

MORONGO WATER DEPARTMENT

**MORONGO
BAND OF
MISSION
INDIANS**



A SOVEREIGN NATION

WATER CONSTRUCTION STANDARDS

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SECTION 1

GENERAL REQUIREMENTS

1-01 GENERAL

The Contractor shall furnish all materials, and provide all construction, and shall bear engineering, permit, fees and all other costs necessary for the complete installation of the water system as shown on the Water System Construction Plans as well as other approved drawings or plans and as required in the " Tribal Standards for Plan Preparation and Processing" and " Tribal Standards for the Furnishing of Materials and the Construction of Water Facilities," together with any other required or authorized changes to those documents.

It is the sole responsibility of the contractor to contact Underground Service Alert of Southern California (**U.S.A. @ 800-227-2600 or 811**) for the locations of underground utilities. The contractor shall perform in compliance with all safety requirements, including, but not limited to FED-OSHA requirements. All construction shall be provided by a licensed contractor.

1-02 DEFINITIONS

The word "**Tribe**" shall mean the Morongo Band of Mission Indians.

The word "**Tribal Council**" or the word "Council" shall mean the Morongo Band of Mission Indians Tribal Council.

The word "**Engineer**" shall mean a civil engineer registered as such in the State of California appointed by the Tribe acting either directly or through his properly authorized agents, assistants, inspectors and superintendents.

The word "**Contractor**" shall mean the person, persons, partnership or corporation duly licensed as such in the State of California to enter into a contract for the performance of the work required.

The word "**Plates**" shall mean collectively all of the Plates attached to an accompanying the Standards and made a part hereof.

The word "**Plans**" shall refer to the Water System Construction Plans that have been prepared by a Contractor or the Tribal Engineer and approved by the Tribe or its duly elected officer or Department.

The word "**Contract Documents**" shall mean those documents, particularly the approved project plans and specifications, which compromise the agreement between the Contractor and the Tribe.

The word "**Contractor**" shall mean any person, corporation, or other entity acting as an independent contractor that is hired by either the Tribe or other persons or entities; is

authorized to perform work on facilities, or facilities to be connected to Tribal facilities or on facilities to be dedicated to the Tribe; and from whom the Council will accept completed facilities which are constructed in accordance with Tribal Design and Construction Standards. All Contractors, hired by the Tribe or other persons shall be required to comply with **ALL** Tribal requirements.

The word “**Design Engineer**” shall mean the person, firm, partnership or corporation responsible for the preparation of projects plans, specifications, electronic drawing files, and field surveys.

The word “**Representative**” shall mean Tribal Council, *Department Manager, superintendent, inspector, consultant, or other person* authorized by the Tribe to conduct and carry out business on behalf of the Tribe.

The word “**Electronic drawing files**” shall mean the electronic files of the hard copy construction plans submitted to the Tribe on compact disk in conformance with the latest mapping standards.

The word “**Potable Main**” shall mean a potable water main designed and constructed for the purpose of conveying potable water and fire flows to residential, commercial, and industrial customers.

The word “**Service Line**” shall mean the pipe connecting individual customers to a water main.

The word “**Water Main**” shall mean “the main line or distribution system that is designed and constructed for the purpose of conveying water throughout the system.

The term "**ASTM**" shall mean American Society for Testing Materials.

DEFINITIONS

ADF- Average Daily Flow

AWWA- American Water Works Association

HGL- Hydraulic Grade Line

IND- Industrial

PE- Polyethylene Pipe

DI- Ductile Iron

PVC- Polyvinyl Chloride

ANSI- American National Standards Institute

1-03 CONDITIONS

On all questions relating to the acceptability of the material, machinery or plant equipment, classification of material or work, the proper execution, progress of sequence of the work, quantities and the interpretation of the specifications or drawings, the decision of the Tribe or its representative shall be final and binding.

The Contractor shall obtain copies of and comply with all applicable current statutes, laws, ordinances, rules, regulations, and specifications within the County of Riverside (or where applicable), and any other governmental agencies having jurisdiction and shall make application for all required permits and bear the cost of same.

The Contractor shall furnish to the Tribe copies of all required permits, licenses, bonds, and certificate of insurance(s), prior to commencement of the work.

1-04 SUPERVISION AND INSPECTION

Tribal Engineer or its duly appointed representative shall decide within the provisions of the specifications all questions which may arise concerning the quality or acceptance of materials furnished and work performed. If work has been covered up prior to inspection, the Tribe or its representative determines that it is necessary to inspect, the Contractor shall expose, or otherwise make available for observation at the sole cost of the contractor.

1-05 DEFECTIVE WORK OR MATERIALS

No work which is defective in its construction or deficient in any of the requirements of these specifications will be considered as accepted in consequence of the failure of any inspector connected with the work to point out said defects or deficiency during construction. The Contractor shall correct any imperfect work, without compensation from the Tribe, before final acceptance of the work by the Tribe.

All materials not conforming to the requirements of these specifications shall be considered as defective. They shall be rejected, whether in place or not, and shall be removed immediately from the site of the work by the Contractor at his expense. No rejected material, the defects of which have been subsequently corrected, shall be used until approved in writing has been given by the Tribe.

