

4.4.2 CONSTRUCTION METHODS. This subsection covers the requirements for trenching, placing, and back filling of all underground pipelines (sewer, water, storm drains, etc.). The methods employed in performing the work shall be the responsibility of the Contractor. The Contractor shall make such changes in the methods used as are necessary to install an acceptable finished product. The methods shall include, but are not limited to the following:

4.4.2.1 CONTROL OF GROUND WATER. All trenches shall be kept free from water during excavation, fine grading, pipe laying, jointing, and embedding operations. Where the trench bottom is mucky or otherwise unstable because of the presence of ground water, and in cases where the static ground water elevation is above the bottom of any trench or bell hole excavation, such ground water shall be lowered and controlled to the extent necessary to keep the trench free from water and the trench bottom stable

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when the work within the trench is in progress. Surface water shall be prevented from entering the trenches.

Dewatering for pipeline construction shall commence when groundwater is first encountered and shall continue until such time as water can be allowed to rise. Requirements of section 4.3.2.2 shall be complied with when groundwater is encountered. Dewatering shall be conducted such that no pipelines are placed in water nor shall water be allowed to rise over the pipe until the pipeline has been pressure tested and any concrete or mortar has achieved final set. Water shall not be allowed to rise in pipeline trenches or drained excavations until pipelines are backfilled or restrained to prevent flotation.

4.4.2.2 EXCAVATION FOR PIPELINES. Trench excavation shall include all operations necessary for excavation of all materials of whatever nature in relation to pipeline installation. All excavation, including the manner of support and provisions for access to trenches, shall comply with all current regulations as determined by OSHA. Trenches shall be excavated to the lines and grade shown on the drawings, and to a depth to provide the minimum required cover of three (3) feet over the pipe unless otherwise approved by the Water Department. Pipe installation shall be in accordance with the pipe manufacturer's recommendations. The bottom two feet of the trench should have vertical walls. All finish grading necessary for preparation of the trench bottom shall be made manually. Over-excavating shall not be allowed without re-compaction of backfill in accordance with these standards.

Excavation for trenches in rock shall extend to a depth of at least four inches below the bottom of the pipe. Bedding material as outlined in Table 4.1 shall be placed and mechanically compacted to ninety-five percent (95%) of maximum dry density in maximum six inch lifts to provide a smooth, well compacted and stable foundation for the pipe or appurtenant works.

Trench bottoms shall be hand-shaped as specified and the maximum width of the trench, measured at the top of the pipe, shall be as narrow as possible, but not wider than fifteen (15) inches on each side of the pipe.

Where unstable earth, mud or muck is encountered in the excavation at the grade of the pipe, the unsuitable material shall be removed to a minimum of twelve inches below grade and the subsequent hole shall be backfilled with crushed rock or gravel (as called out in Table 4.1 under "foundation material") to provide a stable subgrade. The gravel material shall be deposited over the entire trench width. The maximum layer thickness shall be six inches. Each layer shall be compacted by tamping, rolling, vibrating, spading, slicing, rodding or by a combination of one or more of these

methods. In addition, the material shall be graded to produce a uniform and continuous support for the entire length of the installed pipe.

Should the Contractor elect to install the pipe by boring, or jacking, approval must first be obtained from the City's Representative. The Contractor shall furnish, place, and maintain all supports and shoring that may be required for the sides of the excavation, and all pumping, ditching, or other approved measures for the removal or exclusion of water, including, but not limited to, storm water and waste water reaching the worksite from any source so as to prevent damage to the work or adjoining property.

The maximum amount of open trench permitted in any one location shall be five hundred (500) feet, or the length necessary to accommodate the amount of pipe installed in a single day, unless otherwise approved by the City's Representative. Open trenches shall not be allowed to stay open without proper safety precautions and barricading. Trenches should not be left open over night.

In the event "foundation material" is used in backfill, or replacement of over excavated material, the Contractor shall construct dams within the drain rock bedding material at maximum intervals of six hundred (600) feet. The dams shall be constructed to the top of the pipe or the level of groundwater, whichever is greater, with Class "B" Portland Cement Concrete or other approved material and shall have a minimum thickness of six inches.

