein shall also include detailed information on structural, electrical, mechanical and other miscellaneous changes or modifications required to adapt their equipment to the design shown.

2.02 INFORMATION FOR RECORD

a. Laboratory Certificates: Certificates shall include the results of tests by an independent laboratory for comparison to Specification requirements, mix design data and approval, plan inspection reports and certification, and other required information from the laboratory. All information submitted shall be signed by an authorized agent of the laboratory.

b. Licenses and Permits: The Contractor shall obtain all licenses and permits required by Local, State and Federal laws and submit copies of them to the Engineer.

c. Installation and Calibration Certificates: Certificates shall be submitted for equipment as indicated in the individual sections. These certificates shall indicate manufacturer's satisfaction with the installation, the accuracy of calibration and alignment, and the operation of the equipment. Such certificates must be signed by an authorized agent of the manufacturer.

d. Manufacturers' Literature: Literature indicating the compliance of the product with the Specifications shall be included with all submittals. This shall include catalogs and other descriptive bulletins. Relevant portions of the literature shall be clearly identified by highlighting or under lining.

e. Manufacturers' or Suppliers' Certificates: Certificates shall state that the products have been sampled and tested in accordance with the proper industrial and governmental standards and meet the requirements of the Contract Documents. Certificates shall be signed by an authorized agent of the manufacturer.

f. Design Data: Design data shall include the calculations, supporting theories, safety factors and assumptions used in designing the product.

g. Samples: Samples shall be provided as required in the individual sections. Samples shall be of the precise material proposed to be furnished. The number of

samples and sample size shall be of the industry standard unless otherwise stated in the individual sections.

h. Substitutions: Submittals for substitute materials or equipment shall include but not be limited to manufacturer's literature, design criteria, dimensions and installation instruction. The submittal shall also include any certifications or test results required to demonstrate that the proposed materials or equipment meets the requirements of the specifications and is equivalent or better than the specified materials or equipment.

2.03 INFORMATION FOR THE ENGINEER'S REVIEW AND APPROVAL

a. Construction Schedules: Unless otherwise specified, construction schedules shall include:

1) Prior to starting construction of this Contract, the Contractor shall submit through the Engineer for the Owner's review four (4) copies of a schedule, in the form of a bar chart, of the proposed operations. The schedule shall be complete and show in detail the manner in which he proposes to complete the work within the specified time. The schedule shall include purchase lead time and delivery schedule for major equipment. The Engineer will distribute copies of the approved schedule to the Owner, the Contractor and the Owner's Representative.

2) The Contractor shall update the construction schedule monthly to show the work completed and any changes in the schedule.

b. Shop Drawings: Shop drawings shall include the following along with any special requirements listed in the individual Specification Sections:

1) Scaled details
2) Scaled dimensional drawings
3) Sectional assembly drawings
4) Fabrication information
5) Installation instructions and drawings
6) Wiring schematics with termination point identification
7) Motor information, Electric Motors
8) Piping schematics
9) Materials of construction
10) Manufacturer's name and model
11) Manufacturer's catalog data

c. The Contractor shall indicate on the submittals all variances from the Specifications.

2.04 OPERATION AND MAINTENANCE INFORMATION

a. The Contractor shall furnish four (4) copies of information for all equipment requiring maintenance.

b. This information will be accepted only if properly identified with Contract Section Numbers and only after revised, where necessary, to conform to the Owner's Representative notes on previous submittals that have been "Approved as Noted." Manuals shall be tailored to suit the specified equipment provided.

c. Submittals shall include but not be limited to the following:

1) Descriptive literature, bulletins or other data covering the equipment or system.
2) Complete list of equipment and appurtenances included with the system, complete with manufacturer and model number.
3) Utility requirements.
4) General arrangement drawing.
5) Sectional assembly.
6) Dimension print.
7) Materials of construction.
8) Certified performance curve.
9) Performance guarantee.
10) Parts list with assembly drawings.
11) Recommended spare parts list with part and catalog number.
12) Lubrication recommendations and instructions.
13) Schematic wiring diagrams.
14) Schematic piping diagrams.
15) Description of associated instrumentation.
16) Drive dimensions and data.
17) Operating instructions.
18) Maintenance instructions including trouble shooting guidelines, lubrication and preventive maintenance instructions with task schedule.
19) Special tools and equipment required for operation and maintenance.
20) Description of equipment controls.
21) Pump seal data
22) Assembly, installation, alignment, adjustment and checking instructions.
23) Confirmation of all corrections noted on shop drawings "Approved as Noted."

24) Suppliers name, address and telephone number along with manufacturers job number and/or Purchase order number.

d. All manuals shall be tailored to the project by high lighting appropriate information and/or deleting or crossing out non-applicable information. All options furnished shall be indicated.

e. Manuals shall be printed on heavy, first quality paper, 8-1/2" x 11" size with standard three hole punching. Large manuals shall be submitted in three ring binders. Drawings shall be reduced to 11" x 17". Where reduction is not possible, larger drawings shall be folded separately and placed in envelopes which are bound into the manual. A Table of Contents and index tabs shall be furnished for all manuals containing data for three or more items of equipment.

f. Equipment shall not be considered substantially complete until all associated O & M submittals are accepted by the Engineer.

g. Field modifications to equipment during installation shall be included in the manual so that the manual reflects as-built conditions. Revisions to the manual may be submitted for incorporation into the manual where appropriate. However, the Engineer reserves the right to return all four manuals for revision to reflect as-built conditions.

2.05 OTHER SUBMITTALS

a. Other submittals are required under various sections of these Specifications.

PART 3: EXECUTION

3.01 GENERAL

a. Delivery prior to approval of any material or equipment for which submittals are required will be at the Contractor's risk. Material or equipment for which submittals are required shall not be incorporated into the work until after the submittals have been reviewed and approved.

b. Any material or equipment on-site which is rejected by the Owner's Representative after review of submittals shall be removed from the job site by the Contractor within two (2) working days of notification of rejection.

3.02 DISTRIBUTION

a. Distribution of submittals shall be as follows unless otherwise directed in the individual Sections:

1) Information for Record - The Contractor or the laboratory shall submit one (1) copy of all test certificates, licenses, permits and installation and calibration certificates directly to the Owner's Representative.

2) Information for Engineer's Review and Approval

a) The Contractor shall submit to the Owner's Representative four (4) copies of all documents requiring review.

b) The Owner's Representative will review the submittals with reasonable promptness for their compliance with the design concept and the Contract Documents.

c) If the submittals are found insufficient three copies will be returned to the Contractor for correction. The Contractor shall than resubmit four (4) copies of the corrected information.

d) Upon acceptance, the Owner's Representative will distribute marked copies as follows:

(1) One (1) copy - Owner's Representative
(2) Two (2) copies - Contractor
(3) One (1) copy - Engineer

PART 4: SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

a. When not listed in the proposal, all "CONSTRUCTION SUBMITTAL" costs will be considered incidental work for which no separate payment will be made.

END OF SECTION

SECTION 01350
COMMON PRODUCT REQUIREMENTS

PART 1: GENERAL

1.01 SCOPE

a. This section includes several product requirements common to most products.

b. This section defines the minimum requirements of these common traits. The requirements specified herein apply to all products furnished under the Contract except where modified in other sections or otherwise recommended by the manufacturer.

1.02 SUBMITTALS

a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include:

1) Manufacturer's certification that all materials and products which will come in contact with potable water meet the requirements of the specifications contained herein.

PART 2: PRODUCTS

2.01 GENERAL

a. Whenever any material, article, device, product, or fixture is indicated or specified by patent or proprietary name, by name of manufacturer, or by catalog number, such specifications shall be deemed to be used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired. This procedure is not to be construed as eliminating from competition other products of equal or better quality by other manufacturers where fully suitable in design, and shall be deemed to be followed by the words "or approved equal". The decision relative to equality shall be by the Engineer and Owner, and shall be final.

b. All material incorporated into the project shall be new and previously unused, unless the express approval for items is received from the Owner.

2.02 MATERIALS IN CONTACT WITH POTABLE WATER

a. All materials or products specified in these Contract Documents or required to complete the work which will come in contact with or which will be used on material or products which will come in contact with potable water shall conform to all State and Federal Requirements.

b. All materials or products as specified above shall meet the requirements of the National Sanitation Foundation Standard 61, Drinking Water System Components - Health Effects, or approved equal.

c. Whenever any material or product is indicated or specified by patent or proprietary name, name of manufacturer or model number, such specification is used for the purpose of establishing a standard of quality and facilitating the description of the material or process desired. Such specification of a particular product shall not be construed as acceptability under the above listed criteria. It shall be the Contractor's responsibility to provide certification as required above or provide an equal quality product for which certification can be provided."

d. Any material or product installed without certification that it conforms to requirements as specified above shall be removed and replaced by the Contractor at no additional cost to the Owner.

PART 3: EXECUTION

3.01 DELIVERY, HANDLING AND STORAGE OF PRODUCTS, MATERIALS, EQUIPMENT

a. Unless otherwise specified in the individual sections, the Contractor shall deliver, handle and store materials and equipment in accordance with the requirements of the manufacturer and the following:

1) Delivered materials and equipment shall be in the manufacturer's original, unopened packaging with labels intact and legible.

2) Delivered materials should be in sufficient quantity to allow continuity of work.

3) The delivered materials and equipment shall be stored on clean raised platforms in conformance with the manufacturer's requirements.

4) The materials and equipment shall be protected from the weather, dust, mud, oil, moisture and other elements that are detrimental to the material or equipment.

5) Materials and equipment shall be protected against damage by construction traffic.

6) Materials and equipment that are damaged or do not conform to the Specifications shall be removed immediately from the project site.

7) Storage of materials, equipment and incidentals shall comply with all Local, State and Federal ordinances, regulations and requirements.

8) Emulsions and paints shall be stored in temperatures above 40°C.

b. Materials, equipment and articles to be incorporated into the work shall be stored so as to facilitate inspection and in such manner as to ensure the preservation of their quality and fitness for the work. Stocked materials, even though approved before storage, shall be subject to test and shall meet requirements of the Specifications at the time they are to be used in the work.

c. Where construction is in roads, streets, etc., that portion of the right-of-way not required for public travel may be used for storage purposes, unless otherwise prohibited, and for placing of the Contractor's plant and equipment. Any other additional space required for construction facilities or storage of materials and equipment shall be provided by the Contractor at his expense.

d. The Contractor will confine his equipment, the storage of materials and equipment and the operations of his workmen to areas permitted by law, ordinances, permits or the requirements of the Contract Documents, and shall not unreasonably encumber the premises with materials or equipment.

PART 4: SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

a. When not listed in the proposal, all "COMMON PRODUCT REQUIREMENTS" costs will be considered incidental work for which no separate payment will be made.

END OF SECTION

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SECTION 01505
TEMPORARY TRAFFIC CONTROL

PART 1: GENERAL

1.01 SCOPE

a. This section includes all work necessary to provide temporary traffic control to minimize obstruction and inconvenience to the public and to protect pedestrian and vehicular traffic.

b. Temporary traffic control shall include, but not be limited to:

1) Furnishing, installing, maintaining and removing all required traffic control devices.

2) Providing flaggers, barricades, lights and signs as required by City, County or State agencies and their road and traffic control policies.

c. Contractor shall provide temporary traffic control measures outside the contract limits when the Contractor's work activities affect traffic outside the contract limits.

d. All work under this section to conform with all Federal, State and local regulations and requirements.

1.02 DEFINITIONS

a. MUTCD:
1) Manual on Uniform Traffic Control Devices.
2) Signing and Flagging Standard for Short-Term Work Zones.

1.03 SUBMITTALS

a. Traffic Control

1) The Contractor shall submit a traffic control plan at the Preconstruction Conference. The traffic control plan shall include:

a) Location and types of traffic control measures proposed.

b) Proposed order and duration of traffic control measures.

PART 2: PRODUCTS

2.01 UNIFORM TRAFFIC CONTROL DEVICES

a. Use new or like-new equipment for all temporary items under this Section unless otherwise specified.

b. All barricades, signs, lights, flags and other traffic control devices shall conform to the current edition of the MUTCD unless otherwise specified.

c. Signs

1) Use standard size and shape conforming to the current edition of the MUTCD unless otherwise specified or ordered. Double-face signs will not be allowed except for flagger "STOP/SLOW" sign paddles.

2) Type

a) Unless otherwise specified or shown on the plans, use signs composed of orange reflectorized sheeting background with nonreflectorized black legend on one of the following materials.

(1) Sheet aluminum

(2) 3/4-inch medium or high-density overlay plywood.

b) Where there is interference from extraneous light sources which limits the effectiveness of the reflectorized surface, or as required by the Engineer, illuminated signs shall be used.

d. Flaggers

1) Flaggers shall be equipped with a minimum of the following:

a) Clothing to cover the complete body except head, neck, and arms below the point of the shoulders.
b) An OSHA approved hard hat.
c) An orange, fluorescent red-orange, or fluorescent yellow-orange vest. For night-time conditions, the vest shall be reflective.

d) Highly visible, reflective "STOP/SLOW" sign paddles conforming to the MUTCD.
e) Portable, self-contained two-way radio with a range suitable for the project.
f) Illuminated stand area of high visibility at night.