1-06 MAINTENANCE OF EXISTING IMPROVEMENTS

Unless otherwise indicated in the Construction Plans or in the Standards, or unless otherwise cared for by the owner of a public utility or franchise, all water, gas, oil, irrigation, telephone, electrical lines and structures or house laterals in place, and other surface or subsurface structures or lines, shall be maintained and shall not be disturbed, disconnected or damaged during the progress of the work. All expense, of whatever nature arising from such disturbance or in the replacement or repair thereof, shall be borne by the Contractor.

1-07 USE OF EASEMENTS

Facilities shall be located inside the established right of way and shall be offset from the right of way line a minimum of 5 feet.

Approval of new easements when established right-of-way is not feasible shall be done by the Realty Department and/or Tribal Council. When pipelines or other water related facilities are constructed in easements, the minimum easement width shall be **20** feet.

1-08 START OF CONSTRUCTION

No work shall begin on any water facility project until the design report, plans, specifications, and the electronic drawing files have been approved by the Tribe or its representative.

Construction shall commence as soon as a Notice To Proceed has been granted to the Applicant or its representative by the Tribe or its representative. The Contractor shall schedule a pre-construction meeting with ALL parties and Departments that would ultimately be involved with the project including ALL affected utilities.

1-09 CONTRACTORS RESPONSIBILITY

The contractor shall supervise, inspect, and direct the work competently and efficiently as to NOT delay the project, and perform the work in accordance with the Contract Documents. The Contractor shall be solely responsible for the means, methods, techniques, sequence, and procedures of construction.

The Contractor shall provide competent, qualified personnel to survey, layout, and construct the work as required by the Contract Documents. The Contractor shall at ALL times maintain good discipline and order at the job site. Except as otherwise noted in the Contract Documents, all work at the site shall be performed during regular working hours.

Unless otherwise specified, the Contractor shall furnish and assume responsibility for all materials, equipment, labor, transportation, construction, equipment, tools, temporary utilities, sanitary facilities, and all incidentals for the completion of the work.

The Contractor shall be responsible for the initiating, maintaining, and supervising of ALL safety precautions and programs in connection with the work. The Contractor shall take ALL necessary protection to prevent damage, injury, or loss to all persons on the work site or anyone who may be affected by the work. This shall include property at the site, or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structure, utilities, and underground facilities not designated for removal.

1-10 TRAFFIC CONTROL

The Contractor shall be responsible for ALL traffic control and shall NOT interfere with public travel, whether vehicular or pedestrian. The Contractor shall submit a detailed traffic plan and must be approved by the Tribe or its representative. This will NOT be required when the Contractor is working on private property in which he has obtained written

permission from the land owner.

1-11 DRAINAGE PROVISIONS

The Contractor shall provide for the drainage of water, and or surface water as may be applied or discharged on site in performance of the work. No water shall drain into the County flood control system or any blue line stream within the United States. The Contractor shall be responsible for the costs of ALL damages resulting from the introduction of such waters.

1-12 RESPONSIBILITY FOR EXISTING UTILITIES, STRUCTURES

It shall be the sole responsibility of the Contractor to investigate and field verify the existence and location of utilities whether shown on the approved plans or not. The Contractor shall be solely responsible for the protection of all structures or utilities, including pipes, cables, fences, or similar items.

1-13 CONNECTIONS TO EXISTING FACILITIES

Unless otherwise specified or indicated, the Contractor shall make all necessary connections to existing facilities, including structures, drain lines, and utilities such as water, sewer, gas, telephone, and electric. In each case the Contractor shall receive permission from the owner of such utility.

Connection to existing Tribal facilities that are in service shall be planned in advance. There shall be at minimum **48 hours** notice given to the affected utility and any customers which may be affected during the service interruption. The notice shall be verbally and in writing and at minimum, a door hanger left at each affected customer's property. The door hanger shall state the time of service interruption and when service is expected to be restored. This shall include a phone number where the customer may reach the Contractor.

1-14 OPERATION OF TRIBAL FACILITIES

All operation of Tribal facilities shall be done by Tribal staff. At **NO** time shall a Contractor operate any valve, hydrant, service shut-off, pump station or any related facility. For testing, chlorinating, or flushing water lines, specific permission shall be requested prior to commencement from the Tribe or its agent.

1-15 RESORATION AND CLEANUP

The Contractor shall be responsible to keep the job site free from accumulations of waste materials, rubbish, and other debris resulting from work. At the completion of work, the Contractor shall leave the site clean and restore it to its original condition or better.

SECTION 2

MATERIALS

2-01 GENERAL

Furnish new and unused ductile iron pipe for all mains and fire hydrant laterals, unless indicated otherwise on approved plans.

2-02 CLASS OF MATERIAL

All material shall be of domestic origin, and be suitable for a working pressure of 150 pounds per square inch (PSI), unless otherwise specified or approved equal.

2-03 PIPE

Although the information provided in the section applies to nominal pipe size 6-24 inch, it does not exclude the use of larger pipe sizes within the existing water system.