TABLE 4.1

BACKFILL MATERIAL				
SIEVE SIZE	FOUNDATION MATERIAL	BEDDING/PIPE ZONE MATERIAL*	2 FT. ABOVE PIPE ZONE	FINAL BACKFILL MATERIAL
12"	--	--	100	Native material which contains no sod, vegetation, rocks larger than 12" diameter, asphalt or concrete chunks, etc.
6"	--	--	90 - 100	
3"	100	--	80 - 100	
2"	90 - 100	--	70 - 100	
1"	70 - 90	100	50 - 100	
½"	51 - 75	90 - 100	30 - 100	
#4	31 - 65	50 - 80	25 - 80	
#16	16 - 40	30 - 42	16 - 50	
#200	2 - 12	9 - 25	10 - 50	

* ¾" or 1" clean crushed gravel may be used in lieu of the above table.

4.4.2.3 SHEETING, BRACING, AND SHORING OF EXCAVATIONS. All excavations shall be sheeted, braced, and shored as required to protect the workers and existing utilities and improvements from sliding, sloughing, settling or other movement of the trench walls while the work is in progress. All such sheeting, bracing and shoring shall comply with the requirements of the Utah State Industrial Commission. All damage resulting from lack of adequate sheeting, bracing and shoring shall be the sole responsibility of the Contractor, and the Contractor shall effect all necessary repairs or reconstruction resulting from such damage.

4.4.2.4 BLASTING. Blasting shall not be allowed except by written permit from the Fire Chief. If the permit is granted, the Contractor shall comply with all laws, ordinances, and applicable safety code requirements and regulations relative to the handling, storage, and use of explosives and protection of life and property.

In addition to the above, all requirements contained in Section 2.9, Use of Explosives, shall be followed.

4.4.2.5 PIPE LAYING AND BEDDING. Pipe will be carefully inspected in the field by the Contractor and the City's Representative before and after laying. If any cause for rejection is discovered in a pipe before or after it has been laid, it shall be removed and replaced by the Contractor.

When connections are to be made to any existing pipe, conduit, or other appurtenances, the actual elevation or position of which cannot be determined without excavation, the Contractor shall excavate for, and expose the existing improvement before laying any pipe or conduit. The City's Representative shall be given the opportunity to inspect the existing pipe or conduit before the connection is made. Adjustments in line or grade of the connecting pipe which may be necessary to accomplish the intent of the plans will be made at this time.

Pipe shall be laid up grade with the socket bell, or collar ends of the pipe up grade unless otherwise authorized by the City's Representative.

In general cases, the pipe will be laid in one direction only.

Pipe shall be laid true to line and grade, with uniform bearing under the full length of the barrel of the pipe. Suitable excavation shall be made to receive the bell or collar, which shall not bear upon the subgrade or bedding. Any pipe which is not true to alignment or shows any settlement after laying, shall be removed and re-laid to the proper grade and alignment.

A. REQUIREMENTS FOR LINE AND GRADE. All sewer and drainage pipe shall be installed to the defined line and grade within the following limits.

A.1 Variance from established grade shall be not greater than one tenth (1/10) of a foot between manholes. Variance from established line shall be not more than one half foot between manholes. Any variances approved shall not impact the system design capacity and shall be approved by the City's Representative. Any variations shall not result in a level or reverse slope installation.

A.2 The invert elevations of each manhole and box at the inlet and outlet and distance between manholes and/or boxes shall be accurately verified by use of surveying instruments prior to pouring the floor.

A.3 On main lines, invert elevations of each manhole inlet and outlet and the distance measurements between manholes

shall be verified by use of surveying instruments prior to installing precast manhole bases. For service laterals, grades may be verified by use of a carpenter's level or surveying instrument.

A.4 All sewer and drainage pipe systems shall be visually inspected for defects, displacement, proper workmanship, alignment and general compliance.

B. INSTALLATION OF PIPE. A groove shall be excavated along the bottom of the trench to receive the pipe. Bell holes shall be excavated so that only the barrel of the pipe receives bearing from the trench bottom. Large rocks (over six inches in least dimension) near the trench bottom shall be removed and the hole refilled with approved backfill in accordance with Table 4.1.

Water pipe shall not be deflected at the joint more than a maximum of three percent (3%), or three degrees, per hundred (100) feet, or as per the manufacturer's recommendation.

