SPECIAL PROVISIONS

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"SPECIAL PROVISIONS"

SECTION I
"GENERAL REQUIREMENTS"

1.01 DESCRIPTION OF WORK
The Contractor shall furnish, in accordance with the Specification and Drawings, all plant, labor, equipment, and materials required for the construction of the project stated in the Contract Documents and Bidding Schedule.

1.02 SEQUENCE OF WORK
Prior to starting construction, the Contractor shall submit to the Owner a schedule, which shall show the estimated dates of completion of the various construction phases, from fabrication to field installation and connection to the existing systems.

The Owner reserves the right to alter this schedule in order to activate part of the project or coordinate its completion with others simultaneous construction projects.

1.03 COMPLETION OF WORK
All work must be substantially completed within the time specified in the Contract Documents. Final completion including re-pavement of asphalt surface and clean up must be completed within the time specified in the Contract Documents as well as the conditions set forth in the permit issued by the governing agency. ***If the Contractor does not complete the contracted work in the time allocated per the Specifications and the Notice to Proceed, he shall be liable to the Agency for all inspection time for each day after the established Contract completion date that the work remains incomplete. He shall remain liable until the job is approved and accepted by the Agency (for extension of time, see General Provisions, Section 6-6.2).***

1.04 LIQUIDATED DAMAGES
The Contractor shall, as provided in Section 6-9 of the General Provisions, pay to the Agency as fixed, agreed, and liquidated damages for each calendar days delay, in substantial completion and final completion of the work beyond the time agreed upon, the amount of **$800.00** per calendar day.

1.05 PRE-CONSTRUCTION MEETING
Following award of Contract, but prior to commencement of work, the Contractor shall establish a meeting with the Owner to review proposed construction and shall furnish the following items:

(A) A schedule of completing the principal items of work (Construction Schedule).

(B) Projection of monthly payments to be earned.

(C) A list of names, titles, addresses, and telephone numbers of the Contractor's responsible personnel indicating those who may be reached outside of normal working hours for emergency response.

(D) Provide a signed document stating that the Contractor has contacted the City of Upland Police Department, the City of Upland Fire District, County Fire District and the Chaffey Unified School District (Bus Division) of notification of commencement of work.

(E) Shop Drawings. All understandings, interpretations and agreements reached at said conference shall be reduced to writing by the Owner and mailed to all parties attending said pre-construction conference.

1.06 FAILURE TO COMPLY
If the Contractor cannot be contacted or fails to respond, or refuses to comply with instruction given by the City Inspector then, the Agency may take corrective action as necessary to protect

the roadway and traveling public. The Contractor shall reimburse the Agency for any such costs thereof.

1.07 CONSTRUCTION UTILITIES

(A) ***POTABLE WATER*** - All drinking water on the site, during construction, shall be furnished by the Contractor and shall be bottled water or water furnished in approved dispensers.

(B) ***CONSTRUCTION WATER*** – Water for construction, dust control, testing, compaction and other phases of the work requiring water, shall be furnished by the Contractor at his own expense and no additional allowance will be made therefor. The Contractor shall comply with all regulations of the appropriate Water and Fire agencies regarding connection to fire hydrants or standpipes.
The Contractor is advised to contact the San Antonio Water Company concerning the availability of water, cost of hydrant meter & cost of water.

The cost for water shall be included in the lump sum bid of the work and no additional allowance will be made therefor.

1.08 PERMITS AND LICENSE

Unless otherwise specified in the Bidding Schedule, the Agency shall secure the necessary permit for the construction of a water main from the San Bernardino County. At his own expense, the Contractor shall apply and obtain all other permits and licenses required for the execution of work under this Contract.

1.09 PRIVATE PROPERTY

Any private property damaged by the Contractor's operations shall be repaired or replaced in kind by the Contractor at his own expense and to the satisfaction of the property owner and/or the Agency's Inspector.

1.10 AS-BUILT DRAWINGS

The Contractor shall maintain on the job site a set of full size blue-line drawings. On these, he shall mark all as-built conditions, locations, configurations, and other details shown on the original Contract Drawings. Upon completion of work and prior to final acceptance, the as-built drawings shall be turned over to the Agency.

1.11 PROTECTION OF EXISTING UTILITIES

The Contractor shall exercise his best effort and care to protect existing utilities (water lines, gas mains, power poles, etc.) against damage from his operations. All damages shall be repaired by the Contractor at his own expense.

1.12 CONSTRUCTION STAKING

The Owner shall be responsible for all field staking during construction per Section 2-9.5 of the General Provisions.

1.13 BID ITEM FOR SAFETY MEASURES

Each bid proposal submitted under these Specifications for the construction of a pipeline, boring or jacking pits, or similar trenches or open excavations, which are five (5) feet or deeper, or the use of such a trench or open excavation shall contain a separate bid item to provide sheeting, shoring and bracing, or equivalent method, for the protection of life or limb, which shall conform to applicable safety orders, including the Construction Safety Orders of the California Division of Industrial Safety, in accordance with the requirements of the California Occupational Safety and Health Act.

Nothing in this requirement shall be construed to impose tort liability on the awarding body or any of its employees.

1.14 TRENCH SHORING APPROVAL

Any contract for public works for excavation of any trench or trenches five (5) feet or more in depth, the Agency shall require submission by the Contractor and acceptance by the awarding body or by a Registered Civil or Structural Engineer to whom authority to accept has been delegated, in advance of excavation, a detailed plan showing the design of shoring, bracing, sloping, or other provisions to be made for worker protection from the hazard of caving ground during the excavation of such trench or trenches. This plan shall be prepared by a Registered Civil or Structural Engineer.