2-04 FABRICATED STEEL PIPE

Steel pipe and fittings 6-inch diameter and larger shall be lined and coated with cement mortar. Pipe joints shall be bell and spigot "0" rings. Flanged joints shall only be installed at valves or fittings or as shown on the drawings: Applicable sections of the following standards apply:

<u>STANDARD</u>	<u>ITEM</u>
AWWAC205	Cement-Mortar Lining and Coating
AWWAC206	Field Welding
AWWAC207	Steel Pipe Flanges
AWWAC208	Steel Pipe Fittings
AWWA C300 or C301	Rubber Gaskets

All materials shall be suitable for 150 PSI working pressure unless specified otherwise. The outside diameter and wall thickness of pipe shall be as follows:

<u>SIZE</u>	<u>PIPE DIAMETER</u>	<u>THICKNESS</u>
6	6 – 6.90 O.D.	.25 IN
8	8 – 9.05 O.D.	.27 IN
10	10 -11.10 O.D.	.29 IN
12	12-13.20 O.D.	.31 IN
16	16 -17.40 O.D.	.34 IN

2-05 DUCTILE IRON

Ductile iron pipe shall be cement mortar lined, bituminous outside coating approximately one mil thick, each pipe marked with the weight and class designation. Pipe joints shall be mechanical joint or push-on type, joints utilizing rubber ring gaskets. Ductile Iron pipe shall comply with AWWA C-151 standards. Applicable sections of the following standards apply.

2-06 POLYVINYL CHLORIDE (PVC) PIPE

Sizes 6-12 inches shall conform to all requirements of ANSI/AWWA C900 or C909. Unless otherwise required for pressures greater than 150 psig, the PVC pipe shall be class 150, and shall have outside diameters equivalent to cast iron pipe. Each pipe shall be marked as required by ANSI/AWWA.

Sizes 16-24 inches shall conform to all requirements of ANSI/AWWA C905 and shall have a minimum pressure rating of 200 psig. PVC pipe shall be class 235 and have an outside diameter equivalent of cast iron pipe. Each pipe shall be marked as required by ANSI/AWWA standards.

<u>STANDARD</u>	<u>ITEM</u>
AWWAC151	Ductile Iron Pipe
AWWAC104	Cement-Mortar Lining and Coating
AWWA C110	Fittings
AWWA C111	Rubber Gasket Joints

All material shall be suitable for 150 PSI working pressures. Ductile iron pipe shall be thickness Class 50, unless indicated otherwise on the plans.

2-07 GATE VALVES

Gate valves 4 inches and larger shall conform to all requirements of ANSI/AWWA C509. Valves shall be non-rising stem, wedge gate, interior lined, epoxy coated (exterior), resilient seat valves, opening counter clockwise as manufactured by Mueller, or approved equal. The minimum design working water pressure shall be 200 psig unless otherwise indicated on the plans for 3-12" and 150 psig for 16-20" sizes.

Gate valves less than 4 inches in size shall be non-rising stem, bronze, with wedge discs and threaded ends as manufactured by Ohio Brass working class 250 PSI, or approved equal.

2-08 BUTTERFLY VALVES

All butterfly valves shall be suitable for buried use and have a 150 psig working pressure

unless otherwise noted. Valves shall be tight closing with rubber seats and shall meet the strength and performance requirements of ANSI/AWWA C504. All valves furnished shall open counter clockwise. Valve bodies shall be cast iron or ductile iron with flange joint ends. Valve seats shall be of a Buna-N compound unless otherwise noted on approved plans.

2-09 VALVE BOXES AND COVERS

Protection boxes and covers shall be furnished and installed with all buried valves. Valve can bottom material shall be 8"SDR-35 PVC pipe. Slip can top material shall have a minimum diameter of 8 inches and be made of 10-gauge galvanized steel 12" in length. Valve can covers shall be 8" round with the word "WATER" cast on each. The Contractor shall be responsible for setting valve boxes relative to existing final grade. Also, valve boxes shall NOT be installed in concrete gutters, cross-pans, alleys, or driveways.

2-10 VALVE EXTENSION STEMS

Valve extension stems and stem guides shall be furnished and installed on buried valves when the valve operator is greater than 6 feet below final grade. Extension stems shall extend to within 4-5 feet below final grade and shall be furnished with centering rings that center the stem in the valve box. All valve extension stems shall be equipped with a wrench nut.

2-11 FIRE HYDRANTS

In general, the size of fire hydrants shall be determined by the Morongo Fire Department and/or the design engineer. Fire hydrants shall have at minimum one 4 ½ inch outlet and two 2 ½ inch hose outlets with National Standard Thread unless otherwise noted on approved plans and have a working pressure of 200 psig and shall conform to AWWA C502 standards.

Fire hydrants shall be of the dry barrel type. In general, Fire hydrants shall be furnished with outlet threads conforming to local fire department requirements. The maximum bury depth for a fire hydrant as measured from the bottom of the hydrant shoe to the hydrant flange shall be 6 feet unless otherwise approved. Valves shall open to the left or counterclockwise. Hydrants shall be furnished with suitable caps and be painted yellow with industrial enamel paint.