Sewer and drain pipe shall be laid up grade. All pipe installation shall proceed with joints closely and accurately fitted. Gaskets shall be fitted properly in place and care shall be taken in joining the pipes to avoid twisting the gaskets. Joints shall be clean and dry and a joint lubricant, as recommended by the pipe supplier, shall be applied uniformly to the mating joint surfaces to facilitate easy and positive joint closures. If adjustments to the position of a pipe length are required after being laid, the pipe shall be removed and rejoined as a new pipe. When pipe laying is not in progress, the ends of the pipe shall be closed with a tight-fitting stopper to prevent the entrance of foreign material. In addition to the above requirements, all pipe installation shall comply with the specific requirements of the pipe manufacturer.

C. SETTING OF BENDS, TEES, CROSSES AND REDUCERS. Bends, tees, crosses, and reducers shall be lowered into the trench, inspected, cleaned and joined to the pipe.

Concrete thrust blocks shall not be used as a restraining system for waterline mains or laterals without prior approval of Water Department. Reaction restraints or, when permitted by the City's Representative, thrust blocking, shall be applied at bends and tees, and at points of reduction or at fittings where changes in pipe diameter occur.

The design of concrete thrust blocking shall be as shown in the standard drawings or as directed by the Water Department. The material used for thrust blocking shall be Class C concrete. Blocking shall be placed between solid ground and the fitting to be anchored. The area of bearing on the fitting and on the ground shall in each instance be that required in the standard drawings or by the City's Representative. Unless otherwise directed by the City's Representative, the blocking shall be placed so that the pipe and fitting joints will be easily accessible for repair. Restraining joints (megalug or equal) shall also be used to prevent movement wherever thrust blocks are required.

If a megalug retainer system cannot be used, a concrete thrust block system can be substituted, if approved by the Water Department, on a case by case basis.

D. PLUGGING OF DEAD-ENDS. Standard plugs shall be inserted into the bells of all dead-end fittings. Spigot ends of fittings and plain ends of pipe shall be capped. When directed by the City's Representative, a concrete reaction or thrust block shall be provided at all plugged outlet fittings in the sizes indicated on the standard drawings or as directed by the City's Representative. The plugs and caps shall also be tied to the pipe with restraining joints. The number and size of rods shall be as specified.

E. SERVICE LINES. All service lines shall be installed in accordance with the details shown on the standard drawings.

F. PIPE TO BE KEPT CLEAN. All dirt and foreign matter shall be removed from the interior of the pipe before lowering into position in the trench. Pipe shall be kept clean by means approved by the City's Representative during and after laying.

G. JOINTING PIPE SECTIONS. The sealing surface of the pipe, the bell to be joined, and the elastomeric gaskets shall be cleaned immediately prior to assembly, and assembly shall be made as recommended by the manufacturer. When pipe laying is not in progress, the open ends of installed pipe shall be closed to prevent entrance of trench water into the line. Whenever water is excluded from the interior of the pipe, enough backfill shall be placed on the pipe to prevent floating. Any pipe that has floated shall be removed from the trench and the bedding restored. No pipe shall be laid when the trench or weather conditions are unsuitable for proper installations as determined by the City's Representative.

H. **CUTTING PIPE.** The pipe shall be cut in a neat manner without damage so as to produce a smooth end at right angles to the axis of the pipe. Existing transit AC pipe shall not be cut and should be removed and replaced with ductile or PVC pipe.

I. **END PREPARATION.** Pipe ends shall be cut square, deburred and beveled in accordance with the pipe manufacturer's recommendations.

J. **PUSH-ON JOINTS.** The push-on joint shall be a single elastomeric gasketed joint which shall be assembled by positioning the elastomeric gasket in the annular groove of the bell and inserting the spigot end of the pipe into the bell. The spigot end of the pipe shall compress the gasket radially to form a positive seal. The gasket and annular groove shall be designed, sized and shaped so that the gasket will resist displacement. Care shall be taken so that only the correct elastomeric gasket, compatible with the annular groove of the bell, is used. Insertion of the elastomeric gasket in the annular groove of the bell must be in accordance with the manufacturer's recommendations.

K. **MECHANICAL JOINTS.** The mechanical joint shall be a bolted joint of the stuffing box type, and installation recommendations from the manufacturer shall be followed. Each joint shall consist of:

K.1 A bell provided with an exterior gland having bolt holes or slots and a socket with an annular recess for the sealing gasket and the spigot end of the pipe. On all slotted holes the bolts will be supplied with square shoulders.

K.2 A sealing gasket.

K.3 A follower gland with bolt holes matching those in the fitting.

K.4 Tee bolts and hexagonal nuts of cor-ten metal.