PART 3: EXECUTION

3.01 GENERAL

a. Contractor shall adequately warn the public at all times of existing conditions on all streets affected by work operations.

b. Provide approved access to private properties at all times, except during owner approved stages of construction.

c. The Contractor shall notify affected residents, businesses and emergency services in writing during business hours 48 hours in advance of parking removal, and/or street, driveway, and alley detour or closures. Failure to provide proper, timely notification will be grounds to deny the commencement of the work.

d. Emergency traffic such as police, fire, and disaster units shall be provided access to the work area at all times.

e. Provide open trenches and excavations with adequate barricades of an approved type. No open trenches whall be left at night or over the weekends or on holidays. Install and maintain all necessary signs, lights, flares, barricades, railings, runways, stairs, bridges, and facilities for the protection of the public.

f. Contractor shall conform to all applicable local, State and Federal regulations relating to temporary traffic control and protection of the public.

3.02 TRAFFIC CONTROL WITHIN CONTRACT LIMITS

a. Contractor shall provide temporary traffic control as required by MUTCD, as well as applicable local and Federal regulations.

b. When vehicular parking is a hazard to through traffic or to the work, furnish and place NO PARKING signs on any street which is impacted by the work.

c. Flagging stations shall be staffed continuously during working hours.

3.03 DETOURS

a. Contractor shall submit detour plans to the Engineer, local and State authorities a minimum of five (5) days prior to commencement of the work necessitating the detour, and obtain approval from all regulating authorities prior to detour construction.

b. Contractor shall construct and maintain approved temporary detours to provide adequate passage of public traffic.

c. Contractor shall assume responsibility for detours within the limits of the project such as side street crossings, temporary bridges over freshly placed concrete, or utilization of one or more lanes of the construction area for maintenance of traffic.

d. Upon failure to immediately provide, maintain, or remove suitable detours or detour bridges when ordered to do so by Engineer, Owner may without notice to Contractor or Surety, provide, maintain, or remove the detour and deduct costs thereof from any payments due or coming due to Contractor.

e. When detours are not available, confine operations to a width which provides for safe passage of traffic.

3.04 ONE-WAY PILOTED TRAFFIC

a. If, in the judgment of the local traffic authorities, one-way piloted traffic is necessary, provide at least two flaggers to control traffic, one flagger being stationed at each end of the roadway being limited to restricted use and if the length of one way piloted traffic exceeds 2 miles, furnish a pilot car and driver to lead traffic. Pilot cars shall be identified with appropriate sign information mounted on the rear of the vehicle. At the end of each day leave work in such condition that it can be traveled without damage to the work and without danger to the public.

PART 4: SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

a. When not listed in the proposal, all "TEMPORARY TRAFFIC CONTROL" costs will be considered incidental work for which no separate payment will be made.

END OF SECTION

DIVISION 2

UNDERGROUND & SITE WORK

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SECTION 02226
TRENCH EXCAVATION AND BACKFILL

PART 1: GENERAL

1.01 SCOPE

a. This section includes all trench excavation, backfill and related work for the construction of the designated pipelines and other incidental work.

b. Trench Excavation and Backfill Includes:

1) Work of making all necessary trench excavations for the construction of all contract work.

2) Furnishing, placing and use of sheeting, shoring and sheet piling necessary in excavating for and protecting the work and workmen.

3) Performing all pumping and fluming necessary to keep the trenches free from water.

4) Providing for uninterrupted flow of existing drains and sewers and the temporary disposal of water from other sources during the progress of the work.

5) Supporting and protecting all structures, pipes, conduits, culverts, posts, poles, wires, fences, buildings and other public and private property adjacent to the work.

6) Removing and replacing existing sewers, culverts, pipelines and bulkheads where necessary.

7) Removing all surplus excavated material.

8) Performing all backfilling, grading and compaction to the limits specified or ordered by the engineer.

9) Restoring all property damaged as a result of the work included under this section.

c. The Work includes obtaining and transporting suitable fill material from off-site when on-site material is not available.

d. The Work includes transporting surplus excavated material not needed for backfill at the location where the excavation is made, to other parts of the work where filling is required, or disposal of all surplus on other sites provided by the Contractor or as directed by the Owner.

1.02 LABORATORY SERVICES

e. Owner will provide for the backfill compaction testing services as described below.

1) Sieve analysis (ASTM C-136): One test for each select material source and type:

a) Selected bedding and pipe zone backfill material.
b) Crushed rock aggregate base course material.
c) Pit run aggregate material.

2) Backfill Compaction:

a) One moisture density curve (AASHTO T-180) for each size and type of material used for backfill. The maximum dry weight and optimum moisture content shall be indicated. The cost of all retests required due to any unauthorized change in backfill material shall be borne by the Contractor.

b) Test consolidated backfill material in trenches around pipes for conformance with specified "compaction requirements," contained herein:

(1) Where tests indicate insufficient values, perform addi tional tests as required by the Owner's representative. Testing shall continue until specified values have been attained by additional compaction effort.

(2) Retests shall be referenced to the corresponding failing test. The cost of all retests shall be borne by the Contractor.

1.03 CONSTRUCTION WITHIN ROADWAY AND RAILROAD RIGHT-OF-WAYS

a. Permits: the contractor shall be responsible for ensuring that all permits required for construction are obtained.

b. Contractor shall provide bonds and insurance as required by affected agency prior to proceeding with any work.

c. Notification: the Contractor shall give written notice to appropriate officials of the affected Federal or State Highway Department, City, County or railroad at least five days, not including weekends and holidays, before starting construction within highway or railroad right-of-ways and as required under other roadways.

1.04 SUBMITTALS

a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include:

1) When excess excavated material is disposed of at locations off the project site, the contractor shall obtain and submit written permission from the Owner of the property upon which the material is to be placed.

2) Executed copy of permit(s) to dispose of material specified under this section.

1.05 PROTECTION

a. Test Pits: The Contractor shall dig such exploratory test pits as may be necessary in advance of excavation to determine the exact location and elevation of subsurface structures, pipelines and conduits which are likely to be encountered and shall make acceptable provision for their protection, support, and maintenance in operation.

b. Sheeting, Shoring and Bracing:

1) The Contractor shall furnish and install adequate sheeting, shoring, and bracing to maintain safe working conditions, and to protect newly built work and all adjacent and neighboring structures from damage by settlement.

2) Bracing and sheeting shall conform to the recommendations in the Occupational Safety and Health Administration Standards for Construction (OSHA). A trench box may be used in lieu of sheeting and bracing as permitted by OSHA. Unless otherwise approved, all trench support materials shall be removed in a manner that will prevent caving of the sides and movement or damage to the pipe.

3) Bracing shall be arranged so as not to place a strain on portions of completed work until the construction has proceeded far enough to provide ample strength. Sheeting and bracing may be withdrawn and removed at the time of backfilling, but the Contractor shall be responsible for all damage to newly built work and adjacent and neighboring structures.

4) All sheeting, shoring and bracing shall be of Contractor's design and shall be in accordance with all Federal, State and Local codes and requirements.

c. Removal of water:

1) The contractor shall at all times during construction provide and maintain ample means and devices with which to remove promptly and dispose of properly all water entering the excavations or other parts of the work and shall keep said excavations dry until the pipelines to be placed therein are completed. In water bearing sand, well points and/or sheeting shall be supplied, together with pumps and other appurtenances of ample capacity to keep the excavation dry as specified.

2) The contractor shall dispose of water from the work in a suitable manner without damage to adjacent property or structures.

3) Contractor shall provide silt fences, straw bales, and/or sedimentation basins as required to clarify waters prior to discharge in accordance with Federal, State and Local requirements.

1.06 DEFINITIONS

a. Classification of Excavated Materials

1) Unclassified Native Material shall be defined as all material not classified as rock excavation or unsuitable material that is removed from the trench by required excavation.

2) Rock Excavation shall be defined as follows:

a) "Rock excavation shall consist only of that solid bedrock or ledge rock and boulders over two (2) cubic yards in volume which cannot be removed by a D8K (or approved equal) with four barrel hydraulics and dual rippers or 90,000 pound class Excavator (P.C. 400 Komatsu or 235 Caterpillar or approved equal) with single shank ripper on back of bucket, which shall not be more than thirty-six inches (36") in width, but which requires systematic drilling, blasting or the use of rock splitters pneumatic hammers and wedges. All D8K's and 90,000 pound class Excavators shall be in excellent operating condition and operated by personnel competent to operate like machinery."

b) "Removal of existing concrete and asphaltic surfaces does not qualify as rock excavation."

3) Unsuitable Materials

a) Unsuitable material shall be defined as all material that is either too wet, contains grass, roots, brush or other vegetation, large rocks or is classified under ASTM D 2487 as Pt. OH, CH, MH or OL and materials which cannot be compacted to achieve the required percentage of maximum density for the intended use shall not be used in the work.

b. Trench Backfill Zones

1) Pipe embedment zone - The area from 4-inches under the pipe to 1/6 the outside pipe diameter distance above the bottom of pipe for the width of the trench.

2) Pipe Zone - The area from the top of the pipe embedment zone to 6-inches above the pipe for the width of the trench.

3) Trench Backfill Zone - The area from 6-inches above the pipe to bottom line of surface restoration for the width of the trench.

c. Trench Classifications

1) Class I Trench - class i trench shall have select granular material in all three zones for backfill material. For use under paved or graveled roadways, road shoulders, gravel and paved driveways, or as directed by the Engineer. The type of material required for each backfill zone shall be as follows:

Pipe Embedment Zone	Type B or C
Pipe Zone	Type A, B or C
Trench Backfill Zone	Type A and or E (Top 12" must be Type A)

2) Class II Trench - Class II trench shall have select granular material in the pipe embedment and pipe zones and suitable native excavated material in the trench backfill zone to 6-inches below finish grade. The top 6-inches shall be select aggregate base course material as specified. For use under gravel roads, driveways, road shoulders and future or current paved areas, or as directed by the Engineer.

Pipe Embedment Zone	Type B or C
Pipe Zone	Type A, B or C
Trench Backfill Zone	Type A and D

3) Class III Trench - Class III trench shall have select granular material in the pipe embedment zone and native excavated material in the pipe zone and trench backfill zone. For use under unimproved open areas or under gravel roads, road shoulders and driveways or future paved areas with the top surface of select aggregate base course material to the depth specified or shown on the drawings or as directed by the Engineer.

Pipe Embedment Zone	Type B or C
Pipe Zone	Type D
Trench Backfill Zone	Type A and D

4) Class IV Trench - Class IV trench shall have unclassified native excavated material in the pipe embedment and pipe zones and unclassified native excavated material in the backfill zone for backfill material. For use under unimproved open rural area or as directed by the Engineer.

Pipe Embedment Zone	Type D
Pipe Zone	Type D
Trench Backfill Zone	Type D

PART 2: PRODUCTS

2.01 SELECTED GRANULAR BACKFILL MATERIAL REQUIREMENTS

a. Selected backfill material shall consist of well graded pit run, sand or crushed rock or screenings, meeting the following requirements:

1) Type a: 3/4-inch crushed rock aggregate base course material that meets the gradation requirements of CDOT for class 6 aggregate base course.

Sieve Size	Percentage passing
3/4 - inch	100
No. 4	30 - 65
No. 8	25 - 55
No. 200	3 - 12

2) Type B: Selected bedding and pipe zone backfill material shall be 3/4-inch minus screened rock durable and free from slaking or decomposition under action of alternate wetting and drying. The material shall meet the following gradation requirements:

Sieve Size	Percentage Passing
3/4 - inch	100
No. 4	15 maximum

3) Type C: 3/8-inch minus crusher screenings for bedding material with one hundred percent (100%) passing the 3/8-inch sieve and fifty percent (50%) or less passing the No. 8 sieve.

4) Type D: All materials considered as suitable for fill and backfill obtained from the required excavation meeting the requirements of paragraphs 2.01 and 2.02 herein.

5) Type E: Pit run aggregate that is relatively uniformly graded having a maximum rock size of 8-inches and no more than 20% by weight passing the No. 200 sieve size.

2.02 UNCLASSIFIED NATIVE MATERIAL

a. Excavated material free of vegetable matter, large rocks and debris.

b. Excavated material approved by the Engineer for use as backfill in designated trench zones.

c. Individual particles no larger than 8 inches in diameter.

2.03 FOUNDATION STABILIZATION

a. Gravel or crushed aggregate with 100% passing the 1.5-inch sieve size or Engineer approved clean, well graded granular material.

b. Excavation Below Grade: Where the excavation is carried beyond or below the lines and grades shown on the plans or staked, the Contractor shall, at his own expense, refill all such excavated space with required pipe bedding material.

c. Unstable Trench Bottom: Where the excavation is found to consist of muck, organic matter or any other material that the Engineer determines to be unsuitable for supporting the pipe, an additional depth shall be excavated as directed by the Engineer and replaced with an approved granular stabilization material. Payment shall be made on the unit price provided in the bidding schedule.