HYDRANT TYPE

MANUFACTURER AND MODEL

4 ½ x 2 ½ x 2 ½

Mueller A-421 or approved equal

Dry barrel shall conform to AWWA C502-80. Hydrants shall be as follows unless otherwise approved.

HYDRANT TYPE

MANUFACTURER AND MODEL

4 ½ x 2 ½ x 2 ½

Jones 3675 or approved equal

Wet barrel hydrants shall conform to AWWA C503-75 and shall be all bronze top section

and spool. Hydrants shall be as follows, unless otherwise approved.

Furnish catalog and maintenance data (including illustrations and a schedule of parts and the materials of which they are made) to use in maintenance of the hydrants, as well as in ordering repair parts if hydrants other than those specified are proposed to be used.

2-12 BLOWOFF HYDRANT

The hydrant on the 4" blow-off assembly shall be a model J-344 by James Jones Company with a 4" inlet and 2 ½" fire hose connection outlet, or approved equal.

The 2" blow-off assembly shall be a model J-342 Jones with a 2" inlet and a 2 ½" fire hose connection outlet, or approved equal.

2-13 AIR VALVE

The air valve shall be designed to permit automatic escape of large quantities of air from the pipeline when line is being filled and permit air to enter the pipeline when line is being emptied and shall comply with AWWA C152.

It shall also allow accumulating air to escape while the line is in operation under pressure. Valves shall be APCD "Heavy Duty" combination Air Release Valves number: 143c, 145c, 149c, or 150c depending upon size specified on approved plans and suitable for service at 300 psig or approved equal. Combination air valves shall be equipped with soft-seating to prevent leakage at valve where working pressure are either less than 25 psig, or within the soft-seat range as recommended by the manufacturer.

2-14 STEEL FLANGES

Steel flanges shall be AWWA C207, Class D, ring type or blind type as required sizes shown on approved plans.

2-15 JOINT RESTRAINT

All push-on joint and mechanical joint pipe shall be physically immobilized for the appropriate lengths and in the appropriate directions at all tees, dead ends, and bends greater than 11 ¼ degree or greater. All joint restraint shall be provided by construction concrete thrust blocks or by restraining joints along a sufficient length of pipe (40 feet minimum) to resist the separation of joints or as otherwise noted on approved plans.

Retainer glands shall be ductile iron with steel screws, and shall be compatible with the type and style of mechanical joint pipe for which they are used. Wedge style joint restraint shall be EBAA Iron, Inc. "MEGALUG" Series 1100/2000 or approved equal. Flexibility of joint shall be maintained after burial. Glands shall be manufactured of ductile iron conforming to ASTM A536-80 and have a working pressure of at least 250psig.

2-16 GASKETS, BOLTS, NUTS

Gaskets for flanged joints shall be ring type 1/16 inch thick for pipe 10 inches and smaller

and 1/8 inch for larger pipe. Gaskets shall be Johns-Manville type 60 or Crane "Crinite" and shall conform to applicable requirements or AWWA C207. Bolts shall have chamfered or rounded ends projecting ¼ to ½ inch beyond the outer face of the nut and shall conform to ASTM A307.

2-17 FLEXIBLE COUPLINGS

Flexible couplings shall have epoxy coated steel sleeve and malleable iron followers, Rockwell 421, 431, or 441 couplings by Rockwell International or approved equal.

2-18 FLANGED COUPLING ADAPTORS

Flanged couplings adaptors between flanged fittings and asbestos cement pipe shall be Rockwell 916 Ring-Type FCA or approved equal. For ductile iron pipe, use Rockwell 912 Cast FCA or approved equal. For steel pipe, use Rockwell 913 Steel FCA, or approved equal.

2-19 CONNECTION WITH EXISTING SYSTEM

All materials necessary to make connections between proposed and existing water systems per details shown on the Plans shall be furnished and installed by the Contractor and shall be of the size and class shown on the accompanying Plans. Items indicated to be salvaged on the Plans, but not used on this project shall become the property of the Tribe.

2-20 STEEL CASING FOR BORED CROSSINGS

Steel pipe shall be a minimum one-quarter (1/4) inch thick wall for 12 inch to 20 inch nominal diameters and a minimum three eights (3/8) inch thick wall for pipe sizes up to 36 inch nominal diameter or in accordance with the requirements of the governing agency whichever is greater, and shall be manufactured in accordance with American Water Works Association (AWWA) Standard C200 "AWWA Standard for Steel Water Pipe, 6 inches and larger", 33000 SI minimum yield point steel. The casing shall be round and straight, free from protruding bolts, rivets or welds, and shall have an inside diameter of not less than the maximum diameter of the water main plus 6 inches. The ends of the Steel Casing Pipe to be jacked or bored into place shall be prepared to withstand pressures rated by jacking the pipe into place. Casing pipe thickness, length and other features shall be as required by the governing utility or agency.