L. **PIPE BEDDING.** Pipe shall be protected from lateral displacement and possible damage resulting from impact or unbalanced loading during backfilling operations by being adequately bedded in accordance with the bedding details in the standard drawings.

Pipe bedding materials shall be deposited and compacted in layers not to exceed six (6) inches in compacted thickness. Deposition and

compaction of bedding materials shall be completed simultaneously and uniformly on both sides of the pipe. Compaction shall be accomplished with hand or mechanical compactors to the satisfaction of the City's Representative. All bedding materials shall be placed in the trench with hand tools, or other approved methods in such a manner that the bedding materials will be scattered alongside the pipe and not dropped into the trench in compact masses. Bedding materials shall conform to the requirements of Table 4.1 of these standards and shall be free from roots, sod, vegetation or other deleterious material.

In the event trench materials are not satisfactory for pipe bedding, imported bedding will be required. Imported bedding material shall be graded in accordance with Table 4.1, under "bedding material".

M. METER BOXES. All meter boxes shall be located behind the sidewalk. All meters will be provided with concrete collars. Any meter box damaged or covered during the construction operations shall be replaced and/or uncovered and raised to finish grade by the Contractor as determined by the City Representative.

4.4.2.6 BACKFILLING AND COMPACTION. Backfill shall include filling of all trenches to the original ground surface or final grading elevation as shown on the drawings, or otherwise directed by the City's Representative. Backfill shall be carefully placed around and over pipes and shall not be permitted to fall directly on a pipe from such a height, or in such a manner as to cause damage. Backfill material shall be as required by Table 4.1 or as approved by the City's Representative and shall not contain any wood, grass, roots, broken concrete, frozen soil, asphalt chunks, trash or debris of any kind that may cause unequal settlement or improper consolidation.

The backfill in all utility trenches under proposed or existing roadways, curb and gutter, sidewalks and driveways shall be compacted to the equivalent of ninety five percent (95%) of maximum dry density for granular soils or ninety percent (90%) of maximum dry density for silty/clay soils. In shoulders and other street right-of-way areas, the in-place density shall be a minimum of ninety percent (90%) of the maximum dry density:

A. INITIAL BACKFILL PROCEDURE. (Pipe Zone) Backfill of selected material, which shall conform to the requirements of Table 4.1, shall be placed carefully in eight inch non-compacted horizontal layers and compacted to a depth of twelve inches over the top of the pipe. During compaction of the initial backfill, special care shall be taken so as to not move the pipe, either vertically or horizontally. All backfill operations shall be performed in such a manner so as to

avoid any damage to the pipe, valves, laterals, etc. In the event such damage or displacement occurs, such damaged or displaced pipe shall be removed and replaced with undamaged pipe on proper grade and alignment.

B. FINAL BACKFILL PROCEDURE. The backfill above a point twelve (12) inches above the top of the pipe shall be filled in horizontal layers twelve (12) inches thick or less with materials free from roots, vegetation or other deleterious material, or rocks, stones or boulders larger than six inches in the greatest dimension. The material shall be mechanically compacted with appropriate vibrating compaction equipment. Wherever, in the opinion of the City Engineer, surface settlement is not, critical compaction may be reduced to a minimum of ninety percent (90%) of maximum dry density and the backfill shall be neatly rounded over the trench to a sufficient height to allow for settlement to grade after consolidation.

C. MECHANICAL COMPACTION OF BACKFILL. The backfill shall be thoroughly compacted by mechanical compaction.

Structural and trench backfill shall be deposited in horizontal layers and compacted by the following method in such manner that the compacted material will be homogeneous and free from lenses, pockets, streaks, and other imperfections.

The materials shall be deposited in horizontal layers across the length or width of the excavation of not more than six inches compacted thickness. The excavation and placing operations shall be such that the materials when compacted will be blended sufficiently to secure the best degree of compaction, impermeability and stability.

Prior to and during compaction operations, all backfill material shall have the required moisture content and shall be uniform throughout each layer.

If the moisture content is not optimum for compaction, the compaction operations shall be delayed until such time that the material has been brought to the required moisture content. When the material has been properly conditioned, it shall be compacted by using appropriate mechanical compaction equipment as indicated below or as otherwise approved by the City's Representative.

C.1 Vibrating rollers shall consist of a self-propelled roller with

a vibrating steel drum of at least one ton capacity. The roller shall have an effective rolling width of at least twenty four (24) inches and shall deliver a compaction force of at least seven hundred (700) pounds per square inch when vibrating.