PART 3: EXECUTION

3.01 PREPARATION

a. The site of an open cut excavation shall be first cleared of all obstructions preparatory to excavation. Wherever paved or surfaced streets are cut, saw wheel or approved cutting devices shall be used. Width of pavement cut shall not be less than 6-inches greater than trench width. All cut or broken pavement shall be removed from site during excavation.

b. The Contractor shall maintain street traffic at all times and erect and maintain barricades, warning signs, traffic cones, and other safety devices during construction in accordance with Manual of Uniform Traffic Control Devices (MUTCD) to protect the traveling public. Provide flagmen as required during active work in roadway areas.

c. Intent of specifications is that all streets, structures, and utilities be left in condition equal to or better than original condition. Where damage occurs and cannot be repaired or replaced, Contractor shall purchase and install new material which is satisfactory to Owner. Plans and/or specifications cover and govern replacement and restoration of foreseeable damage.

d. The operations shall be confined to the work limits provided. Avoid encroachment on, or damage to, private property or existing utilities unless prior arrangements have been made with copy of said arrangement submitted to Engineer.

3.02 TRENCHING

a. Excavation for trenches in which pipelines are to be installed shall provide adequate space for workmen to place and joint the pipe properly, but in every case the trench shall be kept to a minimum width. The width of trench at the top of the pipe shall not exceed the limits specified or as shown on the drawings.

b. Excavation shall be to the depth necessary for placing of granular bedding material under the pipe as shown on the drawings. If overdigging occurs, the trench bottom shall be filled to grade with compacted granular bedding material.

c. Unless otherwise permitted by the Engineer, trenching operations shall not be performed beyond the distance which will be backfilled and compacted the same day.

d. In general, backfilling shall begin as soon as the conduit is in approved condition to receive it and shall be carried to completion as rapidly as possible. New trenching shall not be started when earlier trenches need backfilling or the surfaces of streets or other areas need to be restored to a safe and proper condition.

e. Where the excavation activities require the removal of portions of an abandoned pipeline, 2,500 psi concrete plugs shall be installed in the open ends of the pipe. Concrete plugs to be a minimum one and one-half (1-1/2) times the diameter of the pipe.

f. Line for vertical and horizontal alignment to be provided by the Engineer with stakes at not more than 50 foot intervals.

3.03 EXCAVATION OF UNSUITABLE MATERIALS

a. Unsuitable materials existing below the contract bottom limits for excavation shall be removed as directed by the Engineer. Such excavation shall be conducted at a time when the engineer is present and shall not exceed the vertical and lateral limits as prescribed by the engineer.

b. Where soft subgrade is encountered in which satisfactory stability cannot be obtained by moisture control and compaction, the unstable material shall be excavated to the depth required by the Engineer.

c. Backfill with foundation stabilization material compacted in layers not exceeding 12-inches depth to required density and compaction.

3.04 DISPOSAL OF UNSUITABLE AND SURPLUS MATERIAL

a. All excavated materials which are unsuitable for use in backfilling trenches or around structures, and materials excavated that are in excess of that required for backfilling and for constructing fills and embankments as shown on the drawings, shall be disposed of by the Contractor at own expense and at disposal sites provided by him as may be required.

b. Surplus excavated material shall be disposed of at designated spoil sites in a legal manner, in full compliance with applicable codes and ordinances.

3.05 ROCK EXCAVATION

a. Where the bottom of the trench encounters ledge rock and/or boulders and large stones which meet the definition of "rock" as described herein, said rock shall be removed to provide 6-inches of clearance to each side and below all pipe and accessories.

b. Excavations below subgrade in rock shall be backfilled to subgrade with approved bedding material and thoroughly compacted.

c. Contractor to excavate and remove the overburden exposing the rock surface, allowing the Engineer to profile the excavated trench for rock measurement. The profiling of the exposed rock surface shall be done prior to commencement of rock removal activities.

d. The Contractor shall comply with the requirements for the use and security of explosives as specified in the special conditions.

3.06 REMOVAL OF CONCRETE CURBS & SIDEWALKS

a. Where trench excavation requires removal of concrete curbs and/or sidewalks, the curbs and/or sidewalks shall be sawcut as required and removed at a tooled joint unless otherwise authorized by the Engineer.

b. The intention of this requirement is to facilitate the replacement of curbs and sidewalks to the joint pattern of the existing and surrounding curbs and/or sidewalks. The sawcut lines for concrete sidewalk and curb cuts shown on the drawings are schematic and not intended to show the exact alignment of such cuts.

3.08 BACKFILL AND COMPACTION

a. General

1) Backfill Immediately: All trenches and excavations shall be backfilled immediately after pipe is laid therein, unless otherwise directed by the Engineer. Under no circumstances shall water be permitted to rise in unbackfilled trenches after pipe has been placed.

2) Backfilling With Excavated material: Where specified or directed, material excavated in connection with the work shall be used for backfilling, in accordance with the type of trench classification shown on the contract drawings. No material shall be used for backfilling that contains stones, rock or pieces of masonry greater than 8-inches, frozen earth, debris, earth with an exceptionally high void content, organic material, or marl.

3) In no case shall backfill material deposited by machinery be allowed to fall directly on the pipe and in all cases the bucket shall be lowered so that the shock of the falling backfill material will not cause damage.

4) All backfill material shall be placed with moisture-density control in accordance with the typical trench detail shown on the Standard Detail Sheets. All approved backfill material shall be adjusted to within three

percent (3%) of the optimum moisture content prior to its placement in the trench. Jetting or water soaking trenches to achieve compaction of the backfill will not be permitted except when the backfill consists of gravel or other granular material having less than twenty percent (20%) by weight passing a No. 200 sieve.

5) During initial backfilling, the contractor shall take all necessary precautions to prevent movement or distortion of the pipe or structure being backfilled. Pipe zone material shall be placed and compacted in even lifts on both sides of the pipe to above the top of the pipe. Above the pipe bedding and pipe zone the earth backfill material shall be placed full width in uniform layers not more than twelve (12) inches thick. Each layer shall be compacted to the required density with approved mechanical or hand tamping equipment.

b. Embedment Zone

1) Pipe embedment material shall be placed in the trench, compacted and shaped to provide continuous support for the pipe between joints or fittings.

2) Holes shall be provided for all joints or fittings as required to permit assembly.

3) Pipe shall be laid directly on the embedment materials.

c. Pipe Zone

1) Backfill shall be placed in uniform layers on both sides of the pipe. Each layer shall be placed, then carefully and uniformly tamped to the specified density so as to eliminate the possibility of lateral displacement of the pipe.

2) Care shall be taken to ensure that the material under the haunches of the pipe is sufficiently compacted.

d. Trench Zone

1) After the backfill has been placed and compacted around the pipe and structures to a height of 6-inches over the top as specified above, the remainder of the trench may be backfilled by machine.

2) The backfill material shall be deposited in horizontal layers not exceeding 12-inches thick, and each layer shall be thoroughly compacted to the

specified density by approved methods before the succeeding layer is placed.

e. Backfilling Under Existing Conduits

1) Where it is necessary to undercut or replace existing utility conduits and/or service lines, the excavation beneath such lines shall be backfilled the entire length with granular bedding material tamped in place in 6-inch layers to the required density. The granular bedding shall extend outward from the spring line of the conduit a distance of 2 feet on either side and thence downward at its natural slope.

f. Backfilling Under Pavement and Walks

1) Where any pavement, driveway, parking lot, curb and gutter, or walk is to be placed over a backfill area, granular material shall be used. The material shall be placed and compacted to the required density in accordance with the specification contained herein.

3.09 COMPACTION REQUIREMENTS

a. Compaction requirements for Type I, Type II and Type III trench shall be as follows:

1) Compaction of the pipe embedment and pipe zone shall be achieved by mechanical compaction in horizontal lifts or other approved method to ninety percent (90%) of the maximum dry density per AASHTO T-99 test method.

2) Compaction of the trench zone shall be achieved by mechanical compaction in horizontal lifts or other approved method to ninety-five percent (95%) of the maximum dry density per AASHTO T-99 test method.

b. Compaction requirements for Type IV trench shall be as follows except under gravel roads, driveways, road shoulders or future or current paved areas which shall be compacted in accordance with paragraphs "a.-1 and 2 above".

1) Compaction of the pipe embedment and pipe zone shall be achieved by mechanical compaction in horizontal lifts or other approved method to eighty percent (80%) of the maximum dry density per AASHTO T-99 test method.

2) Compaction of the trench zone shall be achieved by mechanical compaction in horizontal lifts or other approved method to eighty-five percent (85%) of the maximum dry density per AASHTO T-99 test method.

3.10 COMPACTION TESTS

a. Trenches shall be backfilled and consolidated in layers, as specified, to the existing ground surface. All backfill shall be frequently tested to insure that the required density is being attained. Contractor shall contact governing agency to determine their requirements for compaction testing, however, the minimum requirements for compaction testing shall be as follows:

1) For every 300 lineal feet of trench and each branch or section of trench less than 300 feet in length, at least one compaction test shall be performed for each two foot vertical lift of backfill material placed. The first test shall be taken approximately two feet above the top of pipe and the last test shall be at the pavement subgrade or 6 inches below the ground surface in unpaved areas. Compaction tests shall be taken at random locations along the trench and wherever poor compaction is suspected. If any portion of the backfill placed fails to meet the minimum density specified, the area shall be defined by additional tests if necessary and the material in the designated area shall be removed and replaced to the required density at the Contractor’s expense.

2) All compaction testing shall be performed by a certified testing laboratory. The cost of the testing shall be born by the Owner. It shall be the Contractor's responsibility to assist in coordinating the testing and to make necessary excavations in order to accommodate compaction tests at all locations designated.

b. The initial test series for each type of backfill material shall be continued until the method of consolidation employed has proven to attain the required compaction. Any change in the proven method of consolidation will not be permitted unless approved by the Owner's Representative.

c. Subsequent tests or series of tests shall be in locations and at depths ordered by the Engineer.

d. The cost of all retests shall be borne by the Contractor.

3.11 SURFACE RESTORATION AND CLEAN UP

a. Surface restoration shall conform to these Contract Documents where applicable. Restore ground surfaces to original conditions and elevations unless otherwise specified or directed.

b. Clean up and remove all excess materials, construction materials, debris from construction, etc. Replace or repair any fences, mailboxes, signs, landscaping, or other facilities removed or damaged during construction. Replace all lawns, topsoil, shrubbery, flowers, etc., damaged or removed during construction. Contractor to be responsible for seeing that lawns, shrubs, etc. Remain alive. Leave premises in condition equal to or better than original condition before construction.

c. Immediately after any section of a completed pipeline has been tested and approved by the Owner or Engineer, the Contractor shall replace all paved surfaces removed or damaged by his operation. All pavement replacement shall be in accordance with the typical trench detail shown on the standard detail sheets, and in accordance with any permit requirements impose by the City, County or State.

d. Unless otherwise approved, all asphalt pavements removed shall be replaced with hot mixed bituminous pavement and all aggregate base course material shall be Colorado Department of Transportation, Class 6 Aggregate Base Course. Paved surfaces shall be restored to their original line and grade and finished to match adjacent undisturbed surfaces. If Contractor is unable to replace asphalt pavement with hot mixed bituminous pavement, then temporary cold asphalt pavement shall be used. Contractor will be responsible for maintaining the cold asphalt pavement until it can be replaced with hot mixed bituminous pavement. All costs for temporary pavement, maintaining temporary pavement, an replacing asphalt pavement with hot mixed bituminous pavement shall be considered to be included in the bid price for pavement replacement.

All curbs, gutters, sidewalks, gutter pans, driveways and other concrete street hardware within the right-of-way shall be replaced by a licensed Cement Contractor with a permit issued by the office of the City Engineer. All concrete shall be Colorado Department of Transportation, Class B.

PART 4: SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

a. When not listed in the proposal, all trench excavation and backfill costs will be considered incidental work for which no separate payment will be made.

b. When listed in the proposal, payment for work specified under this section will be made at the prices listed in the proposal and as outlined below. Quantities to be computed by the engineer from measurement of actual work completed and accepted.

c. Common Excavation

1) Paid for on a linear foot basis for each size and classification of trench at the prices named in the proposal. Length will be measured horizontally along pipe actually installed without deducting for fittings and appurtenances.

d. Foundation Stabilization

1) Paid for on a cubic yard basis at the prices named in the proposal. Length and width will be measured horizontally along foundation stabilization material actually installed.

2) Depth measured to be actual depth installed below bottom of bedding. The average depth will be used with measurement intervals of 25 feet along centerline of trench.

3) No payment will be made for unauthorized foundation stabilization.

e. Rock Excavation

1) Payment for unforeseen rock conditions shall be made after negotiations to determine a unit price based on the best and safest method selected and approved by the engineer for the rock removal.

2) Rock excavation will be paid for on a cubic yard basis and or at the prices named in the Proposal. Measurement will be as outlined below.

a) The length will be the entire horizontal distance measured along the centerline of the trench.

b) The width for measurement purposes shall be 12 inches greater than the maximum outside diameter of the pipe.

c) The measurement for depth will be the vertical distance from the top of the rock to the depth shown on the plan. The depth will be

measured at intervals of 25 feet along the centerline of the trench and the average depth between measuring points will be the depth used for computing the depth of rock.

f. Measurement and payment for rock excavation will be in addition to the payment for trench excavation and backfill. Payment for rock excavation shall include full compensation for all work necessary to excavate the rock material. Price indicated also includes the cost for embedment and pipe zone materials.

g. AC Pavement Cuts

1) When not listed in the proposal, all pavement cuts to be considered incidental to work for which no separate payment will be made..