Nothing in this Section shall be deemed to allow the use of a shoring, sloping, or protective system less effective than that required by the safety standards set forth by the State of California Safety Requirements.

Nothing in this Section shall be construed to impose tort liability on the awarding body or any of its employees.

SECTION II
"EARTHWORK"

2.01 GENERAL
The Contractor shall perform all earthwork required for construction of the proposed improvements as specified and shown. Earthwork includes all plant, labor, equipment, and materials, as required or necessary to clear shrub, excavate, trench, fill, backfill, and grade for the construction of all structures, pipe lines, ditches, embankments, and graded areas.

2.02 UNKNOWN UNDERGROUND FACILITIES
The Agency has attempted to show all known underground facilities on the plans. The Contractor's attention is directed to the possible existence of pipe and other underground improvements, which may or may not be shown on the plans. ***The Contractor shall request Underground Service Alert sufficiently ahead of his excavation (72 hours minimum) to correctly locate the existing underground facilities***. When the exact location of a utility becomes doubtful, the Contractor shall excavate and expose the utility ahead of trenching operations. The inspector representing the Engineer of Work may adjust the alignment of the pipeline to provide the least amount of interference with the utility as determined by the inspector. All reasonable precautions shall be taken to preserve and protect any such improvements whether shown on the plans or not. Where it is necessary to remove and replace or to relocate such improvements in order to prosecute the work, they shall be removed, maintained, and permanently replaced following a review by the Agency and owners of the utility.

2.03 RIGHT-OF-WAY
Earthwork within the right-of-ways of the State Division of Highways, the County Road Department, City or other governmental agencies (e.g. Bureau of Land Management), having jurisdiction, shall be done in accordance with the requirements and the provisions of the permits issued by those agencies for the construction within their respective right-of-ways. Such requirements and provisions, where applicable, shall take precedence and supersede the provisions of these specifications. These technical specifications shall be the minimum requirement.
In addition to the requirements herein set forth for earthwork, all work shall be in accordance with the requirements of the County Flood Control District where flood control drainage easements are encroached or ordinance of any other agencies having jurisdiction.

2.04 GRADING
In addition to the requirements herein set forth for piping and structural earthwork, all shall be in accordance with the requirements of the County Grading Ordinance or ordinance of any other agencies having jurisdiction.

2.05 GENERAL EXCAVATION
Except when specifically provided to the contrary, excavation shall include the removal of all materials of whatever nature encountered, including all obstructions of any nature that would interfere with the proper execution and completion of the work. The removal of said materials shall conform to the lines and grades shown or ordered.

Unless otherwise provided, the areas of construction shall be stripped of all vegetation and debris and such material shall be removed from the site prior to performing any excavation or placing any fill. Excavated material suitable for backfill shall be stored temporarily in such a manner as will facilitate work under the Contract.

Any damage done to private property by reason of work on easements shall be the responsibility of the Contractor. Fences and landscaping, which are removed or damaged by the Contractor, shall be restored to their original condition at the Contractor's expense.

The Contractor shall furnish, place, and maintain all supports and shoring that may be required for the sides of the excavations, and all pumping, ditching, or other approved measures for the removal or exclusion of water, including taking care of storm water reaching the site of the work from any source so as to prevent damage to the work or adjoining property.

Excavation shall be sloped or otherwise supported in a safe manner in accordance with applicable state and federal industrial safety requirements. Barriers shall be placed at each end of all excavations and at such places as may be necessary along excavations to prevent accidents. Lights shall also be placed along excavations from sunset each day to sunrise of the next day until such excavation is entirely refilled. All excavations shall be performed, protected, and supported as required for safety and in the manner set forth in the operating rules, orders, and regulations prescribed by the Division of Industrial Safety of the Department of Industrial Relations of the State of California.

2.06 PIPELINE TRENCH EXCAVATION

Unless otherwise shown or ordered, excavation for pipelines, fittings, valves, and appurtenances, shall be open-cut trenches. The bottom of the trench shall have a minimum width equal to the outside diameter of the pipe plus 12 inches and a maximum width equal to the outside diameter of the pipe plus 20 inches. Except when otherwise shown or ordered by the Agency, the bottom of the trench shall be excavated uniformly to the grade of the bottom of the pipe. Rounding out the trench to form a cradle for the pipe will not be required.

The maximum amount of open trench permitted in any one location shall be 500 feet, or the length necessary (subject to written request in advance by the Contractor and based on the approved Construction Schedule) to accommodate the amount of pipe installed, backfilled, sufficiently compacted to support traffic load, and temporarily paved in a single day. All trenches shall be fully backfilled and temporarily paved at the end of each day or, in lieu thereof, when reviewed by the Inspector, heavy steel plate adequately braced and capable of supporting vehicular traffic may be used in certain locations where it is impractical to backfill at the end of each day. The above requirements for backfilling or use of steel plate will be waived (upon written approval of the Agency) in cases where the trench is located further than 100 feet from any traveled roadway or occupied structure, In such cases, however, barricades and warning lights as set forth in Division 300 and satisfactory to the Inspector shall be provided and maintained.