C.2 Pneumatic rollers shall consist of a self-propelled roller with pneumatic tires arranged in a manner so as to provide a satisfactory compacting unit. The roller shall have an effective rolling width of at least thirty (30) inches and shall give a compaction force of at least five hundred (500) pounds per inch of width of tread when fully loaded. The tires shall be uniformly inflated.

C.3 Vibrating plates shall consist of a pneumatic vibrating plate attached to the boom of a backhoe and capable of compacting an area of at least three square feet. The plate and backhoe combination shall together be capable of exerting a compactive force of at least one thousand (1,000) pounds per square inch.

C.4 Hand compactors shall be used when hand-compacted methods are specified or required because the location of the area to be compacted does not permit the use of self-propelled mechanical compactors. Vibrating plates, "pogo-stick" tampers or other approved hand-compacting equipment shall be used.

C.5 Jetting and flooding or other water consolidation methods are not permitted.

D. FLOWABLE BACKFILLING. For trenches under pavement, sidewalk, curb and gutter, and in all existing city streets, flowable backfill may be used (unless otherwise directed by the City's Representative) for backfill and shall be in conformance with the standards for "Flowable Fill" as described below. Flowable fill shall not be used as backfill for water main trenches without prior approval of the City's Representative. Flowable fill shall be discharged from the ready mix truck by reasonable means into the trench to be filled. The fill shall be brought to an elevation equal to the bottom of the road base and shall be finished level to provide a uniform surface. Flowable fill shall not take the place of roadbase or asphalt in the roadway section.

When surface restoration cannot take place promptly in existing City

streets or in other areas where safety is a concern, the flowable fill may be extended to the bottom of the surface course and a temporary driving surface installed. When the permanent surface is installed the temporary surface and flowable fill shall be removed to the level of the bottom of the roadbase and the roadway structure properly restored in accordance with these standards.

Flowable fill:

D.1 Portland Cement - Type II or V.

D.2 Fly Ash - ASTM C-618, Class F, except loss on ignition shall not exceed three percent (3%) maximum, and shall come from a source approved by the City Engineer.

D.3 The coarse and fine aggregate for flowable fill shall be natural material and consisting of mineral aggregate particles meeting the following requirements.

<u>Sieve Size</u>	<u>Percent Passing</u>
3/4	100
200	0-10

D.4 Mix Design - shall meet the following:

Minimum compressive strength (28 days)	50 PSI
Maximum compressive strength (28 days)	150 PSI
Maximum fly ash per cubic yard	100 lb.
Minimum cement per cubic yard	50 lb.
Minimum slump	6 in.
Maximum slump	10 in.

4.4.2.7 TRENCHES ON HIGHWAYS AND STREETS. No work of any kind shall be performed in any public right-of-way without first obtaining an encroachment permit. Wherever any trenches will be in, or must cross any State road or any City road, alley or drainage way, the Contractor, or other responsible party, shall obtain any and all encroachment permits as are required for these crossings and shall become familiar with and abide by the rules and regulations of the Utah Department of Transportation and the City of St. George.

All Contractors or responsible parties excavating or encroaching over or under any public right-of-way including roads, drainage way, easements or other public property shall first obtain an encroachment permit in compliance with the applicable local ordinances prior to excavating.

All asphalt cuts shall be made with a diamond or carbide-tipped masonry or asphalt cutting saw unless otherwise approved by the City's representative. No scarifier-tooth cuts, back-hoe or bucket rips will be allowed.

All backfilled trenches in roadways shall be patched with hot-mix asphalt within five days of initial excavation, unless otherwise directed by the City's Representative. All backfill shall be in accordance with these standards.

All concrete or asphalt surfaces damaged or cut in trenching operations or other work within the right-of-way shall be restored to an "as-good or better condition" in accordance with the provisions outlined in Section 4.7 of these standards.

During the entire trenching, backfilling and patching operations, the Contractor shall be required to observe all safety and traffic control procedures as outlined in these standards.

The Contractor shall be responsible for maintenance of the trench, patch, and related work for a period of twelve (12) months from date of completion.

No more than four hundred (400) feet of trench shall be left unfilled at any time in one continuous run, unless otherwise approved by the City's Representative.

All streets and roads shall be kept free from dust and shall be open to through traffic. Approval to close the street must be obtained by the Contractor from the City Engineer or his designated representative. At least one-half (1/2) the width of any street or road shall be temporarily restored for use before excavation is commenced on the remaining portion of the street or road.