2-21 CONCRETE

Portland cement shall conform to ASTM C94 (Option A) entitled "Ready Mixed Concrete" and shall have a minimum 28-day compressive strength of 2500 PSI unless otherwise indicated.

2-22 SERVICE SADDLES

All pipe saddles for service line connections of 1 inch shall be brass or ductile iron, and shall be furnished with brass or stainless steel straps in either a double-strap configuration with a minimum strap width of 2 inches each or single strap with a minimum of 3 inches

including Buna-N O-ring style. Saddles shall have an epoxy or nylon coating and be furnished with stainless steel washers and nuts. Acceptable saddles are Ford 202BS, FS202, Romac 202N, 202B, or approved equal. Service saddles for 1 ½ or greater shall be Smith Blair 317 Double Strap or approved equal.

2-23 CORPORATION STOPS

Corporation stops shall be bronze body, Mueller H-15028 (1 inch) and H-15023 (2 inch) or approved equal, with iron pipe inlet. Angle shut off valves shall be Mueller H-14258 (1 inch) and H-14277 (2 inch) or approved equal.

2-24 PIPE

Service lines shall be copper Type-K or approved equal. Tubing shall meet ASTM B-88 and ANSI/NSF 61 requirements. HDPE-PE3408 piping is also acceptable and must meet ASTM D2239.

2-25 TAPPING SLEEVES

Smith-Blair 622, 626 and 662 as applicable or approved equal epoxy coated with 316 stainless steel bolts.

2-26 INSULATION FITTINGS

Insulation couplings, flanges, fittings, and unions shall be the products of F.H. Maloney Company, Cor Ban Products Company, or approved equal.

2-27 CONCRETE VAULTS

Vaults design shall consist of live load for H20-44/HS20-44 or as required by AASHTO standard. Risers shall be installed where required to meet dimensional requirements, and allow for adequate depth. Cover shall be torsion assist and be rated for H-20 traffic. The No. 700 and 800 series Brooks sectional vaults, as manufactured by Brooks Products, Inc., or approved equal, are to be used.

2-28 TRACER WIRE

Tracer wire shall be 12 gauge type UF, 600V single strand copper wire. Splices in wire shall be "3M" Type DBY-6 low voltage for direct bury, and shall be waterproof gel cap type connectors.

2-29 WARNING TAPE

Warning tape shall be located **at minimum** 2 feet above buried pipe. Tape shall be placed in the center of trench line and covered with native backfill material. Tape shall bear **"CAUTION BURIED WATER LINE BELOW"**, have a minimum width of 3 inches, blue in color, and be Non- Metallic.

SECTION 3

EXCAVATION, TRENCHING AND BACKFILL

3-01 GENERAL

The work covered by this portion of the standards consists of the furnishing of all plant, labor, equipment, appliances, and materials and the performance of all operations in connection with excavation, trenching, and backfilling for water mains and appurtenant structures, in strict accordance with the Standards and the applicable drawings.

In case of conflict in requirements for excavation, trenching and backfilling between Tribal Standards and any statues, laws, ordinances, rules, regulations and specifications of any agency having jurisdiction, it shall be understood that the more exacting requirements shall govern. In general, easements and the aforementioned statues, laws, ordinances, rules regulations and specifications of any agency having jurisdiction will apply within the boundaries or public rights-of way to which they apply.

3-02 EXCAVATION

Perform all excavation of every description and of whatever substances encountered, to the depths and alignment indicated on the construction drawings or as otherwise specified. During excavation, material suitable for backfilling shall be piled in an orderly manner, a sufficient distance from the banks of the trench to avoid overloading and to prevent slides or cave-ins. All excavated materials not required or suitable for backfill shall be removed by the contractor.

Such grading shall be done as may be necessary to prevent surface water from flowing into trenches or other excavations. Remove, by pumping or other means approved by the Tribe, any water accumulated in the trench from any source.

Suitable shoring, timbering or sheeting shall be provided where necessary to support the sides of the trench prior to and during the installation of the pipe. The shoring methods and procedure shall be consistent with Federal and Local safety guidelines, including, but not limited to FED-OSHA, Title 8 requirements.

Unless otherwise indicated, excavation shall be by open cut except that short sections of a trench may be tunneled if, in the opinion of the Tribe, the pipe can be safely and properly installed and backfill can be properly tamped in tunnel sections.

All spoil shall be thrown on one side of the trench only to facilitate distribution and installation of pipe in such a manner that it will not endanger the work and will avoid obstructing roads and driveways. Adequate provisions shall be made for maintaining the flow of watercourse, drains, sewers or ditches crossing the trench, and upon completion of the work, they shall be restored to their original condition.

The use of trench digging machinery will be permitted except where its operation will cause

damage to trees, buildings or existing structures above or below the ground. At such locations, hand methods shall be employed to avoid such damage. Trees, fences, poles and other property shall be protected unless their removal is authorized. Any damaged property shall be satisfactorily restored by the contractor.

Minimum cover over the pipe in areas where grade is not shown on the Plans shall be 36 inches and in accordance with details shown on **Plate 6**. Depth of cover shall be measured from the established street grade or the surface of permanent improvement to the top of the pipe barrel. In the case of lines outside of the existing or proposed street right-of-way, the depth of cover shall be measured from the average natural ground surface. Any deviation shall be subject to approval of the Tribe.