(A) TRENCH OVER-EXCAVATED WHERE SHOWN - Trenches shall be over-excavated where shown, to the depth shown, and backfilled to the grade of the bottom of the pipe with suitably selected granular material or with sand. Said backfill shall be brought to optimum moisture content and compacted to 95 percent of maximum dry density where the pipeline trench passes under structures, and 90 percent elsewhere. Work specified in this subsection shall be performed by the Contractor at his own expense.

(B) TRENCH OVER-EXCAVATED WHEN ORDERED - Trenches shall be over-excavated beyond the depth shown, when ordered by the Inspector and in areas where poor soil (soft, spongy, or unstable material) or rock is encountered. Such over-excavation shall be to the depth ordered by the Inspector. The trench then shall be refilled to the grade of the bottom of the pipe with either selected granular material obtained from the excavation, sand, or crushed rock, at the option of the Agency. When crushed rock bedding is ordered, the material shall be a well-graded material (Class II Aggregate Base). Bedding shall be placed in layers, brought to optimum moisture content, and compacted to 95 percent of maximum dry density where the pipeline trench passes under structures and 90 percent elsewhere. All work specified in this Subsection shall be performed by the Contractor at his own expense when the over-excavation ordered by the Agency is less than 6 inches below the limits shown. When the over-excavation ordered by the Agency is 6 inches or greater below the limits shown, additional payment will be made to the Contractor for that portion of the additional payment will be made under a separate unit price bid

item for over-excavation and bedding if such bid item has been established. Otherwise, payment will be made in accordance with a negotiated price for execution of a change order.

(C) OVER-EXCAVATION NOT ORDERED, SPECIFIED, OR SHOWN - Any excavation carried below the grade ordered, specified, or shown, shall be refilled to the required grade with suitably selected granular material. Such material shall be moistened as required and compacted to 95 percent of the maximum dry density under structures and 90 percent elsewhere. The Contractor at his own expense shall perform such work.

2.07 SITE GRADING

After stripping has been done, all areas covered by the work, including excavated and filled sections shall be graded uniformly to the lines and grades indicated on the Drawings. The finished surface shall be reasonably smooth and well compacted. All excavated material suitable for fill shall be transported to and placed in the fill area within the limits of the work. All excavated materials which are unsuitable for fill shall be disposed of by the Contractor at his own expense. During construction, excavation and filling shall be performed in a manner and sequence that will provide drainage at all times. Ditches shall be cut accurately to the cross-sections and grades indicated. Any excessive ditch excavation shall be backfilled to grade with suitable, thoroughly compacted material or with suitable stone or cobble to form an adequate paving.

2.08 EXCAVATION IN LAWN AREA

Where pipeline excavation occurs in lawn areas, the sod shall be carefully removed and stockpiled to preserve it for replacement. Excavated material from the trench may be placed on the lawn provided a drop cloth or other suitable method is employed to protect the lawn from damage. The lawn shall not remain covered for more than 72 hours. Immediately after completion of back filling and testing of the pipeline, the sod shall be replaced in a manner so as to restore the lawn as near as possible to its original condition.

2.09 EXCAVATION IN VICINITY OF TREES

Trees and other natural growths outside the actual lines of construction operations shall not be destroyed and such measures as are necessary shall be taken by the Contractor for the protection thereof. Trees shall be supported during excavation as may be directed by the Inspector. In the installation of pipelines outside of public right-of-ways or in easements, trees shall not be removed and no tree roots over 2 inches in diameter shall be cut without express permission of the Inspector.

2.10 ROCK EXCAVATION AND BLASTING

Rock excavation shall include removal and disposal of the following:

(a) All boulders measuring 1/3 of a cubic yard or more in volume

(b) All rock material in ledges, bedding deposits, and un-stratified masses which cannot be removed without systematic drilling and blasting

(c) Concrete or masonry structures which have been abandoned

(d)

Conglomerate deposits which are so firmly cemented that they possess the characteristics of solid rock and which cannot be removed without systematic drilling and blasting.

Said rock excavation shall be performed by the Contractor at his own expense, provided that should the quantity of rock excavation be affected by any change in the scope of the work, and appropriate adjustment of the Contract price will be made under s a separate additive-deductive bid item if such bid item has been established. Otherwise, payment will be made in accordance with a negotiated price.

All operations, storage, and handling of explosives shall be according to provisions of Division II, Part I, of the Health and Safety Code, State of California, and shall comply with all State, County, and local laws. Drilling and blasting are to be done only by personnel skilled in such operations.

All necessary precautions shall be taken for protection of life and property. Warnings shall be given to nearby property owners that blasting is in progress. Safety mats shall be used to restrict flying particles. The Contractor shall size each blast to minimize nuisance and reduce the possibility of damage to local structures.

2.11 DISPOSAL OF EXCESS EXCAVATED MATERIAL

The Contractor shall remove and dispose of all excess excavated or waste material at his own expense.

Excavated material shall not be deposited on private property unless the Contractor furnish written permission, duly assigned by the owner of the private property involved, to the owner before such material is placed on private property.

2.12 BACKFILL (GENERAL)

Backfill shall not be dropped directly upon any structure or pipe. Materials used for backfill shall be selected material, free from grass, roots, brush, or other vegetation, or boulders having maximum dimension larger than three inches. Material coming within six inches of any structure or pipe shall be free of rocks or unbroken masses of earthy materials having maximum dimensions larger than three inches. Backfill shall not be placed around or upon any structure until the concrete has attained sufficient strength to withstand the loads imposed. Backfill around water retaining structures shall not be placed until the structures have been tested, and the structures shall be full of water while backfill is being placed.