2) When listed in the Proposal, payment for work specified under this section will be made at the prices listed in the Proposal. Quantities to be computed by the Owner's Representative for measurement of actual work completed and accepted.

h. Payment indicated shall include complete compensation for all labor, equipment, materials and incidentals involved in the work specified herein. No additional compensation will be considered unless allowed and submitted in accordance with sections VIII and XIII of the General Conditions.

END OF SECTION

SECTION 02501
TRENCH SURFACE RESTORATION

PART 1: GENERAL

1.01 SCOPE

a. This section includes all surface restoration and related work for the construction of the designated pipelines and other work as required for the completion of the project.

b. Surface restoration includes, but is not limited to, the following:

1) Restoration of all surfaces disturbed during construction including A.C. pavement, concrete, gravel, lawns, topsoil, trees, shrubbery, flowers, fences, mailboxes, signs, landscaping, etc.

2) Surfaces shall be restored in-kind unless otherwise shown on the drawings or directed by the Engineer.

3) Maintenance of all surfaces until final surface restoration is completed. Temporary AC pavement cold patching may be required for all street crossings which are not permanently restored within seven (7) days of excavation depending on the permit requirements of governing agency.

4) Depth, type and compaction of materials shall be equal to original surfaces unless otherwise specified herein or shown on the drawings.

1.02 CLASSIFICATIONS

a. Class A: Asphalt concrete pavement restoration for State Highway, County Roads or City Streets, whichever is the governing agency in the area of the work. Also asphalt concrete driveways.

b. Class B: Gravel Road restoration.

c. Class C: Gravel shoulder restoration including graveled driveways.

d. Class D: Concrete driveways, sidewalks, curbs and gutter restoration.

e. Class E: Unimproved or open areas restoration.

PART 2. PRODUCTS

2.01 AGGREGATE BASE COURSE MATERIAL (ROAD BASE)

a. Aggregate Base Course Material or Road Base used for surface restoration shall be material meeting the requirements of the Colorado Department of Transportation (CDOT), Mesa County or the City of Grand Junction, whichever is the governing agency in the area of the work.

2.02 TOPSOIL

a. Native topsoil shall be removed and stockpiled to be used for topsoil replacement when possible. Where imported topsoil is required, it shall be clean sandy loam, free from sulfates or alkali.

b. Depth of topsoil shall be determined by actual existing field conditions or as directed by the Engineer.

2.03 A.C. PAVEMENT

a. A.C. pavement shall conform to the requirements of CDOT, Mesa County or the City of Grand Junction, whichever is the governing agency in the area of the work.

2.04 PORTLAND CEMENT CONCRETE

a. All concrete shall conform to the requirements of CDOT, Mesa County or the City of Grand Junction, whichever is the governing agency in the area of the work.

2.05 GRASS SEED AND MULCH

a. Grass seed and mulch shall conform to the requirements of CDOT, Mesa County or the City of Grand Junction, whichever is the governing agency in the area of the planting, except as modified herein.

b. Seed mixtures shall be compatible with the immediately surrounding vegetation.

c. Seed mix to be approved by the Engineer prior to application.

2.06 GRASS SOD

a. Grass sod shall be certified nursery grade cultivated grass sod with a strong fibrous root system, free of stones and burned or bare spots, and compatible with the immediately surrounding grass.

PART 3. EXECUTION

3.01 GENERAL

a. The intent of this specification is that cleanup activities and surface restoration work immediately follow the installation of pipe, construction of structures, etc. This is imperative so as to impact activities by the property owner, or other users, as little as possible.

b. Trench backfill and subgrade shall meet compaction requirements as set forth in the applicable sections contained herein prior to proceeding with surface restoration work.

c. All workmanship for A.C. pavement surface restoration shall conform to the standard requirements of CDOT, Mesa County or the City of Grand Junction, whichever is the governing agency and in accordance with the project permit requirements for Asphalt Concrete Pavement replacement and patching.

d. The Contractor shall notify the Engineer a minimum of 24 hours in advance of performing any A.C. pavement surface restoration work. No A.C. pavement surface restoration work shall be performed when weather conditions, in the Engineers opinion, are not suitable for placement of A.C. pavement.

e. All workmanship for concrete restoration shall conform to the standard requirements of CDOT, Mesa County or the City of Grand Junction.

f. In areas designated for Class E surface restoration, topsoil shall be removed and stored at an approved location prior to excavation.

3.02 PROTECTION

a. No heavy construction vehicle shall operate on any pavement, curbing or walk.

b. Concrete Curbing and Walks:

1) No concrete shall be mixed, transported, placed or finished when the temperature of the base, subgrade or air is below 40°F or whenever, in the

opinion of the Engineer, the temperature may fall below 40°F within twenty four (24) hours after the concrete has been placed.

2) The Contractor shall take such precautions as are necessary to protect newly placed concrete from rain.

3) The Contractor shall protect newly placed concrete from freezing for no less than seven (7) days.

3.03 CLASS A SURFACE RESTORATION - Asphalt Concrete Pavement and Driveways

a. Asphalt concrete pavement restoration shall conform to all standards and requirements of the Colorado Department of Highways (CDOT), Mesa County or City, whichever is the governing agency in the area of the work.

b. The wearing course shall match the existing pavement in thickness, line and grade but in no case shall the pavement thickness be less than three (3) inches placed in two (2) lifts.

3.04 CLASS B SURFACE RESTORATION - Gravel Roads

a. Surface restoration shall conform to all standards and requirements of Mesa County or City, whichever is the governing agency in the area of the work.

b. The wearing course shall match the existing road surface in thickness, line and grade, but in no case shall the gravel thickness be less than four (4) inches.

3.05 CLASS C SURFACE RESTORATION - Gravel Shoulders And Driveways

a. Gravel shoulder restoration shall conform to all standards and requirements of the Colorado Department of Highways (CDOT), Mesa County or City, whichever is the governing agency in the area of the work.

b. Gravel driveway restoration shall conform to the same requirements as gravel shoulder restoration or as directed by the Engineer. The gravel thickness shall not be less than six (6) inches.

c. Gravel shoulders and driveways shall be compacted by mechanical means to ninety five percent (95%) of the maximum dry density per AASHTO T-180 unless otherwise directed by the Engineer.

3.06 CLASS D SURFACE RESTORATION - Concrete Driveways, Walks, Curb and Gutter

a. Concrete driveways, sidewalks, curb and gutter restoration shall conform to all standards or requirements of the Colorado Department of Highways (CDOT), Mesa County or City, whichever is the governing agency in the area of the work.

b. Concrete surface restoration shall also conform to drawing details and specifications, Paragraph 3.08, contained herein. Where there is a difference between the agencies requirements and these specifications, the most stringent requirement shall take precedence.

c. The supporting aggregate base course shall be not less than six (6) inches thick and shall be compacted by means of mechanical compaction to ninety five percent (95%) of the maximum dry density per AASHTO T-180.

3.07 CLASS E SURFACE RESTORATION - Unimproved or Open Areas

a. Surface restoration shall conform to all standards and requirements of the governing agency.

b. Surface restoration shall also conform to drawing details and specifications contained herein.

c. Compact to density of existing in place materials by mechanical means unless otherwise directed by the Engineer.

d. Contractor shall replace trees, shrubbery, flowers, ground cover in kind to match existing as approved by the Engineer.

e. Reseeding:

1) All areas to be seeded shall be made substantially clear and free of weeds, briars, sticks, loose stones greater than 1-inch, and all other debris detrimental or toxic to the growth of grass.

2) The surface soil in all areas to be seeded shall be in a condition favorable for the germination and growth of grass seed. A minimum of 1/2-inch and maximum of 1-1/2 inches of surface soil shall be in a loose condition.

3) Soil preparation operations shall be directional along the contours of the areas involved.

4) Seed shall be applied at a time approved by the Engineer when conditions are favorable for germination.

f. Resodding:

1) Provide a finish grade such that the top of installed and fresh-cut mature grass will be level with all adjoining sidewalks and curbs. Add or remove topsoil as necessary to achieve proper finish grade.

2) All areas to be sodded shall be made substantially clear and free of weeds, briars, sticks, loose stones greater than 1-inch, and all other debris detrimental or toxic to the growth of grass.

3) The surface soil in all areas to be sodded shall be in a condition favorable for the growth of grass. A minimum of 1/2-inch and maximum of 1-1/2 inches of surface soil shall be in a loose condition.

4) Lay sod perpendicular to direction of slope with alternating joints. Fit sod pieces tightly together: no joints and overlapping; hand tamp firmly and evenly.

5) Topdress lightly with topsoil to fill depressions and joints between strips; leave finished sodding smooth and free of lumps and depressions.

6) Roll sod to ensure the root system is bound to the soil.

7) Sod shall be applied at a time approved by the Engineer when conditions are favorable for growth.

3.08 CONCRETE CURBING, WALKS AND DRIVEWAYS

a. All soil subgrade under driveways, curbs, curb and gutter and walks shall be compacted in accordance with the requirements of the applicable sections contained herein.

b. All curbs, sidewalks and driveways shall conform to the lines, grades and thicknesses of existing structures, but in no case shall the thickness be less than sixteen (16) inches for Type "C" curbs, four (4) inches for sidewalks, and six (6) inches for driveways and driveway aprons.

c. A minimum 6-inch's of 3/4-inch aggregate base course 3/4"-0" granular material leveling course shall be provided under all curbs, sidewalks and driveways.

d. Unless otherwise authorized by the Engineer, sidewalks and/or curbs shall be constructed to match the joint pattern of the existing and surrounding sidewalks and/or curbs.

PART 4. SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

a. When not listed in the proposal, all "SURFACE RESTORATION" costs will be considered incidental work for which no separate payment will be made.

b. When listed in the Proposal, payment for work specified under this section to be made at the units and prices named in the Proposal for each class of surface restoration, complete and acceptable to the Engineer.

c. Length to be measured horizontally along center line of the trench to the nearest foot with out deducting for structures, valves, etc.

d. Restoration of concrete curbing and walks shall be considered incidental to the restoration of the street to which it is adjacent.

e. Cutting OF AC Pavement

1) AC pavement sawcutting to be paid for on a linear foot of trench basis at the unit prices named in the Proposal.

2) In no case will payment be made for duplicate cuts where over-excavation, inadequate backfill compaction or less than prompt repaving results in the need for new cuts.

f. Payment indicated to include complete compensation for all labor, equipment, materials and incidentals required for completion of the work. No additional compensation to be allowed.

END OF SECTION

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SECTION 02634
CARRIER PIPE AND BORED CASING

PART 1. GENERAL

1.01 SCOPE

a. This section includes all work necessary to install all railroad and highway bored crossing and all related work for the construction of the designated pipeline and other incidental work.

b. Work shall includes, but is not limited to, the following:

1) Obtain all necessary permits, bonds and insurance required by Union Pacific Railroad, CDOT and other regulating authorities.

2) Furnish and install casing for bored crossing as shown on the drawings.

3) Installation of carrier pipe and appurtenances in casing.

4) Coordinate with railroad, CDOT, and other regulating authorities.

5) Furnish any and all protective fencing, berms and/or guard rails as required by the regulating authority.

1.02 SUBMITTALS

a. Submittals shall conform to the requirements of these Contract Documents and shall include:

1) As-built location of the casing.
2) Proof of insurance.
3) Copies of applicable permits.

PART 2. PRODUCTS

2.01 EXCAVATION AND BACKFILL

a. Conform to requirements of applicable sections contained herein.

b. Backfill with same material as that used for carrier pipe.

2.02 CASING PIPE

a. Contractor shall provide casing of a size to permit proper construction of the carrier pipe to the required lines and grades. Casing shall be welded smooth steel pipe conforming to the requirements of ASTM A-53 or approved equal.

b. Minimum casing wall thickness shall be as outlined below.

1) Casing Pipe - Minimum Size and Thickness

Carrier Pipe Diameter (Inches)	Minimum Casing Pipe Diameter (Inches)	Casing Minimum Wall Thickness (Inches)
<6	8	0.188 (3/16)
6	10	0.281 (9/32)
8	14	0.281 (9/32)
10	16	0.313 (5/16)
12	18	0.344 (11/32)
14	22	0.375 (3/8)
16	24	0.406 (13/32)
18	26	0.438 (7/16)
20	28	0.469 (15/32)

c. Casing pipe shall have a minimum yield strength of 35,000 psi.

d. The class of casing specified is based upon the superimposed loads and not upon the stresses resulting from jacking or boring operations. Any increase in casing strength to withstand jacking or boring operations shall be the responsibility of the Contractor, supplied at no additional cost to the Owner.

2.03 CARRIER PIPE

a. Carrier pipe shall conform to the plan requirements and specifications contained herein.

2.04 CASING SPACERS

a. Polyethylene Spacers. Calpico Model PX casing insulators with at least four (4) skids per band or an approved equal.

b. Wood Spacers. Wooden skids made of sound douglas fir, pressure treated with an approved preservative, and beveled on both ends for ease of installation. Field cut edges shall be given a heavy coat of preservative. Straps shall be Type 316 stainless steel, or approved equal and shall be installed at spacing shown on the Drawings,.

c. A minimum of three (3) bands per length of pipe shall be required.

2.05 SAND

a. When called for on the Drawings, sand for filling the annular space between the carrier pipe and casing pipe shall be clean, well graded sand, acceptable to the Engineer.