The width of the trench at the top level of the pipe shall be in accordance with the following table:

PIPE SIZE-INCHES Inside Diameter	TRENCH WIDTH-INCHES	
	Minimum	Maximum
4	20	28
6	22	32
8	24	32
10	26	36
12	30	36
14	32	42
16	34	42
18	42	42
20	44	44
24	48	48
30	54	54
36	60	60

Uniformly placed on both sides of the pipelines for the full width of the trench and have a maximum loose depth of not more than **6 inches** as measured from the trench bottom. This material shall then be tamped under and around the pipe and joints until all voids underneath and around the pipe and joints have been filled.

After the voids beneath the pipe have been filled, the material between the trench walls and the pipe shall be compacted, with each layer firmly compacted prior to placing the subsequent material, until the material has reached a minimum depth of the horizontal centerline of the pipeline to a depth of **12 inches** over the pipelines, the backfill material shall be placed in horizontal layers not exceeding **8 inches** in depth and properly compacted by tamping.

Where the trench has been excavated below grade for any purpose, the trench shall be refilled to the proper trench grade with sand backfill material and compacted to 90 percent of its maximum density as determined by ASTM 1556. The trench base shall be graded to

provide a uniform bearing and support for the pipe its entire length with sand backfill material.

Not more than 400 feet of trench shall be open at any time. At the conclusion of the day, all trenches shall be backfilled to eliminate the possibility of entry by pedestrians and motorists. Only approved open trenches shall be allowed to remain open at night. They must be barricaded with illumination and or fencing.

Excavation behind all fittings requiring thrust blocks shall not be machine dug, but shall be hand dug to keep the trench wall solid and undisturbed.

The Contractor shall, at his own expense, provide monuments and necessary survey work to determine the alignment and grade for the pipelines to be laid in accordance with the Plans and such grade shall be uniform. **NO** high or low points in the line shall be permitted, except as shown on the Plans, or to conform to the general grade of the street or contour of the terrain through which the pipe is to be laid. No deviation shall be made from the required line or grade except with the written consent of the Tribe or its agent. In the event a "High Point" is created at locations other than shown on the Plans or as directed by the Tribe, air and vacuum release valves of suitable capacity shall be installed, at no expense to the Tribe, to permit air to be release from or taken into the pipeline at said "High Point." Blow off assemblies shall be installed at low points at no expense to the Tribe.

All excavations shall be kept free of water while pipe is being placed. Furnish, install and operate all necessary machinery, appliances and equipment to keep excavation sufficiently free from any source during construction of the work to permit proper pipe laying and jointing and shall dispose of water so as not to cause injury to public or private property or to cause a nuisance or a menace to the public. Where it is necessary to use concrete in conjunction with an excavation, all construction areas will be kept free of water until concrete has been placed and allowed to attain its initial set.

Adequate provision shall be made for maintaining the flow of watercourse, drains, sewers or ditches crossing the trench and upon completion of the work, they shall be restored to their original condition.

Groundwater control shall be provided at those locations where the groundwater is higher than a plane 1 foot below the bottom of the pipeline.

3-03 BACKFILL

Initial Backfill - Initial backfill should be accomplished as soon as possible after the pipe has been laid. The backfill material shall be sand, obtained from either on-site or off-site sources and shall be approved by the Tribe and shall contain no' clay lumps, organic materials or other deleterious materials and no particles larger than **1 inch**. The material shall be sufficiently damp to permit thorough compaction on all sides of the pipe free from voids. Initial backfill shall consist of placing the backfill from proper trench grade to an elevation of **12 inches** over the top of pipe by the following procedure:

The first lift of material shall be uniformly placed on both sides of the pipelines for the full

width of the trench and have a maximum loose depth of not more than **6 inches** as measured from the trench bottom. This material shall be tamped under and around the pipe and joints until all voids underneath and around the pipe and joints have been filled.

After the voids beneath the pipe have been filled, the material between the trench walls and the pipe shall be compacted, with each layer firmly compacted prior to placing the subsequent material, until the material has reached a minimum depth of the horizontal centerline of the pipeline to a depth of **12 inches** over the pipelines. The backfill material shall be placed in horizontal layers not exceeding **8 inches** in depth and properly compacted by tamping.

Final Backfill - The balance of backfill shall contain no such smaller dimensions as specified by the governing body having jurisdiction and shall be free from brush or any other perishable or objectionable matter that would prevent proper compaction, consolidation or that might caused

All of the backfill placed shall be compacted to a minimum dry density of 90 percent of its maximum dry density as determined by ASTM 1556.

Jetting of the material to accomplish compaction will not be permitted without prior authorization by the Tribe or its agent. Where jetting has been approved by the Tribe, backfill shall be thoroughly consolidated by use of water jets.

If there are any deficiencies in the quantity of material for backfilling the trenches or for filling depressions caused by settlement, the Contractor shall be responsible for the difference. Surplus spoil shall be spread or be hauled away as directed by the Tribe or its agent.