Whenever the excavated material is unsuitable for backfill, the Contractor shall arrange for and furnish imported backfill material at his own expense.

All compaction shall be done in accordance with the applicable County requirements.

2.13 PIPELINE TRENCH BACKFILL

(A) Pipeline trenches shall be backfilled to a level 12 inches above the top of the pipe with selected sandy material obtained from the excavation; provided if, in the Engineer's opinion, said material is unsuitable for backfill purposes, imported material having a sand equivalent value of not less than 20 shall be used for this portion of the trench backfill. Imported sand backfill, when ordered by the Engineer, will be paid for under a separate unit price bid item if such bid item has been established; otherwise, payment will be made in accordance with negotiated price. Such material shall be compacted to 85 percent of maximum dry density.

(B) After the initial portion of backfill has been placed as specified above, and after all excess water has completely drained from the trench, backfilling of the remainder of the trench may proceed. The remaining portion of the backfill shall be selected material obtained from the excavation per Section 2.12. Each layer shall be moistened and placed in horizontal layers. Each layer shall be tamped, rolled or otherwise compacted to 95 percent of maximum dry density where the trench is located under structures and 90 percent of maximum dry density within the top 3 feet.

(C) Backfill around and beneath structures, and beneath paved areas except where otherwise specified for a particular structure or ordered by the Engineer, backfill placed around and beneath structures, and beneath paved areas, shall be placed in horizontal layers not to exceed 8 inches in thickness, as measured before compaction, where compaction is attained by mechanical means. Where the use of sheepsfoot rollers is impractical, the layers shall not exceed 6 inches in thickness before compaction, and compaction shall be attained by means of hand-operated power-driven tampers. The backfill shall be brought up evenly with each layer moistened and compacted by mechanical means to 95 percent of maximum dry density beneath structures and beneath paved areas, and 95 percent of maximum dry density around the sides of structures within the top 12" of the top of pipe.

2.14 COMPACTION TESTS

All compaction tests required by either the governing agency having jurisdiction over the right-of-way or by the Agency shall be performed by the Agency or its agent at the Agency's expense. However, in the event these tests prove the compaction to be unacceptable to either the governing agency or the Owner, all cost for subsequent test will be deducted from the progress payments to the contractor.

In-place soil densities shall be determined by testing in accordance with the latest published edition of the ASTM D-1556 sand cone method or ASTM D-2922 for nuclear method.

Optimum soil moisture-density relations shall be established in accordance with the method of test specified in the latest published edition of ASTM Standard D-1557 method C.

In either case, the tests will be scheduled within 24 hours of the Contractor's request for tests, at locations to be selected by the Owner and/or the governing agency. However, tests shall not be scheduled until a minimum 4 hours work is available for the testing laboratory, as determined by the Engineer. Results of these tests shall then be available within 24 hours.

Required depth for testing relative compaction will be at top of pipe zone and every 3 feet thereafter. (Reference County Permit requirements)

In accordance with provisions for guarantee of the work, the Contractor shall return at his expense to correct any backfill conditions subsequently found to be substandard by either failure or more extensive testing. The Contractor shall provide all labor and equipment necessary to prepare for all tests and to assist the soils engineer in taking the tests, as directed by the Engineer. The Contractor's attention is directed to additional provisions related to testing contained in Section 4-1.4 of the General Provisions.

SECTION III
"ASPHALT PAVING"

3.01 GENERAL
This Section covers the furnishing and placement of asphalt concrete required for the repair and replacement of pavement along streets, private driveways, and parking areas damaged by Contractor's operations. Where pavement is within the rights-of-way of the State Division of Highways, the County Transportation Department, any city of other governmental agency having jurisdiction, paving shall be done in accordance with the requirements and the provisions of the permits issued by those agencies for the construction within their respective rights-of-way. Such requirements and provisions, where applicable, shall take precedence and supersede the provisions of these specifications. These technical specifications shall be the minimum requirement. In addition to the requirements herein set forth for asphalt paving, all work shall be in accordance with the requirements of the County Flood Control District where flood control drainage easements are encroached or ordinance of any other agencies having jurisdiction. In any case, the highway surface excavated or damaged by the Contractor shall be replaced in as good or better condition as the same was before such work was begun.

3.02 PAVEMENT CUT
Existing pavement to include driveway approaches shall be saw-cut to neat straight lines. Pavement cracked adjacent to the trench shall be removed. It is considered by the Agency that the Contractor has thoroughly inspected the project site (or pipeline alignment); re-checked with the agency having jurisdiction concerning pavement repair requirements, and is fully familiar with the site conditions and work scope required under this Contract. ***Immediately*** upon completion of backfill, pavement repair shall be as follows:

3.03 TEMPORARY PAVEMENT REPAIR
On secondary roads, place a minimum of 3 inches of aggregate base bedding material in the trench, then place 2 inches of compacted "cold mix" or regular asphalt concrete flush with existing pavement surface. On primary roads, after tacking the existing pavement and placement of base, AR 4000, Type B, 1/2 inch maximum hot mixed asphalt concrete shall be placed and compacted to finish grade. It is considered by the Owner that a "primary" road is a road having a right-of-way greater than 60 feet.