PART 3. EXECUTION

3.01 GENERAL

a. Construction in all cases shall conform to the requirements of regulating authority. A minimum of seven (7) days notice to the regulating authority is required prior to entry of right-of-way for construction of bored crossing.

b. Before the start of work, Contractor shall submit satisfactory evidence to the Engineer that he has complied with all permit and insurance requirements.

c. Temporary fencing and warning barricades shall be installed around the boring pit(s) in accordance with all Federal, State, local and regulating authority requirements.

3.02 EXCAVATION

a. Excavation shall be unclassified and shall include whatever materials are encountered to the depths shown or required. Contractor shall provide shoring and dewatering as required. Shoring and dewatering systems shall be of Contractor's design.

3.03 INSTALLATION OF CASING PIPE

a. Casing pipe shall not deviate from established line or grade at either end by more than the following:

Line	±1.0 feet
Grade	±0.5 feet

b. Sections of casing pipe shall be joined by welding joints with a continuous weld around the circumference of the pipe. It shall be the Contractor's responsibility to provide joints capable of resisting boring or jacking forces without failure.

c. Boring pits shall be braced and shored as required by Federal, State or local laws and regulations. A safe and satisfactory means of removing boring material from the pit shall be provided.

d. The boring shall be no larger than the outside diameter of the casing.

3.04 PIPE INSTALLATION IN CASING

a. General

1) Casing insulators shall be placed on the carrier pipe as shown on the drawings or specified herein so that pipe is supported continuously by the skids and is not supported by the bells.

2) Carrier pipe and skids shall be gently pulled through casing to avoid damage to pipes and couplings.

3) Contractor shall provide a means of pulling the toning wire through the casing when the use of non-metallic carrier pipe is specified.

4) All carrier pipe joints within the casing pipe shall be restrained or harnessed.

b. PVC Pressure Pipe

1) In order to prevent over belling of PVC pipe while installing it through the casing, the Contractor shall provide a method for restricting the movement between the assembled bell and spigot in accordance with the recommendations of the pipe manufacturer.

3.05 CLOSURE OF CASING AFTER CARRIER PIPE INSTALLATION

a. Ends of the casing shall be closed with sacking or similar material following the placement of fill in the casing, but shall not be tightly sealed.

3.06 PLACING FILL IN CASING

a. When required, the Contractor shall completely fill the annular space between the pipe and the casing with approved sand to prevent pipe flotation.

b. The Contractor shall accomplish the filling by pouring or pumping from the two ends as necessary.

3.07 RESTORATION OF TRENCH LINES

a. Where pipe must be laid across the bore pit, the pit shall be filled with compacted granular material to the pipe spring line.

b. Trench backfill and surface restoration shall conform to the specification contained herein.

PART 4. SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

a. When not listed in the proposal, all "CARRIER PIPE AND BORED CASING" costs will be considered incidental work for which no separate payment will be made.

b. When listed in the Proposal, payment for work specified under this section will be made at the prices named in the Proposal and as outlined below, complete and acceptable to the Engineer.

1) Payment for bored crossing to be made at the lump sum price named in the Proposal installed complete, tested, disinfected and acceptable to the Engineer.

c. Payment to include complete compensation for all labor, materials, equipment and incidentals necessary to install bored crossing to the pay limits shown on plans. Payment includes complete compensation for all bore pits, backfill, casing, carrier pipe and temporary fencing, berms and/or guardrails. No additional compensation to be allowed.

d. No payment to be made for pipe or valves which have not passed a hydrostatic leakage test.

END OF SECTION

SECTION 02635
DIRECTIONAL DRILLING

PART 1. GENERAL

1.01 SCOPE

a. This section includes all work necessary to install all directionally drilled crossings and all related work for the construction of the designated pipeline and other incidental work.

b. Work shall include, but is not limited to, the following:

1) Obtain all necessary permits, bonds and insurance required by regulating authorities.

2) Furnish and install pipe crossing as shown on the drawings.

3) Coordinate with regulating authorities.

4) Furnish any and all protective fencing, berms and/or guard rails as required by the regulating authority.

5) Providing temporary traffic control as required by the regulating authority and by Section 01505 of these Specifications.

1.02 SUBMITTALS

a. Submittals shall conform to the requirements of these Contract Documents and shall include:

1) Proof of insurance.
2) Copies of applicable permits.

PART 2. PRODUCTS

2.01 EXCAVATION AND BACKFILL

a. Conform to requirements of applicable sections contained herein.

b. Backfill with same material as that used for carrier pipe.

2.02 CARRIER PIPE

a. Carrier pipe shall conform to the plan requirements and specifications contained herein.

PART 3. EXECUTION

3.01 GENERAL

a. Construction in all cases shall conform to the requirements of regulating authority. A minimum of two (2) days notice to the regulating authority is required prior to entry of right-of-way for construction.

b. Before the start of work, Contractor shall submit satisfactory evidence to the Engineer that he has complied with all permit and insurance requirements.

c. Temporary fencing and warning barricades shall be installed around the drilling machine in accordance with all Federal, State, local and regulating authority requirements.

3.02 EXCAVATION

a. Excavation shall be unclassified and shall include whatever materials are encountered to the depths shown or required. Contractor shall provide shoring and dewatering as required. Shoring and dewatering systems shall be of Contractor's design.

3.03 INSTALLATION OF CARRIER PIPE

a. General

1). Carrier pipe shall not deviate from established line or grade at either end by more than the following:

Line	±1.0 feet
Grade	±0.5 feet

2). The Contractor shall first drill a pilot hole (diameter as determined by Contractor) in the alignment of the new pipeline. A reamer of sufficient size to accommodate the new pipeline shall be pulled back to preream the hole. The carrier pipe shall then be pulled back to the extents shown on the drawings.

b. PVC Pressure Pipe

1) Where the drawings indicate the use of PVC pipe Certa-Loc C900 shall be used with restrained couplings.

2) Deflection of the pipe shall be no greater than 75% of the manufacturer's recommended deflection.

c. HDPE Pressure Pipe

1) Where the drawings indicate the use of HDPE pipe, the joints of pipe shall be butt-fusion welded together in accordance with manufacturers recommendations. The ends of the pipe shall have a flange fitting welded where the drawings indicate it shall be attached to pipe of other materials.

2) HDPE pipe shall only be used with permission of Ute Water's Engineer.

3.04 RESTORATION OF TRENCH LINES

a. Trench backfill and surface restoration shall conform to the specification contained herein.

PART 4. SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

a. When not listed in the proposal, all "CARRIER PIPE " costs will be considered incidental work for which no separate payment will be made.

b. When listed in the Proposal, payment for work specified under this section will be made at the prices named in the Proposal and as outlined below, complete and acceptable to the Engineer.

c. Payment to include complete compensation for all labor, materials, equipment and incidentals necessary to install directionally drilled crossing to the pay limits shown on plans. Payment includes complete compensation for all bore pits, backfill, casing, carrier pipe and temporary fencing, berms and/or guardrails. No additional compensation to be allowed.

d. No payment to be made for pipe or valves which have not passed a hydrostatic leakage test.

END OF SECTION

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SECTION 02667
WATER DISTRIBUTION SYSTEM

PART 1: GENERAL

1.01 SCOPE

a. This section includes the construction of buried water distribution pressure piping from 4-inches in diameter and larger and appurtenances as shown on the drawings or as required to complete the work.

b. Work under this section shall include, but not be limited to the following:

1) Installation of all buried pipe, fittings, joint restraints, valves, fire hydrant assemblies and service connection assemblies.

2) Installing connections to all existing and/or new facilities and provide temporary services as required.

3) Pressure testing of new pipe lines and appurtenances.

4) Disinfecting new pipelines and appurtenances dechlorination and flushing for a complete and operable system.

1.02 QUALITY CONTROL

a. Laboratory Services: Water quality testing services shall be provided by the Ute Water Conservancy District.

b. Field Inspection:

1) All new water distribution pressure piping installations shall be inspected by a Representative of the Ute Water Conservancy District. Inspection shall begin at the beginning of construction and continue through the testing disinfection and flushing operations. Any defective work discovered after installation shall be removed and correctly replaced in a manner satisfactory to the Engineer, or Ute Water Districts Representative at the Contractor's expense.

2) All defective materials shall be suitably marked and removed from the job site before the end of the following day.

c. Final Inspection and Acceptance: The acceptance of all pipelines by the Ute Water District will be based on the following:

1) Submittal of satisfactory results of required test (such as pressure test, leakage tests, disinfection tests, compaction tests, etc.) certified by an Engineer or approved by a certified testing laboratory.

2) Passing a final inspection of the work by the Ute District.

3) Submittal of "As-Built" construction drawings.

4) Restoration of all non-public surface disturbance.

5) Restoration of all surface disturbance within the public right-of-way to the satisfaction of the City, County or State.

6) Contractor shall warrant the work for a period of one year from the date of acceptance against defects in material and workmanship.

1.03 SUBMITTALS

a. Submittals shall be in accordance with the requirements of these Contract Documents and shall include the following:

1) Material and pressure class schedule of all pipe fittings and appurtenances.

2) Special joint details and any special provisions required for assembly.

3) Manufacture's literature for each size and type of pipe, fittings and valve proposed.

4) A certificate from the pipe, valves and fittings manufacturer stating that the materials have been sampled and tested in accordance with the provisions of and meet the requirements of the designated specification.

PART 2. PRODUCTS

2.01 PIPE

a. General

1) Pipe buried underground, unless otherwise specified or shown, shall be bell and spigot with rubber gasket (push-on) type joints in straight runs and mechanical joints each way from bends. The spigot end of each pipe shall be marked to indicate when the pipe is properly inserted in the bell.

2) All gaskets shall be a single molded rubber ring fitted into a specially shaped recess and forming a pressure tight seal.

3) All ductile iron pipe and fittings shall be polyethylene encased conforming to AWWA C-105.

b. Ductile Iron (DI) Pipe

1) All ductile iron pipe shall be centrifugally cast in conformance to AWWA C-151 unless otherwise specified.

2) All ductile iron pipe shall be minimum Class 52 thickness, unless otherwise shown or specified.

3) Ductile iron pipe shall be cement lined per AWWA C-104.

4) Restrained Joint Pipe

a) All ductile iron pipe and fittings where shown on the Drawings to be restrained shall be positively restrained push-on joint pipe capable of being deflected after assembly and conforming to specifications contained herein.

5) All pipe shall be as manufactured by Pacific States, US Pipe, Tyler Pipe, or approved equal.

c. PVC Pressure Pipe

1) 2-inch Through 3-inch Pipe Schedule 40 PVC

a) Unless otherwise shown on the drawings, PVC pressure pipe 2-inches through 3-inches in diameter shall be Schedule 40, socket type solvent weld joints.

b) Solvent weld glue and primer shall be "Wet & Dry" for all solvent weld joints.

2) 4-inch Through 12-inch (AWWA C-900 or AWWA C-909)

a) Unless otherwise shown on the drawings, PVC pressure pipe 4-inches through 12-inches in diameter shall conform to the requirements of AWWA C-900 or AWWA C-909 (design stress of 4000 psi), NSF ap-

proved, with cast iron pipe equivalent (CI) outside diameter dimensions and conforming to the following:

(1) Shall be minimum Class 150 pipe with wall thickness equivalent to a standard dimension ratio (SDR) of 18.

3) 14-inch Through 24-inch Pipe (AWWA C-905)

a. Unless otherwise shown on the drawings, PVC pressure pipe 14-inches through 24-inches in diameter shall conform to the require ments of AWWA C-905, NSF approved, with cast iron pipe equivalent (CI) outside diameter dimensions and conforming to the following:

(1) Shall be minimum Class 165 pipe with wall thickness equivalent to a standard dimension ratio (SDR) of 25.

4) All pipe shall be as manufactured by J-M Pipe and P-W Pipe, or approved equal.

d. HDPE (Polyethylene) Pressure Pipe

4) Unless otherwise shown on the Drawings, PE pressure pipe 4-inch and larger in diameter shall conform to the requirements of AWWA C-906, NSF approved, and shall be a minimum of Pressure Class 150 pipe.

5) HDPE pipe shall only be used where approved by Ute Water's Engineer.

2.02 PIPE JOINTS

a. General

1) Gaskets and glands shall be provided by the manufacturer of the fitting on which they are to be used and shall be specifically designed for the pipe OD equivalent used.

2) Where required a non-toxic vegetable soap lubricant shall be supplied with the pipe or fittings in sufficient quantities for installing the pipe.

3) All MJ bolts shall be Cor-Blue bolts or approved equal.

4) All flange bolts shall be stainless steel. All stainless steel bolts shall receive a coating of "anti-seize" on the threads prior to installation.

b. Ductile Iron Pipe Joints

1) Push-On Joints

a) All push-on joints shall be single rubber gasket push-on joints conforming with the requirements of AWWA C-111 unless otherwise specified. Gaskets and lubricant shall be provided by the manufacturer of the pipe on which they are to be used.

b) Restrained Push-On Joints

(1) Restrained joint ductile iron pipe and fittings shall have a flexible, positively restrained push-on joint system capable of being deflected after assembly.

(2) Unless otherwise specified, all restrained joint ductile iron pipe and fittings shall be "TR-Flex" as manufactured by U.S. Pipe or approved equal.