All excavation, backfilling and temporary resurfacing on any portion of any street or road shall be completed in one working day so that trenches are not left open or uncovered over night.

All requirements governing work within a right-of-way as contained in Section 2.5 (Barricades and Warning Signs - Work Area Protection) of these standards shall be adhered to.

All utility installations, i.e., gas, power, phone, cable T.V. and associated utilities, shall conform to the applicable test requirements contained within these standards for earthwork, compaction, base course, bituminous surface course, concrete and other materials.

4.4.2.8 CLEANING OF SANITARY SEWER LINES. When sewer lines have been placed and the trench backfilled, the sewer lines shall be thoroughly cleaned, flushed, and tested prior to acceptance by the City's Representative. No debris shall be permitted to enter any sewer lines in service. All debris shall be removed from the sewerline and manholes. Methods of cleaning are subject to approval by the City's Representative.

4.4.2.9 CLEANING AND DISINFECTION OF WATER SYSTEMS. After being tested and prior to being placed in service, all lines shall be disinfected by chlorination. Prior to chlorination the entire line shall be flushed to ensure that all dirt or foreign objects have been removed from the line. Sufficient chlorine shall be added to ensure a residual of twenty five (25) parts per million in the water after twenty-four (24) hours standing in the pipe. Chlorine calcium hypochlorite dry chlorinating chemical solution may be used for this purpose. Methods of application shall be approved by the Water Department. Following chlorination, all treated water shall be drained and the pipeline thoroughly flushed with clean water.

All lines being disinfected shall be flushed after the specified twenty-four (24) hour contact period. Such flushing shall be continued until the water is free from excess chlorine. All lines being disinfected including hydrant laterals, branch lines, and dead-end mains shall be flushed. After final flushing the chlorine residual shall be tested by the Water Department. It is the contractor's responsibility to coordinate this test. The discharge of flushed water shall not cause erosion or damage to streets or other property. Procedures for discharge will be subject to the review and approval of the City's Representative and Water Department.

4.4.2.10 SPECIAL REQUIREMENTS.

A. CONNECTIONS TO EXISTING FACILITIES - DRY TAPS. All connections to existing facilities shall be approved by the City Water Department. The Contractor shall make the approved connections to existing facilities as shown on the drawings. Dry connections to existing facilities shall be made only at locations shown on the drawings and shall be made at such times which will cause the least inconvenience to the water user(s). Dry connections shall be planned to minimize the duration of any shut down. The Contractor shall notify the Water Department at least two business days prior to beginning any connections to the existing facilities. When a connection to an existing water main is made, approximately four ounces of high test calcium hypochlorite (HTH) shall be placed in the pipe at each point where the existing main is cut. All new pipe and fittings at such connections shall be swabbed internally with an

approved chlorine solution. All connections shall be made in the presence of the Water Department representative.

Valves shall not be operated without a Water Department representative present. Existing facilities shall not be shut down for connections to new facilities without prior Water Department approval. In no case shall an existing pipeline be shut down for a total of more than twenty four (24) hours (a maximum of three (3) , eight-hour periods).

The actual work plan and schedule for making a connection to an existing facility which requires an existing pipeline to be shut down, shall be submitted to the Water Department and shall be approved before the Contractor will be allowed to proceed. The Contractor shall notify, by a method approved by the Water Department, all affected Water Department customers at least twenty four hours prior to shut down. Valves at connections to all existing facilities shall be operated by the Contractor, but only in the presence of the Water Department representative. If the water will be shut off for an extended period of time, the Water Department may require the Contractor to supply water for the Water Department's customers.

B. CONNECTION TO EXISTING FACILITIES - WET TAPS (Steel and Steel Composite Mains). The Contractor shall furnish and install, at his sole cost and expense, all tapping fittings and valves for all wet taps on existing City water pipelines. The Contractor shall notify the Water Department a minimum of two (2) business days prior to the time the wet tap is required. No wet taps shall be made without prior approval.

Prior to tapping the main, the tapping valve and fittings shall be properly installed and pressure tested and approved by the Water Department. All wet taps to existing City water pipelines shall be made by the City Water Department at the sole expense of the Contractor requesting the work. The Contractor shall also provide all necessary equipment, labor and appurtenances necessary to complete the job. The wet tap materials shall be obtained from a source pre-approved by the Water Department.