3.04 PERMANENT PAVEMENT REPAIR
Contractor shall refer to the County pavement repair specifications as identified in the permit located in the Appendix of these specifications.

Note: All trenches shall be backfilled and pavement in place on Saturdays, Sundays, and holidays. Temporary paving shall be no less than 2 inches thick and shall be maintained in a safe and smooth, condition until final pavement is in place. The Contractor's attention shall be directed to Subsection 2.06 of the Special Provisions.

3.05 SPREADING AND ROLLING EQUIPMENT
(A) All distribution and spreading equipment shall conform to the Standard Specifications for Public Works Construction, Section 302-5.5. Additionally, all self propelled vibrating screen paving machines shall have no more than a (1) foot extension on its spreader box.

(B) All rolling equipment shall conform to the Standard Specifications for Public Works Construction Section 302-5.6.

SECTION IV
"MATERIAL"

4.01 MATERIALS FURNISHED BY THE CONTRACTOR

Except as otherwise stated on the bidding sheets, these Special Provisions, or ordered by the Agency, all material shall be furnished by the Contractor. Contractor shall furnish all material noted with the following provisions applying:

(A) The Contractor shall furnish the Agency, as soon as issued duplicate copies of all orders placed outside the Contractor's plant for articles or materials to be furnished by the Contractor for incorporation in the work.

(B) The Contractor shall also furnish the Agency with Certificates of Compliance respecting the character of the material to be used.

4.02 MATERIALS FURNISHED BY THE OWNER

The following conditions shall prevail when the Bidding Schedule or these Special Provisions state that certain materials shall be furnished by the Agency.

(A) The Contractor shall within ten days after execution of the Contract, meet with the Agency for the approval of his proposed schedule of construction and shall furnish a written statement of the Contractor's requirements for delivery of materials and equipment to be furnished by the Agency with the dates upon which delivery of each class of said materials and equipment will be necessary in order to conform to the Contractor's Schedule of Construction.

(B) Materials to be furnished by the Owner, except for pipe, will be delivered to the Contractor at the Owner's yard or warehouse and the Contractor will sign for the materials received. The Contractor shall pick up all materials at one time as directed at the Pre-Bid Meeting. No direct payment will be made to the Contractor for hauling or handling materials or equipment furnished by the Owner, but payment for such handling and hauling will be included in the prices named for the Contract items wherein the materials and equipment are used.

(C) The Contractor shall be responsible for coordinating the delivery and the actual placement of all pipe in accordance with Agency requirements and construction schedule.

(D) The Contractor shall be responsible for any damage to property as a result of the unloading or placement of the pipe or other materials. In addition, the Contractor will be responsible for the proper unloading and handling of all pipe materials and assumes all responsibility for any damaged pipe unloaded improperly at the job site.

(E) In the delivery of any materials or equipment to be furnished by the Owner, shall be delayed by strikes, acts of God, or other causes beyond the control or without the fault or negligence of the Owner, the Contractor shall have no claim against the Owner for such delay in delivery, but shall be entitled to so much additional time wherein to perform and complete the Contract on his part as the Owner shall certify in writing.

SECTION V
"INSTALLATION OF DUCTILE IRON PIPE

5.01 GENERAL

The work covered in this section includes the furnishing, installation, and testing of pipe, fittings, and all required appurtenances as shown on the plans. Water line shall be either ductile iron pipe (DIP), or steel pipe (CLML&W steel or CML& steel) as specified herein. In addition to the referenced AWWA Standards, pipe handling, storage and installation shall be in accordance with the following instructions.

(A) INSPECTION - Examine the pipe and fittings for cracks, dents, abrasions, or other flaws prior to installation. Mark defective pipe and remove from the site.

(B) DUCTILE PIPE AND FITTINGS - Install DIP per AWWA Standard C600. Proper and suitable tools and appliances for safe handling of pipe and fittings shall be employed. Care shall be exercised to avoid damage to pipe and fittings. All pipe and fittings shall be carefully examined by the Contractor for defects at the time of laying, and no defective pipe or fittings shall be installed. The engineer may waive rejection on the condition that cradling or encasement is provided or the corrective measures taken. All such work shall be done at the Contractor's expense. All pipe and fittings shall be thoroughly clean at the time of installation and shall be handled in such a manner as to maintain this condition by preventing the entrance of foreign material. Whenever workmen are absent from the job site, open ends of pipe shall be kept plugged. Each section of pipe shall be accurately laid to the required line and grade and shall have a firm bearing for its full length except for a minimum distance at bell holes. After the socket and plain end are wiped clean of all sand and dirt, the plain end should be entered into the socket. It is essential that pipe and fittings be kept level and in straight alignment and that the pipe sections be pulled together slowly to assure proper installation. Joints shall not be deflected beyond the maximum values as specified by the manufacturer.

D. FITTINGS – Water main fittings, tees, bends and reducers shall be made of the same material and finish as the main line. Couplings, adapters, flanges and other appurtenances shall be in conformance with the San Antonio Water Company Special provisions covering construction materials. Steel welded fittings, which meet the San Antonio Water Company Special Provisions, are acceptable for bends and reducers.

Full compensation for furnishing all labor, materials, tools, equipment and incidentals for doing all the work involved in the construction of the water main fittings, tees, bends and reducers, complete in place, shall be considered as included in the contract unit price for the fitting, tee, bend or reducer and no additional compensation will be allowed therefor.