Backfill within traveled streets or highways, existing or proposed, shall meet the standards and approval of the agency or proper authority having jurisdiction over same.

Trenches improperly backfilled, or where settlement occurs, shall be reopened to the depth required for proper compaction, then backfilled and compacted, with the surface restored to the required grade at the sole cost of the contractor.

3-04 PAVEMENT REPLACEMENT

All pavement removal and replacement shall conform to the standards and specifications of the governing body having jurisdiction, and shall meet with their approval. The Contractor shall be responsible for replacing all necessary pavements. Where excavation is required under paved areas, the pavement shall be cut in a manner to affect a smooth, straight-cut edge. If the pavement is found to be damaged after the installation of the pipe and backfilling, the damaged pavement shall be removed and replaced at the sole cost of the contractor. Prior to replacement, the edges shall be coated with emulsified asphalt. All pavement removed from the work site shall be disposed of off-site and shall NOT be included in the trench backfill.

All streets, driveways, shoulders, parking lots, or other paved surfaces which require pavement to be removed as part of the installation, shall be replaced with a pavement of

equal thickness of the existing pavement or as otherwise noted on the plans.

All trench plating shall be installed upon approval of the Tribe or its agent. All plating shall be laid in place as to cover the entire trench walls to a minimum beyond 8 inches. Plating shall be placed TO GRADE of existing asphalt roadway and shall NOT be above grade at any time.

SECTION 4
INSTALLATION

4-01 GENERAL

All foreign matter and dirt shall be removed from the interior of the pipe prior to its installation. Before, lowering, the pipe shall be inspected for defects. Any defective, damaged, or unsound pipe shall be rejected. The entire joint including coupling, machined sections of the pipe and the rubber gasket or ring shall be thoroughly cleaned at the time the joint is made. The entire procedure and method of installation of the pipe and of making the joint shall be done in a workmanlike manner and shall be in strict accordance with the pipe manufacturer's direction and recommendations.

All pipes shall be laid according to the size, class, location and grade shown on the Plans. The faces of all spigot ends and all shoulders in the hubs or sockets must be true and brought into firm contact. Rubber ring locations shall be checked with suitable gages to insure that they are located in the proper position relative to the pipe ends.

When pipe laying is not in progress, the unfinished end of the pipe shall be securely closed with a suitable plug or cover to prevent the entrance of animals or foreign matter into the line.

Take all necessary care and precautions to prevent the pipe from floating due to water entering the trench from any source. The Contractor shall be responsible for damage caused by floating pipe and shall, at his sole expense, restore and replace the pipe to its proper condition, alignment and grade.

Where pipe is laid on a curve or at horizontal or vertical angles in the trench, the maximum deflection at the joint shall not exceed 60 percent of the limitations specified by the pipe manufacturer and each joint shall be adequately blocked to take the thrust until properly backfilled.

The cutting of pipe for inserting valves, fitting or closure pieces shall be done in a neat and workmanlike manner as to leave a smooth end perpendicular to the axis of the pipe. Filed cut pipe lengths shall be filed or ground to resemble the spigot end of the pipe. Whenever it is necessary to join ductile iron pipe with a pipe of dissimilar metal, a method of insulating against the passage of electrical current shall be approved by the Tribe or as per plan.

4-02 HAULING AND UNLOADING PIPE

During loading, transportation and unloading, every precaution shall be taken to prevent injury to the pipe, its lining and its coating. No pipe shall be dropped from cars or trucks nor allowed to roll down skids without proper restraining ropes. Each pipe shall rest upon suitable pads, skids, strips or blocks during transportation and while awaiting installation in the field, and shall be securely wedged or tied in place. Padding shall be used on all car

stakes, skids and other material to prevent damage to the coating during transportation and handling.

Any pipe which is damaged shall be replaced at the sole cost of the Contractor and to the satisfaction of the Tribe.

When it is necessary to move the pipe longitudinally along the trench it will be done in such a manner as not to injure the pipe or its coating. Pipe shall not be rolled or dragged on the ground.

Where pipe is placed in stockpiles, it shall be neatly piled and blocked with strips between tiers.

4-03 PROTECTION OF WORK AND MATERIALS

Care must be taken to protect and preserve all materials to be used in the laying of the pipe. The pipe shall be handled in such a manner as not to injure its shape. All pipe and materials which, in the opinion of the Field Inspector, have been damaged shall be replaced.

All material shall be safely stored until it has been incorporated in the completed project. All material damaged or broken shall be replaced in exact type and kind. All materials received and not used shall be removed.

4-04 HANDLING OF PIPE AND ACCESSORIES

Pipe and accessories shall be unloaded at the point of delivery, hauled to, and distributed at the site of the project. It shall at all times, be handled with care to avoid damage. Whether moved by hand, skid ways or hoists, material shall not be dropped or bumped against pipe or accessories already on the ground or against any other object on the ground.

In distributing material at the site of the work, each piece shall be unloaded opposite or near the place where it is to be laid in the trench.