2) Mechanical Joints

a) All components of mechanical joints shall be in conformance with AWWA C-111.

b) Retainer Glands

(1) Retainer glands shall be used at locations shown on the drawings.

(2) The use of retainer glands in lieu of concrete for thrust restraint is limited to applications specified herein or shown on the drawings.

(3) Retainer glands shall be "Mega-Lug" as manufactured by EBAA Iron Inc., or approved equal.

3) Flanged Joints

a) Flanged joints for ductile iron pipe shall conform to the requirements of AWWA C-115. Unless otherwise shown or specified, flanged spools shall be minimum Class 53 thickness. Gaskets shall be 1/8-inch thick rubber, full face, conforming to the pipe manufacturer's requirements and AWWA C-111.

b) Adapter Flanges

(1) Where shown on the drawings or approved by Engineer, adapter flanges for use in making custom ductile iron spools shall be Uni-Flange Series 200 for pipe 4-inches through 12-inches in diameter, and Uni-Flange Series 400 for pipe greater than 12-inches in diameter, as manufactured by Uni-Flange Corporation, or approved equal.

(2) Gaskets shall conform to AWWA C-111 and shall be provided by the manufacturer of the adapter flange.

(3) Set screws shall be square head design. A listing of the manufacturer's torque installation requirements for all pipe thicknesses shall be included with the adapter flange.

c. PVC PIPE JOINTS

1) Push-On Joints

a) All push-on joints shall be single rubber gasket push-on joints conforming with the requirements of AWWA C-111 unless otherwise specified. Gaskets and lubricant shall be provided by the manufacturer of the pipe on which they are to be used.

2) Mechanical Joints

a) All components of mechanical joints shall be in conformance with AWWA C-111.

3) Restrained Joints

a) Joint restraints shall be used at locations shown on the plans.

b) The use of joint restraints in lieu of concrete for thrust restraint is limited to applications specified in the Contract Documents or approved by the Engineer. Joint restraints shall be specifically designed for use on PVC pipe.

c) All MJ reducers require joint restraints regardless of the use of concrete thrust blocks.

d) All in-line MJ valves require joint restraints regardless of the use of concrete thrust blocks.

e) Joint restraints shall be Uni-Flange Series 1300, 1350 or 1390, as manufactured by Uni-Flange Corporation or approved equal.

4) Adapter Flanges

a) Where shown on the drawings or approved by Engineer, adapter flanges for use in connecting PVC pipe to flanged fittings shall be Uni-Flange Series 900 as manufactured by Uni-Flange Corporation, or approved equal.

b) Gaskets shall conform with AWWA C-111 and shall be provided by the manufacturer of the adapter flange.

d. HDPE (POLYETHYLENE) PIPE JOINTS

1) All joints between Polyethylene pipe and Polyethylene fittings shall be made by thermal butt-fusion. Thermal butt-fusion shall be conducted only by persons who have received training in the use of the fusion equipment according to the recommendations of the pipe supplier or the equipment supplier. When different polyethylene piping materials must be joined, both pipe manufacturers shall be consulted to determine the appropriate fusion procedures.

2) When Polyethylene pipe is being joined to pipe of other materials a polyethylene flange assembly consisting of a metal back-up flange or ring and a polyethylene stub-end or flange adapter shall be used.

3) When approved by the Engineer a mechanical joint type weld-on fitting may be used to connect to ductile iron fittings.

2.03 DUCTILE IRON (DI) FITTINGS

a. General

1) All fittings shall be mechanical joint unless otherwise specified or shown on the drawings.

a) All tees shall be flanged with a Flanged by MJ valve bolted directly to the tee.

b) If size 2" and 3" pipe line is installed off a tee, use IP tapped companion flange, stainless steel nipple (4" minimum length) and IP threaded gate valve.

2) Unless otherwise shown or specified, all fittings shall be as manufactured by Mueller, Tyler, US Pipe or approved equal.

b. Mechanical Joint Fittings

1) All MJ tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 16-inches in diameter shall be ductile iron compact fittings in conformance with AWWA C-153.

2) All MJ tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings greater than 16-inches in diameter shall be ductile iron fittings in conformance with AWWA C-110.

3) Unless other specified, the minimum working pressure for all MJ or ductile iron fittings 4-inches through 16-inch in diameter shall be 350 psi.

4) Unless otherwise specified, the minimum working pressure for all MJ or ductile iron fittings greater than 16-inches in diameter shall be 250 psi.

c. Flanged Fittings

1) All flanged tees, crosses, elbows, reducers, adapters, combinations thereof, and other miscellaneous fittings 4-inches through 48-inches in diameter shall be ductile iron fittings in conformance with AWWA C-110.

2) Unless otherwise specified, the minimum working pressure for all flanged ductile iron fittings shall be 250 psi.

2.04 DUCTILE IRON (DI) COATINGS AND LININGS

a. All pipe and fittings, with the exception of solid sleeve couplings, shall be cement-mortar lined and seal coated in accordance with AWWA C-104.

b. Pipe or fittings which have a damaged cement lining or no cement lining will be rejected at the job site. Cement linings that are installed or repaired by the distributor/supplier shall be completed in strict accordance with AWWA C-104. Cement linings shall not be repaired at the job site.

c. All DI pipe and fittings buried underground shall be coated on the outside with a standard coating of black bituminous paint a minimum of 1 mil thick unless otherwise specified. The finished coating shall be continuous, smooth, neither brittle when cold nor sticky when exposed to the sun, and shall be strongly adherent to the pipe.

d. Unless otherwise specified, DI pipe used within buildings and structures and which is to receive field coats of paint shall not be coated with any black bituminous paint. Such pipe, after proper cleaning, shall be painted with one coat of primer paint that is compatible with the field coats. Painting specifications shall be followed for cleaning and painting.

2.05 COUPLINGS AND ADAPTERS

a. Mechanical joint couplings and adapters shall be limited in their application to connection of new pipe work to existing waterlines, temporary installations, and where specifically called for in the Contract Documents or approved by Engineer.

b. Mechanical joint couplings and adapters shall be solid sleeve type couplings consisting of a ductile iron sleeve, ductile iron follower rings, rubber gaskets, and corrosion-resistant bolts and hex nuts (Cor-Blue or approved equal).

c. Mechanical joint couplings and adapters shall have minimum pressure ratings that will accommodate maximum pressures which will be experienced during hydrostatic and leakage testing.

d. Mechanical joint couplings and adapters shall be as manufactured by Romac, Smith Blair, Dresser, Rockwell or approved equal.

2.06 VALVES

a. General

1) All valves and appurtenances shall have the name, monogram, or initials of the manufacturer cast thereon. They shall be built and equipped for the type of operation as specified herein or as shown on the drawings.

2) Where requested by the Contractor and approved by the Engineer, additional valves may be installed by the Contractor to facilitate installation, testing, or connection to existing pipe work. Unless otherwise specified in writing by the Engineer, such valves requested by the Contractor shall be provided at no additional cost to the Owner.

3) All buried valves shall be supplied with a 2-inch square operating nut. Operating nut shall be 1-5/16 -inch square at the top, 2-inch square at the base and 1-3/4 - inches high. Extension stems shall be provided for buried valves when the operating nut is four (4) feet or more below finished grade. Extension stem shall extend to within twelve (12) inches of the ground

surface and shall be provided with spacers which will center the stem in the valve box.

4) At the minimum, joint restraints will be required at the valve; additional joint restraints maybe required at adjacent joints depending on proximity to the valve, test pressure and line size, with the approval of the Engineer.

5) Unless otherwise specified, all valves shall have a minimum pressure rating that will accommodate maximum pressure which will be experienced during hydrostatic leakage testing.

b. Valve Boxes (VB)

1) A cast iron valve box and lid shall be provided for each underground valve. Valve boxes shall be slip type sized for the type of valve and depth of bury. The lid shall have the word "water" permanently cast on the top. All buried valves shall be provided with valve boxes. Valve boxes shall be 564A, with formed top to receive insert type traffic cover or approved equal.

2) All parts of valve boxes, bases, and covers shall be coated by dipping in bituminous varnish.

c. Gate Valves (GV)

1) Unless otherwise specified or shown on the drawings, all gate valves shall be resilient seat wedge gate valves, cast iron body, fully bronze mounted with non rising stem. The stem and all wearing surfaces shall be bronze or other approved non-corrosive material.

2) Except as modified herein, gate valves and appurtenances shall conform to the requirements of AWWA C-509 covering iron-body, resilient seat non-rising stem gate valves 3-inches through 12-inches diameter.

3) All packing box bolts shall be stainless steel.

4) All gate valves shall open left (counter clockwise).

d. Tapping Valves

1) Tapping valves shall be furnished with flanged inlet end connections having a machined projection on the flange to mate with a machined recess on the outlet flange of the tapping tee. The outlet ends shall conform in dimensions to the AWWA Standards for hub or mechanical joint conditions, except that the outside of the hub shall have a large flange for attaching a drilling

machine. The seat opening of the valves shall be larger than normal size to permit full diameter cuts. Tapping tees shall be of the same manufacture as the tapping valve.

e. Butterfly Valves (BFV)

1) All butterfly valves shall conform to AWWA C-504, except as herein modified.

2) Unless otherwise specified or shown on the drawings, valves shall be flanged end, short body type AWWA Class 150-B, with totally enclosed, geared, manual operator. Flanges shall be 125 pound, full faced, drilled per ANSI B16.1.

3) Valves shall be rated by the manufacturer at 350 psi.

4) All bolts shall be stainless steel.

f. Air Release Valves (ARV)

1) Air release valves shall be sized as shown on the Drawings and manufactured by APCO or approved equal.

2) Air release valves shall be installed at the locations and in accordance with the details shown on the drawings.

2.07 SERVICE PIPE FITTINGS AND TAPPING SADDLES

a. All water service lines shall be seamless Type K copper pipe, conforming to AWWA C-800, 160 psi rated.

b. Unless otherwise shown on the drawings, service pipe shall be 3/4-inch.

c. Each individual residential water service connection shall be equipped with a locking meter stop at the inlet to the meter. All meter stops shall be bronze with copper pipe connector and outlet for meter coupling.

d. All water service connections shall be provided with a corporation stop. All corporation stops shall be bronze with full-way bore with inlets for AWWA iron pipe threads and straight flared or compression outlets to adapt to copper pipe. Corporation stops shall be Mueller Type 300 Ball Valve (B-25025 or B-25028) or approved equal.

e. All services shall be saddle tapped using bronze saddles with bronze or stainless steel bolts and clamps. Service Saddles shall be Mueller Series H-16000 Double Strap with AWWA taper thread or approved equal.

f. All services on PVC water lines shall be saddle tapped using bronze saddles specifically designed for use with PVC pipe with IPS threads and bronze or stainless steel bolts. Tapping saddles for PVC pipe shall be Ford Model 202B with stainless steel band, Clow Brass Service Saddle Style 3407 or 3408, Mueller Series H-1600 double strap or approved equal.

2.08 WATER METERS

a. All meter pits, yokes and water meters shall be provided by the Ute Water Conservancy District.

b. Where connecting to existing water meters, Contractor shall supply all required fittings to make connection.

2.09 FIRE HYDRANTS

a. All fire hydrants shall conform to local fire district requirements.

b. Unless otherwise required by local fire district requirements, all fire hydrants shall conform to the following:

1) All fire hydrants shall be improved, dry barrel type and shall conform to requirements of AWWA C-502. The standard hydrant shall have a six-inch connection, a 5-1/4-inch main valve opening, two (2) 2-1/2-inch hose ports and one (1) 4-1/2-inch pumper port. The hydrant barrel shall be marked with a circumferential rib to denote the intended ground line. The centers of the hose nozzles and pumper nozzle shall be at least 14-inches above the ground grade line.

Hydrants shall be of the "traffic" or "breakaway" design, having easily replaceable breaking devices for the gradeline flange and operating stem that prevents damage to the barrel sections upon impact.

The operating nut and port cap wrench nuts shall be 1-3/8-inch pentagon, measured from point to opposite flat side at the base. The height of the nut shall not be less than one inch.

The nozzle caps shall be removed and the operating nut opened by turning to the left (counter-clockwise). Nozzle caps shall be securely chained to the upper barrel section.

The 2-1/2-inch hose nozzles shall be National Standard fire hose thread.

The pumper port shall be Mueller 4-512 or equal with the following requirements:

a) Outside diameter of male thread is 5.282 inches.
b) Diameter of root male thread is 4.932 inches.
c) Number of threads per inch is 4.
d) Pitch diameter is 5.12 inches.

2) PAINTING:

a) In the Grand Junction Fire District and the Grand Junction Rural Fire District fire hydrants shall have the caps and bonnet painted "Safety Yellow" and the body of the hydrant "Safety Green".

b) In all other Fire Districts fire hydrants shall be painted "Safety Red".

3) Fire hydrants shall be oriented so as to optimize access to ports, or as directed by the Engineer.

4) Ute Water standard detail for fire hydrant assemblies require concrete thrust blocks as shown regardless of the use of joint restraints.

5) Fire hydrants shall be Mueller Centurian or Clow Medalion or as approved by the local jurisdiction.