5.02 PIPE LOCATING WIRE

14 Gauge coated wire for locating pipe shall be taped on top of pipe. It shall be secured at each valve, at each corp stop to angle meter stop, and shall be of a continuous run between valves. Splicing of wire shall be accomplished with 3M Direct Bury Splice Kit or equal. Wire shall be tested for continuity prior to acceptance.

SECTION VI
"TRAFFIC CONTROL"

6.01 TRAFFIC CONTROL PLANS (AS REQUIRED PER PLAN)

Plans for traffic control shall be submitted at least five working days prior to commencing work, for approval by the Engineer.

(A) All annotation onto plans of traffic control elements shall be as per the "MANUAL OF TRAFFIC CONTROLS" as published by the State of California Department of Transportation.

(B) The traffic control plans shall depict at least one typical intersection control for a "4-way cross" and "tee" intersection. These typical intersections shall show all applicable flaggers, signs and delineation with distances and orientation to the construction plans.

(C) The traffic control plans shall be drawn on a reproducible medium.

(D) The traffic control plan sheets shall be 24" x 36" and numbered in sequence.

(E) The traffic control plans shall be drawn at a minimum scale of 1" = 200 feet.

6.02 PUBLIC SAFETY

The Contractor shall conduct his operations so as to offer the least possible obstruction and inconvenience to the public and he shall have under construction no greater length or amount of work than he can prosecute properly with due regard to the rights of the public.

6.03 TRAFFIC CONTROLS

Whenever the Contractor's operations create a conditions hazardous to traffic or to the public, he shall, at his own expense, and without costs to the Owner, furnish, erect, and maintain such fences, barricades, lights, signs, and other devices and take such other protective measures as are necessary to prevent accidents, damage, or injury to the public. The Contractor shall also furnish such flagmen as are necessary to give adequate warning to traffic or to the public of any dangerous or deleterious conditions to be encountered. Signs, lights, flags and other warning and safety devices shall conform to the requirements set forth in the current "MANUAL OF TRAFFIC CONTROLS - Warning Signs, Lights, and Devices for the Use in Performance of Work Upon Highways", issued by the State of California Department of Transportation. ***When construction results in only one paved traffic lane being open to traffic, a minimum of two flagmen with appropriate signs and protective equipment shall be required to direct traffic through the construction zone. In certain cases, pilot cars and/or radio communication between flagmen may be required***.

Full compensation for furnishing all plans, labor, materials, tools, equipment, incidentals, and for doing all the work involved in placing, removing, replacing, storing, moving to new locations, and maintaining construction area traffic control devices as shown on the plans or required in the Specifications shall be considered as included in the prices paid for various items or work, and no additional allowance will be made therefor.

6.04 ROAD CLOSURE

A road closure can only be granted by formal application to the City of Upland or County Road Department. Contractor shall notify the City of Upland Fire Agency, City of Upland Police Department, California Highway Patrol, City of Upland Postal Service, and Chaffey Unified School District (Bus Division) prior to any period of road closure.

6.05 TRENCHING ACROSS ROADWAY

Unless formal approval has been granted for full road closure, excavation of trenches across any roadway shall be progressive. Not more than one-half of the width of a traveled roadway shall be

closed at one time and the remaining width of traveled roadway shall be kept open to traffic by bridging or backfilling.

SECTION VII
"INSTALLATION OF VALVES, HYDRANTS, AND FITTINGS"

7.01 VALVES

Unless otherwise indicated on the plans, all line valves shall be buried with the exception of all geared valves (or any other valves indicated on the plans), which shall be set in valve vaults or manholes. The operating nut on a buried valve shall be readily accessible for operation through a valve box which has been set to finish grade and in a vertical position. Rubber ring grooves of valves shall be inspected before installation by the Contractor for ridges or holes, which would interfere with the rubber ring. Interference with the rubber ring shall be corrected to a satisfactory connection or the valves replaced, as required by the Agency. All valves shall have the same rubber-ring groove profile as the profile in the groove on the pipe couplings furnished with the pipe. All gate valves shall be anchored in concrete as specified by these Special Provisions and Standard Drawings herein. The anchor shall bear against undisturbed ground in all cases, except where unstable conditions are encountered, in unstable conditions, the bearing surface shall be as directed by the Inspector

Valve boxes shall be firmly supported and shall be kept centered and plumb over the wrench nut of the valve; the box cover shall be flush with the surface of the finished pavement or at any other level designated by the Inspector.

7.02 HYDRANTS

Water hydrant assemblies and hydrant resilient wedge valves shall be installed in accordance with the Standard Drawing as specified herein. Concrete pads shall be installed as shown.

Water hydrant assemblies shall be located as shown on the plans, as staked in the field, or as approved by the Inspector. The center of the hydrants shall be, except as otherwise approved by the Inspector, located as follows:

(A) Where concrete curbs or A.C. berms exist or are to be constructed and the sidewalk is next to the property, the water hydrant shall be placed two feet from the back of the curb. Hydrants are to be placed five feet before the curb radius at intersections.

(B) Where the sidewalk is attached and runs contiguous with the curb, the location shall be two feet from the property line or as approved by the Inspector.

(C) Where there are no curbs, sidewalks, or AC berms, the location in general, shall be two feet from the property line or as approved by the Inspector.

The flange elevation at the base of the hydrant shall be set four inches above the curb, sidewalk elevation, surrounding graded area, or as approved by the Inspector.

7.03 TAPPING SLEEVES

Tapping sleeves shall be assembled in accordance with the manufacturer's instructions and to the satisfaction of the Inspector. The pipe barrel shall be thoroughly cleaned with a wire brush to provide a smooth, hard surface for the sleeve. The sleeve shall be well supported independently of the pipe during the tapping operation. Thrust blocks shall be provided as with any other fittings and shall include support for tapping valve.

7.04 SERVICE LATERALS AND AIR AND VACUUM RELEASE VALVE CONNECTIONS

Service laterals and air and vacuum release valve connections shall be installed in accordance with the applicable Standard Drawing. Unless shown on the drawings or approved by the Inspector, long (street) service laterals and air/vac laterals shall be bored, not open trenched, under existing pavement.

The surface of the pipe shall be filed to remove all loose material and to provide a hard, clean surface before placing the service clamp. The service connection shall be tightened firmly to ensure a tight seal, however, care shall be used to prevent damage or distortion from over tightening of either the corporation stop or service connection.

7.05 AIR AND VACUUM RELEASE VALVES

Air and vacuum release valves shall be installed at high points in continuous lines as shown on the job plans. If the profile changes during construction from that shown on the drawings, the air and vacuum and air release valves shall be installed at the high points in lines as constructed. The installation shall be completed as shown on the Standard Plan for air and vacuum release valves.

7.06 BLOWOFFS

Blowoffs shall be installed in accordance with the standard plan for blowoffs. Blowoffs shall not be connected to any sewer, submerged in any stream, or installed in any manner that will permit back siphonage into the distribution system.

SECTION VIII
"THRUST BLOCKS AND ANCHOR BLOCKS"

8.01 GENERAL

Anchors and thrust blocks shall be constructed as shown on the Standard Drawings or where directed by the Inspector and as specified herein. In general, thrust blocks and anchors will be placed at all angles greater than five degrees, at changes in pipe size, at cast-iron fittings, and at hydrant locations.

Steel rods used for tie downs and enforcement shall be Rebar No. 4 coated with Minnesota Mining and Manufacturing EC44, Koppers Bitumastic 505 (Supertank), or an approved equal.

Concrete used will be a minimum class rating of 450-C-2000.

8.02 THRUST BLOCKS

The area and design of the bearing surface shall be as specified by the Standard Drawing for thrust blocks. The bearing surface shall be against undisturbed ground in all cases, except where unstable conditions are encountered. In unstable conditions, the bearing surface shall be as directed by the Inspector. Unless otherwise directed by the Inspector, the thrust blocks shall be placed so that the pipe and fitting joints are accessible for repair. Polyethylene shall be installed between the fitting and concrete to provided as a bond break.

SECTION IX
"CLEANING AND DISINFECTION OF WATER MAINS"

9.01 GENERAL

Disinfection of water mains applies to all construction involving *domestic* pipelines. After the pipelines have been cleaned and tested, but before they have been connected to the existing system, disinfection shall be accomplished. In the event groundwater is encountered and it is impossible to prevent its entrance into the mains, or the mains are not free from dirt, they shall be thoroughly flushed prior to disinfecting. During the chlorinating process, all valves and facilities shall be operated. All water mains, water services, attached appurtenances, and connections if any shall be disinfected in accordance with the latest revision of AWWA C601 and as specified herein.

9.02 DISINFECTION OF WATER MAINS

a. Tablet Disinfection – Tablet disinfection may be used. This method may be used only for lines when scrupulous cleanliness has been exercised. It shall not be used if water or foreign material has entered the main, or if dewatering and repairs are required because preliminary flushing cannot be used. Where tablet disinfection is permitted, the disinfection solution shall be made by the use of hypochlorite tablets attached by means of gasket cement to the inside top of the lengths of pipe as they are being laid, followed by the filling of the main with water. The amount of adhesives shall be limited to the smallest practicable amount applied to one side of the tablet only. The tablets shall have an average weight of 5 grams each and shall contain not less than 70 percent of available chlorine.

b. Residual Chlorine Test – After 24 hours of retention, the hypochlorite solution will be tested by the Engineer, and to be acceptable, shall have a minimum of twenty-five (25) parts per million of residual chlorine.

c. Additional Disinfection – If the test results are not satisfactory, the Contractor shall provide a 2-inch outlet for the connection of injection type chlorination equipment, after which the Contractor shall inject chlorine solution into the main for the necessary additional disinfection.

9-03 FLUSHING OF WATER MAINS

Following the period of retention and after testing of residual chlorine by the Engineer, the chlorinated water shall be thoroughly flushed from the line until the replacement water throughout the length of the pipeline is comparable in quality to the water served the public for the existing system. The Contractor shall provide the Engineer with bacteriological
test results in accordance with the State Department of Public Health Standards.

Care shall be taken that the water is flushed from the line at its extremities and that the services are free of chlorinated water before being placed in service.

The chlorinated water may be used later for the testing of other lines, or if not so used, shall be disposed of by the Contractor. The Agency will not be responsible for loss or damage resulting from such disposal. When a hypochlorite solution has been used for disinfecting the main, the flushing shall be in a direction opposite to that from which the line was filled.

The Contractor shall furnish all equipment in good operating condition, labor, material, and water necessary for chlorinating and flushing the pipeline and for certification of the pipeline disinfecting.

The Agency requires that all chlorinating of new water main facilities shall be done by an independent chlorinating company who will provide a certified operator for the duration of the tests and a certified chlorinating result to the Engineer.