2.10 TAPPING TEES

a. Tapping tees used for making connections to existing, in-service lines shall have Class 125 outlet flanges.

b. In all cases, the tapping tee shall be designed for use with the existing pipe materials and OD equivalent.

c. Unless otherwise specified or approved by the Engineer, all tapping tees shall be furnished with a fusion bonded epoxy coating conforming to the requirements of AWWA C-550.

d. The tapping tees shall be as manufactured by Mueller, or approved equal.

2.11 BACKFILL AND BEDDING MATERIAL

a. Unless otherwise shown on the drawings or specified herein, all pipe bedding materials shall be in conformance with the applicable excavation and backfill specifications contained herein.

2.12 CONCRETE

a. Concrete for thrust blocks shall be Portland Cement concrete with minimum compressive strength at 28 days of 3000 psi.

b. Reinforcing steel shall be deformed bars conforming to ASTM A-615, Grade 60.

2.13 TONING WIRE

a. A continuous insulated 10 gauge solid copper toning wire shall be supplied with non-metallic pipe. Insulation shall be direct burial type.

b. Additional wire shall be installed as necessary to allow the toning wire to be looped up at all valve boxes and hydrants on all lines.

PART 3. EXECUTION

3.01 PRODUCT HANDLING

a. Care shall be taken in handling and transporting to avoid damaging pipe and appurtenances. Loading and unloading shall be accomplished with the material under control at all times and under no circumstances shall the material be dropped. Material shall be securely wedged and restrained during transportation and supported on blocks when stored in the shop or field. Manufacturer's recommendations shall be carefully followed during material handling and storage.

b. Store all pipe on a flat surface so that the blocking will support the barrel evenly. It is not recommended that pipe be stacked higher than four (4) feet. Plastic pipe, if stored outside for long periods of time shall be covered with an opaque material to protect it from sunlight.

c. Lower all pipe and fittings into trench in a manner to prevent damage to pipe or fittings. Heavy impact may cause a slight longitudinal indentation in the outside of PVC pipe and a crack on the inside. This may result in a split as soon as the pipe is placed under pressure. Any pipe that has been impacted shall be examined closely for this type of damage.

3.02 PREPARATION OF TRENCH

a. Trench excavation shall conform to requirements of applicable sections contained herein.

b. Unless otherwise specified or shown on the drawings, the width of the trench at the top of the pipe shall not exceed the values outlined below. Trench widths are based on the width of the pipe plus the distance from each side of the pipe to the face of the trench (or the back of the sheeting, if used).

1) For pipe twenty-four (24)-inches in diameter or less, trench width shall not exceed width of the pipe plus nine (9) inches on each side.

i) For pipe greater than twenty-four (24)-inches in diameter, trench width shall not exceed width of the pipe plus fifteen (15) inches on each side.

c. Unless otherwise directed or called for on the drawings, all pipe trenches shall be excavated below the proposed pipe invert as required to accommodate the depths of pipe bedding material as scheduled on the drawings.

3.03 GRADE AND ALIGNMENT

a. All waterlines shall be installed with a minimum depth of bury of 54-inches measured from the top of pipe to finish grade unless specifically approved by Ute Water's Engineer. A greater depth may be necessary to avoid underground obstructions. A minimum of six (6) inches of clearance shall be maintained between the pipe and obstructions.

b. When waterlines are designed to be laid in a straight line and/or at a specific grade, the deviation from line and grade shall not be in excess of 0.2 feet horizontally for line and 0.1 feet vertically for grade.

3.04 UTILITY CONFLICTS

a. The Contractor shall be responsible for exposing potential utility conflicts far enough ahead of pipeline construction to make necessary adjustments in grade and alignment of the new work within the recommended limits of pipe and fitting deflection and/or the lines and grades stated in the Contract Documents.

b. The Contractor shall be responsible for informing the Engineer of the need for a grade and/or alignment adjustment.

c. The Contractor shall not deviate from the design line and grade stated in these Contract Documents without the approval of the Engineer.

3.05 SANITARY SEWER CROSSINGS

a. The physical relationship between water lines and sanitary sewers shall conform to requirements of the Colorado State Department of Health. The minimum horizontal spacing between sewer lines and water lines shall be ten (10) feet measured center line to center line.

b. Where sewer lines and water lines cross, the sewer pipe shall be a minimum of eighteen (18) inches clear distance vertically below the water line. If this clear distance is not feasible, the crossing must be constructed so as to protect the water line. Minimum protection shall be as follows:

1) When sewer crosses over water pipe, no matter what the separation distance, the sewer line shall be concrete encased with reinforced concrete to a distance of 10-feet on each side of the waterline as shown on the Standard Detail Drawing.

2) When the sewer crosses under the water pipe with less than 18-inches separation the sewer line shall be concrete capped to springline a distance of 10-feet on each side of the waterline as shown on the Standard Detail Drawings.

c. In all cases, suitable backfill or other structural protection shall be provided to preclude settling and/or failure of the sewer or water piping, especially the higher pipe.

d. Contractor shall contact Engineer when sewer lines are found within the above described zone. Engineer may field verify the need for concrete encasement of sewer lines. Contractor shall install ductile iron sewer lines only after direction from the Engineer.

3.06 OPERATION OF EXISTING VALVES

a. The Owner will operate or supervise the operation of all existing valves during the course of the work. The Contractor shall not operate any existing valve unless specifically instructed to do so by the Engineer or the Owner.

b. The Contractor shall be responsible for coordination of the work with the Owner to provide for the timely operation of existing valves.

c. The Contractor shall coordinate and perform the work so as not to require the Owner's personnel to operate any valves outside of the Owner's normal work hours.

3.07 SANITARY PRACTICES DURING INSTALLATION

a. Pipe shall not be laid in standing water. Precautions shall be taken to prevent dirt, debris, or other foreign materials from entering the pipe during all phases of construction. Tools, rags, and other materials shall be kept out of the pipe at all times.

b. At the end of each day, or at other times when the trench site is left unattended, the open ends of the pipe shall be sealed with a water tight plug to prevent trench water and foreign materials from entering the pipe. If water is in the trench, the seal shall remain in place as long as water is able to enter the pipe.

3.08 PIPE INSTALLATION

a. Pipe shall be laid and joined one length at a time to the required line and grade. Pipe shall be placed with the bell end facing the direction of laying unless otherwise specified.

b. Where pipe is laid on grades in excess of fifteen percent (15%), the bells shall face upgrade. Where pipe is laid on grades in excess of twenty percent (20%), pipe anchorage systems shall be required.

c. The outside of the spigot and the inside of the bell shall be clean before the pipe or fittings are installed. If the pipe contains dirt or other foreign matter, the interior of the pipe shall be cleaned as necessary to remove the material prior to installation.

d. As the pipe is placed in the trench, bell holes shall be dug and the pipe supported on bedding materials the full length of the barrel.

e. Where required, lubricate the outer surface of the rubber gaskets and the spigot end of the pipe using approved lubricant.

f. Assemble the pipe in accordance with the manufacturers recommendations. Regardless of the method used to assemble the pipe, the pipe shall be kept in alignment during installation of the spigot into the bell end or the fitting.

g. After each length of pipe is installed in the trench, the pipe shall be secured in place with approved backfill material tamped under and along sides to prevent movement. Additional backfill material shall be placed and compacted in 12-inch layers to the height shown on the plans and details or as directed. The remainder of the trench shall be backfilled as specified and called for in these Contract Documents.

h. Pipe ends shall be kept clear of backfill at all times.

i. Wherever piping passes through walls, a wall casting pipe or sleeve shall be installed unless otherwise shown on the drawings.

3.09 FITTING INSTALLATION

a. All connections shall be made in strict accordance with manufacturer's recommendations.

b. The connection of pipe with plain ends of the same diameter in new construction shall be accomplished with ductile iron, mechanical joint sleeve couplings unless otherwise approved by the Engineer.

c. Contractor shall use the correct rubber ring with the ductile iron bell or fitting, (Tyton ring with Tyton bell; MJ ring with MJ fitting) and specifically designed for the pipe OD equivalent used.

3.10 CUTTING PIPE

a. General

1) Where new or existing pipe requires cutting in the field it shall be done in a manner to leave a smooth end at right angles to the pipe centerline. The pipe shall be marked around its entire circumference prior to cutting.

2) After cutting and dressing or beveling, the reference mark on the spigot shall be accurately relocated and marked at the proper distance from the end as recommended by the manufacturer. The reference mark may be located by using a factory marked end of the same size as a guide.

b. Ductile Iron Pipe

1) Ductile iron pipe shall not be flame cut.

2) The cut end of the pipe shall be ground smooth as required. For push-on joint connections, the cut end shall be beveled as necessary to remove sharp edges which may damage the gasket. The width and general appearance of the bevel shall closely resemble the bevel on an original pipe end.

3) Any lining or coating damaged during the cutting process, as determined by the Engineer, shall be cause for removing the damaged section by recutting the pipe or for rejecting the pipe altogether.

c. PVC Pipe

1) For push-on joint connections, the cut end shall be beveled as specified herein.

2) Factory finished beveled end may be used as a guide to determine the angle and length of taper. The end may be beveled using a plastic pipe beveling tools which will cut the correct taper automatically. A portable type sander or abrasive disc may also be used to bevel the pipe end. Any equivalent tool or equipment which will produce a smooth bevel surface may be substituted.

3.11 CONNECTION TO EXISTING, IN-SERVICE MAINS

a. The Contractor must provide at least 2 business days notice to the District prior to connecting to existing mains so that the District can notify customers of a planned outage.

b. Immediately prior to installation, all fittings, valves and appurtenances, including tool surfaces which will come in contact with potable water, shall be thoroughly cleaned by washing with potable water and then swabbed or sprayed with a one percent (1%) hypochlorite solution in accordance with the requirements of AWWA C-651.

c. Cut-In Connections

1) All valves shall be operated by or under the supervision of a Ute Water District Representative.

2) Prior to taking any waterline out of service, the Contractor shall assemble all personnel, equipment, and materials necessary to complete the work, completely assemble all fitting assemblies and check components for compatibility with the existing waterline, and accomplish all excavation that is required to make the connection in as short of time possible or within a time period approved by the Ute Water Representative.

3) Existing valves may leak. The Contractor shall be prepared to make required connections in situations where there is still a partial flow of water after the isolation valves have been closed.

4) In situations where an existing pipe joint is found adjacent to a proposed connection and the Engineer determines that construction operations may compromise the joint, the Contractor shall remove the existing pipe between

the joint and the new work as directed by the Engineer, and replace that section with new materials.

d. Tapping Tees

1) Contractor shall fully support the weight of the tapping tee, associated valve and the existing pipeline. Under no circumstances shall the weight of the tapping unit be supported by the existing pipe. Pipe which is damaged due to failure of the Contractor to follow this requirement shall be replaced at no additional cost to the Owner.

3.12 STANDARD MAIN BLOW-OFFS

a. At all permanent dead-ends on new waterlines and at other locations specified or shown on the drawings, a 2-inch blow-off assembly shall be installed as specified herein and in accordance with drawing details.

b. Valve boxes or meter boxes shall be provided for all blow-offs and shall be installed flush with finished grade and be kept free of rocks and debris.

3.13 PIPE ANCHORAGE

a. Pipe anchorage systems shall be installed as shown on the drawings or as specified herein.

b. All plugs, caps, tees, and bends of 11-1/4° or more on waterlines that are 4-inches in diameter or larger shall be securely anchored by concrete thrust blocking or restrained joints as approved by the Engineer. The use of threaded tie back rods for thrust restraint shall not be used unless specifically shown on the drawings or directed by the Engineer.

c. Thrust blocks shall be installed where specified herein, shown on the drawings, or as directed by the Engineer. Installation shall be in conformance with drawing details and the following:

1) All concrete thrust blocks shall be placed using forms as necessary to allow access to the bolt circles after the placement of the thrust blocking concrete. The bearing surface shall be placed so that the pipe and fitting joints will be accessible for repair. Concrete shall in no case extend around more than one-half the circumference of the fitting at any point.

2) A plastic sheet or other similar protection shall be placed between the concrete and any portions of the valve, fitting, or nuts and bolts with which the concrete comes in contact. Do not encase pipe joints or cover bolt circles with concrete.

3) Concrete thrust blocking shall be placed between undisturbed earth and the fittings to be anchored. If, in the opinion of the Engineer, the undisturbed earth against which the bearing surface will be established is compromised by adjacent trenches or excavations, the Contractor shall excavate additional material as required to establish a new bearing surface that is consistent with the size, configuration, and location of the piping.

3.14 SERVICE TAPS

a. Service pipe and fittings shall conform to plan details. Installation shall be in accordance with pipe manufacturer's recommendations.

b. All service on DI and PVC pipe shall be saddle tapped.

3.15 FIRE HYDRANTS

a. Installation of hydrants shall conform to plan details. Installation shall be in accordance with AWWA C-600 and set where indicated on plans or directed by the Engineer.

b. Hydrants shall be installed true and plumb.

c. Hydrants shall be set a minimum of three (3) feet behind the curb/sidewalk or within the utility corridor right-of-way unless otherwise shown or directed.

d. Hydrants shall set so that the center of the safety breakaway flange is located a minimum of 2 inches and a maximum of 6 inches above finished curb, sidewalk or finished grade.

e. Where utility conflicts may require changes in grade, Contractor shall pothole existing utilities far enough in advance to allow the proper height hydrants to be on hand.

f. Hydrants set too high shall be removed and replaced with an appropriate hydrant by the Contractor at no additional cost to the Owner. Extensions required for hydrants set too low shall be supplied and installed by the Contractor at no additional cost to the Owner.