SECTION X
"HYDROSTATIC TESTING & LEAKAGE ALLOWANCE"

10.01 GENERAL

Hydrostatic and leakage test specifications applies to all construction involving pipelines, whether it is a main construction, booster plant piping, or reservoir piping, excepting reservoir drain lines.

The required test pressures shall be applied by a pump connected to the pipe in a manner satisfactory to the Engineer. The Contractor shall provide calibrated meters for measurement of the leakage, necessary bulkhead, piping, gauges, pumps, power, and labor, and perform and furnish everything necessary for making all tests required, at his own expense and shall furnish to the Engineer copies of all tests performed.

The Contractor, at his own expense, shall do all excavation necessary to locate and repair leaks or other defects which may develop under test, including removal of backfill already placed, and shall replace such excavated material and shall make all repairs necessary to the required water tightness, after which the required tests shall be repeated until the pipe and fittings meet the requirements set forth herein.

10-02 HYDROSTATIC TESTING

Upon completion of the laying, joining, backfilling and compacting of backfill, and at least seven days after the last concrete thrust device has been placed, the pipe and fittings involved in the construction shall be filled with water for a minimum of 24 hours. Care shall be taken to see that all air vents are open during the filling, and after the section has been completely filled, it shall be allowed to stand under a light pressure for a sufficient length of time to allow any cement mortar lining to absorb and to allow the escape of air from any air pockets. During this period, all fittings and connections shall be examined for leaks. If any are found, they shall be stopped. A test pressure 50% greater than the class of pipe and fittings shall then be applied to sections and maintained for a four-hour period. Test sections will be chosen which give, as nearly as possible, constant pressure throughout the section with the pressure being measured at the lowest point. Any noticeable leaks shall be stopped and any defective pipe shall be replaced with new sections.

The test shall be made prior to connecting the new line with the existing Agency's pipes and mains. The test shall further be conducted with the open ends of pipes, valves, and fittings suitably closed. Valves shall be operated during the test period.

The test shall be conducted in the following manner. All air shall be expelled from the pipe. To accomplish this, if air valves, hydrants, or other outlets are not available, taps shall be made at the high points to expel the air, and these taps shall be tightly plugged afterwards. The pressure in the pipeline shall then be pumped up to the specified test pressure. When the test pressure has been reached, pumping shall be discontinued until the pressure in the line has dropped 5 psi, at which time the pressure shall again be pumped up to the specified test pressure. This

procedure shall be repeated until four hours have elapsed from the time the specified test pressure was first applied. At the end of the four-hour test period, the pressure shall be pumped up to the test pressure for the last time.

Contractor shall provide at his own expense, the installation and material for all temporary blowoffs.

10.03 LEAKAGE ALLOWANCE

After the pressure test is satisfactorily completed, the piping shall be tested for leakage at a pressure equal to the pressure class of the pipe and fittings involved in each test section. The Contractor shall test the piping sections as designed by the Engineer and the required pressure shall be maintained for a two-hour period, during which time the leakage shall be accurately measured.

The leakage allowance shall be in accordance with the latest revision of AWWA C-600. The leakage shall be considered, as the total amount of water pumped into the pipeline during the four-hour period including the amount required in reaching the test pressure for the final time. Leakage shall not exceed the rate of 11.65 gallons per inch of diameter per mile of pipe per 24 hours. Any noticeable leak shall be stopped and all defective pipe, fittings, valves, and other accessories discovered in consequence of the test, shall be removed and replaced by the Contractor with sound material and the test shall be repeated until the total leakage during a test of two hours duration does not exceed the rate specified below. The following table indicates the leakage allowance for various sizes of pipe and is equal to the number of gallons per the two-hour test per 1,000 feet of pipe being tested.

ALLOWABLE LEAKAGE
STEEL & DIP PER 1000 FEET OF PIPELINE*
(GALLONS PER HOUR)

Pipe Test Pressure at Lowest Point in Line (psig)

Avg. Test Pressure (psi)	NOMINAL PIPE DIAMETER / INCHES										
	3	4	6	8	10	12	14	16	18	20	24
450	0.48	0.64	0.95	1.27	1.59	1.91	2.23	2.55	2.87	3.18	3.82
400	2.45	0.60	0.90	1.20	1.50	1.80	2.10	2.40	2.70	3.00	3.60
350	0.42	0.56	0.84	1.12	1.40	1.69	1.97	2.25	2.53	2.81	3.37
300	0.39	0.52	0.78	1.04	1.30	1.56	1.82	2.08	2.34	2.60	3.12
275	0.37	0.50	0.75	1.00	1.24	1.49	1.74	1.99	2.24	2.49	2.99
250	0.36	.047	0.71	0.95	1.19	1.42	1.66	1.90	2.14	2.37	2.85
225	0.34	0.45	0.68	0.90	1.13	1.35	1.58	1.80	2.03	2.25	2.70
200	0.32	0.43	0.64	0.85	1.06	1.28	1.48	1.70	1.91	2.12	2.55
175	0.30	0.40	0.59	0.80	0.99	1.19	1.39	1.59	1.79	1.98	2.38
150	0.28	0.37	0.55	0.74	0.92	1.10	1.29	1.47	1.66	1.84	2.21
125	0.25	0.34	0.50	0.67	0.84	1.01	1.18	1.34	1.51	1.68	2.01
100	0.23	0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.35	1.50	1.80

*** If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.**