3.16 VALVE AND VALVE BOX INSTALLATION

a. Valve installation shall be in accordance with AWWA C-600 and applicable sections contained herein. A valve box shall be supplied for each valve,

conforming to plan requirements and at locations shown on plans or staked in field.

b. Valve boxes shall be centered over the valve and installed plumb, with the cover flush with the finished grade. Valve boxes shall be set so they do not transmit shock or stress to the valves.

c. Backfill shall be placed around the valve boxes and thoroughly compacted in conformance with the compaction requirements for the adjacent backfill, and in a manner that will not damage or displace the valve box from proper alignment or grade. Misaligned valve boxes shall be excavated, plumbed and backfilled at Contractor's expense.

d. Toning wire, where required, shall be looped up at all valve boxes.

e. Valve boxes shall be kept free of rocks and debris at all times.

3.17 INSTALLATION OF TONING WIRE

a. Toning wire shall be placed on top of the pipe and taped to the top of the pipe using duct tape at about 8 foot intervals.

b. When splicing wire to connect a new roll of wire or to connect wire from lateral water lines the wire shall be tied together in an overhand knot, the end of the insulation strip off to expose at least 3/4" of bare wire, the wire twisted together , and then a silicone filled wire nut screwed over the end to completely cover and seal the exposed wire.

c. Wire shall be looped up into at least one valve box at all valve clusters and at all fire hydrants.

d. Contractor, at his expense, will be responsible for testing the toning wire to insure that there is complete continuity of signal. Each valve box shall be visually inspected to verify that the toning wire has been properly placed. The continuity of the toning wire shall be tested in each direction from a valve box or fire hydrant with an electronic locator. Any areas that do not show continuity will be fixed at the Contractor's expense.

3.18 CLEANING POTABLE WATER MAINS

a. All water mains shall be cleaned in accordance with AWWA C-650.

b. Minimum blowoff size for water mains shall be as shown in the following table:

Water Line Size	Minimum Blowoff Size
4″	1″
6″ – 8″	2″
10″- 16″	4″
18″ – 20″	6″

c. Prior to completion of pressure and leakage testing and prior to being placed into service, all new water mains and repaired portions or extensions of existing mains shall be disinfected by chlorination by the Contractor in accordance with AWWA Standard C 651 except as may be modified herein.

3.19 DISINFECTING POTABLE WATER MAINS

a. All water mains shall be disinfected in accordance with the requirements of AWWA C-651 except as modified herein.

b. The use of chlorine tablets glued into the pipe with permatex will not be allowed. All new water lines shall be disinfected by introducing chlorinated water from a water truck or other means, approved by the Engineer, into the new line. Chlorine residual shall not be less than 50 ppm

1) Dry chlorine powder, that has 68% Calcium Hypochlorite as the active ingredient, or liquid chlorine bleach, that has 5% by weight chlorine, shall be used at the rate as set forth:

a) Dry chlorine powder shall be mixed at the rate of 0.62 pounds of powder per 1000 gallons of water.

b) Liquid chlorine bleach shall be mixed at the rate of one gallon per 1000 gallons.

c) The amount of chlorinated water required for various sizes of water lines is shown in the following table:

CHLORINATED WATER REQUIRED FOR DISINFECTION

Pipe Diameter (in)	Cross-sectional Area (ft^2)	Volume per 100 feet of pipe (gallons)
2	0.02	16
3	0.05	37
4	0.09	66
6	0.20	147
8	0.35	261
10	0.55	408
12	0.79	588
14	1.07	800
16	1.40	1045
18	1.77	1322
20	2.18	1632
24	3.14	2350
30	4.91	3672

2) Powdered chlorine or liquid chlorine bleach shall be thoroughly mixed with clean water in a water truck or other storage container. After mixing the solution shall be tested to insure that it is at least a 50ppm chlorine residual. If there is not at least a 50ppm residual more powdered chlorine or liquid chlorine bleach shall be added to bring the residual up to 50ppm. The chlorine residual shall be tested using a commercially available chlorine residual tester that measures concentrations above 10ppm.

3) After the water line has been completed and before making connections to services or other water mains, except those shown on the drawings, water line shall be slowly loaded with chlorinated water from the water truck or tank until all air has been expelled. Air shall be bled from all service lines and fire hydrant laterals to insure adequate disinfection of all lines.

c. The dosage of chlorinating agent shall be of the amount to produce a minimum chlorine residual of 50 mg/L of free chlorine at all points in the line. Tests with the DPD method shall be made at selected points to determine the residual.

d. Where the Contractor chooses to use other methods for disinfecting the water line he shall submit a detailed plan to the Engineer, for Engineer's approval, indicating methods of introducing chlorine to the water line, methods for flushing the line and the means by which heavily chlorinated water will be disposed of.

e. Chlorinated water shall be retained in the lines for sufficient time to accomplish the desired disinfection but not less than 24 hours. All valves and hydrants in the line shall be operated during the retention period. At the end of this 24 hour period, the treated water in all portions of the main shall have a residual of not less than 25 mg/L free chlorine.

f. Valves shall be manipulated so that the strong chlorine solution in the line being treated will not flow back into lines adjoining the new line. Check valves may be used if desired.

g. The Contractor shall furnish required materials and apparatus and perform the work of disinfection. If additional taps and open trenches at points of connection are required, the Contractor shall bear the responsibility of making taps and maintaining open trenches until a satisfactory analysis has been obtained.

3.20 CLEARING THE MAIN OF HEAVILY CHLORINATED WATER

a. Following chlorination, all heavily chlorinated water shall be flushed into a water truck from the lines at their extremities until the replacement water throughout the lines shall, upon test, have a chlorine residual of no more than that of the existing system to which the new line is connected.

b. Heavily chlorinated water that is in the water truck shall be disposed of in accordance with all Federal, State and Local laws and regulations. The environment into which the chlorinated is to be discharged shall be inspected. If there is any possibility that the chlorinated discharge will enter any stream, storm drain, or any drainage feature, then a neutralizing chemical shall be applied to the chlorinated water prior to discharge from the water truck. The table below shows the neutralizing chemicals that can be used and their respective dosages, in pounds, per 1000 gallons of water:

CHEMICAL REQUIRED FOR DECLORINATING WATER

Residual Chlorine (ppm)	Sulfur Dioxide (SO_2)	Sodium Bisulfite ($NaHSO_3$)	Sodium Sulfite (Na_2SO_3)	Sodium Thiosulfate ($Na_2S_2O_3$-$5H_2O$)
1	0.008	0.012	0.014	0.012
2	0.017	0.025	0.029	0.024
5	0.042	0.063	0.073	0.060
10	0.083	0.125	0.146	0.120
25	0.21	0.313	0.365	0.30
50	0.42	0.625	0.73	0.60

3.21 FLUSHING AND CLEANING

a. After all of the heavily chlorinated water has been removed from the new water line, fire hydrants and service lines, the main shall be flushed to remove all dirt and debris that may be in the line. Contractor shall flush the line to obtain a minimum velocity of at least 2.5 fps in the line.

b. Upon completion of flushing Ute Water Conservancy District will take bacteria samples and provide the laboratory analysis. Should the initial treatment prove ineffective, the chlorination shall be repeated as set forth in Paragraph 3.19 at no additional cost to the Ute Water District until confirmed tests show acceptable results.

3.22 PRESSURE AND LEAKAGE TESTS FOR PRESSURE PIPE

a. The Contractor shall furnish the pump, pipe connections, taps, gauges, auxiliary water container, bulkheads, plugs and other necessary equipment and perform pressure and leakage tests on all lines unless otherwise directed by the Engineer. All equipment and material that will come in contact with water entering the distribution system shall be clean and disinfected prior to use. Water shall be potable water that has only been stored in clean disinfected containers.

b. Tests shall be conducted on all pipelines or valved sections thereof. Tests on lines anchored or blocked by concrete shall not be conducted until the concrete has taken permanent set.

c. Hydrostatic leakage testing shall be performed in conformance to the applicable sections of AWWA C-600 or local jurisdiction requirements, whichever is more stringent, except as modified below. Unless otherwise authorized by the Ute Water District, all hydrostatic leakage tests shall be witnessed by the Engineer or the Districts field Representative.

d. The test pressure shall be 150 lbs./sq. in., or 50 percent (50%) above the normal operating pressure, whichever is greater. Hydrostatic pressure shall be applied by pumping water from an auxiliary supply. The Contractor shall accurately determine the amount of water required to reach the initial test pressure and the amount required to repressurize the pipe structure at the completion of the test period.

e. The test pressure shall be maintained for a minimum of four (4) hours and additional time as required for thorough inspection to find any leaks or defects in the water main and appurtenances. Should the pipe section fail to pass the tests,

the Contractor shall find and correct failures and repeat the tests until satisfactory results are obtained at no additional cost to the Owner.

f. Where test pressure is 250 psi or less, the hydrostatic test shall be performed with the hydrant line valves open.

g. Air Removal - Before applying the specified test pressure, air shall be expelled completely from the pipe, valves, and hydrants. If permanent air vents are not located at all high points, the Contractor shall install corporation cocks at such points so that the air can be expelled as the line is filled with water. After all the air has been expelled, the corporation cocks shall be closed and the test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and plugged or left in place at the discretion of the Owner.

h. Allowable Leakage

1) No pipe installation will be accepted if the leakage is greater than that determined by the formula outlined below or local jurisdiction requirements, whichever is more stringent.

$$L = \frac{SD\sqrt{P}}{133{,}200}$$

Where:

L = allowable leakage, in gallons per hour
S = length of pipe tested, in feet
D = nominal diameter of the pipe, in inches
P = average test pressure during the leakage test, in pounds per square inch (gauge)

NOTE: This formula is based on an allowable leakage of 11.65 gpd/mi./in. of nominal diameter at a pressure of 150 psi.

2) The allowable leakage in gallons per hour at various pressures and pipe sizes is shown below. In the event of discrepancies between formulas and table values, the more stringent shall apply.

ALLOWABLE LEAKAGE PER 1,000 FEET OF PIPELINE - *gph*

AVG. TEST PRESSURE *psi*	**NOMINAL PIPE DIAMETER - *in.***									
	3	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**
250	0.36	0.47	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.37
225	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84
125	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68
100	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50

3) If the pipe structure under test contains sections of various diameters, the allowable leakage shall be the sum of the computed leakage for each size. No additional leakage allowance will be given for fire hydrant assemblies.

3.23 CLEANUP

a. Cleanup and surface restoration area shall conform to the requirements contained herein and shall closely follow pipe-laying activities.

b. Contractor shall remove all excess materials, broken pavement, construction equipment, etc., within three (3) days after pipe is laid in any area.

c. Contractor shall level and resod lawn areas, grade and gravel shoulder or parking areas, and replace any signs, mailboxes, etc. which were removed or damaged.

PART 4. SPECIAL PROVISIONS

4.01 MEASUREMENT AND PAYMENT

a. When not listed in the Proposal, all "WATER DISTRIBUTION SYSTEM" costs will be considered incidental work for which no separate payment will be made.

b. When listed in the Proposal, payment for work specified under this section will be made at the prices named in the Proposal for the following items installed, tested, disinfected and acceptable to the Engineer.

1) Mainline pipe to be paid for at the unit prices named in the Proposal for each size and type of pipe. Length to be measured horizontally along centerline of pipe without deducting for valves and fittings. Unless otherwise listed in the Proposal, cost of mainline pipe fittings and appurtenances shall be included in the unit price for mainline pipe.

2) Unless otherwise listed in the Proposal, valves are to be paid for at the unit price named in the Proposal for each size and type of valve complete with valve box and cover.

3) Each fire hydrant assembly to be paid for at the unit price named in the Proposal. Payment for each fire hydrant assembly shall include hydrant, spool piece, gate valve, fittings, mainline tee, thrust blocking and all appurtenances, as well as excavation, backfill, compaction and surface restoration.

4) All mainline connections named in the Proposal to be paid for at the lump sum prices named in the Proposal. Unless otherwise listed in the Proposal, payment for each mainline connection shall include fittings, pipe thrust restraint and all appurtenances inclusive of valves, as well as excavation, backfill, compaction and surface restoration outside of the specified trench pay limits.

5) Each air release valve assembly to be paid for at the unit prices named in the Proposal. Unless otherwise listed in the Proposal, payment for each air release valve assembly to include fittings, pipe, valves, manhole, drain line and all appurtenances, as well as excavation, backfill, compaction and surface restoration.

6) All near and far side water service to be paid for at the unit prices named in the Proposal. Payment for each service to include fittings, pipe and all appurtenances, as well as sawcutting, excavation, backfill, compaction and surface restoration.

c. No payment to be made for pipe or valves which have not passed a hydro-static leakage test.

d. Quantities to be computed by the Engineer from measurement of actual work completed and accepted.

e. Installation of pipe anchorage and thrust restraint systems to be considered incidental work for which no separate payment will be made.

f. Payment indicated to include complete compensation for all labor, equipment, materials and incidentals involved in the work as listed in the Proposal and as specified under this section. No additional compensation to be allowed.

END OF SECTION