Pipe shall be handled in such a manner as to avoid damage to machined or special ends. When such damage cannot be repaired to the Tribes satisfaction, they shall be replaced by the Contractor at their sole cost and expense.

Precautions shall be taken to protect the interiors of pipes, fittings and valves against contamination.

All pipe, fittings and accessories shall be carefully lowered into the trench in a workmanlike manner, using proper tools and equipment. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

4-05 INSTALLATION OF DUCTILE IRON MAINS

Steel or ductile pipe shall be laid according to size, line, and grade designated on the plans. Before any steel or ductile pipe is lowered in place, the trench bottom shall be prepared so that each length of steel or ductile pipe shall have a firm and uniform bearing over the

length of the barrel. Proper excavation shall be made to receive the bell of each pipe section. All adjustments in line and grade shall be made by scraping away or filling and tamping in under the barrel of the pipe. Wedging or blocking will not be permitted.

Rubber ring joints shall be completed in the trench. The ends of the pipe shall be thoroughly cleaned and positioned for joining. A non-toxic vegetable soap solution shall be applied to the inside of the bell, and rubber gasket snapped into the groove on the spigot end.

The ductile iron water mains shall be laid and the work incidental thereto performed in accordance with applicable requirement of AWWA C6DD Standard for Installation of Gray and Ductile Cast Iron Water Mains. All installations shall include tracer wire and Warning tape as noted in Section 2-28 & 2-29. All tracer wire shall extended to the top of all valve protection cans and/or boxes.

Pipe will be inspected in the field before any backfilling shall occur and after verification by the Field Inspector.

4-06 FIRE HYDRANT ASSEMBLY INSTALLATION

Fire hydrants shall be installed at the locations shown on the Plans in accordance with details shown on **Plate No. 1-1 and 1-2**, as appropriate herein, and positioned to provide complete accessibility and to minimize the possibility of damage from vehicles or injury to pedestrians. The size and type of hydrant shall correspond to the designation shown on the Plans. The entire hydrant assembly shall be plumb. The face of the 4-inch nozzle shall be parallel to the street centerline. The hydrant shall be located so that centerline of the riser or barrel is not less than 18 inches or more than 24 inches in back of the curb face or face of berm on the edge of the street pavement in areas where the sidewalk is adjacent to the curb; the hydrant shall be located immediately behind the sidewalk.

Provide and install all necessary fire hydrants bury extensions to permit installation of the hydrant assembly to proper grade as per plan.

Make certain that the automatic drain openings of the dry barrel fire hydrants are kept open before and during installation. Provide a gravel pocket adjacent to the drain opening to extend to the surface of the ground in such a manner as to properly clear the fire hydrant assembly.

Upon completion of the water main and system installation, and after the field tests have been performed, each fire hydrant shall be operated in the presence of the Field Inspector. Operation shall consist of opening the fire hydrant assemblies and allowing water to flow freely from one or more of its outlets. Upon completion of this sequence the fire hydrants shall be turned off and all protection caps properly placed on each outlet.

4-07 GATE VALVE INSTALLATION

Valves shall be installed at the locations shown on the Plans and in accordance with details shown on **Plate 2 detail "A"** and correspond to the size and type of ends shown on the Plans. All valves shall be equipped with a protection box and cap.

The cutting of pipe for inserting into the bells of valves shall be done in a neat and workmanlike manner, using proper tools and equipment. Under no circumstances shall valves be dropped or dumped into the trench. All valves shall be lowered into the trench using proper tools and procedures. All valves shall be installed at 500 ft. intervals.

Except in cases of emergency or as directed by the Tribe or its agent, gate valves shall not be operated without a Tribal representative present. During the course water main installation, all gate valves shall be left completely open or completely closed, unless authorized otherwise by the Tribe or its agent. Upon completion of the water mains and all appurtenances, all gate valves shall be operated through a complete open and closed cycle in the presence of the Field Inspector. After completion of this operational cycle, all valves shall be left in an OPEN position unless directed otherwise by the Inspector.

4-08 PROTECTION BOXES

Protection boxes shall be installed to proper finished grade in rights-of-way of presently unpaved streets and easements and in accordance with details shown on **Plate 2**. The entire assembly shall be plumb. When installed in paved areas, the valve box shall be installed with its top at finish grade.

4-09 BLOW-OFF ASSEMBLY INSTALLATION

Blow-offs shall be installed at the locations shown on the Plans and in accordance with the details shown on **Plates NO.3 and NO.7** herein. The entire assembly shall be plumb with nozzles at right angle to the street or as directed by the Tribe or its agent.

Blow-offs shall be located to provide complete accessibility and to minimize the possibility of damage from vehicles or injury to pedestrians. Upon completion of the water main and system installation, each blow-off shall be operated in the presence of the Field Inspector. Operation shall consist of opening the hydrant head on the assembly and allowing water to flow freely from its outlet. Upon completion of this sequence, the blow-off assembly shall be turned off and all protection caps placed on the outlet.

4-10 FLANGED FITTINGS AND CONNECTIONS

All flanged valves and fittings shall be properly positioned and aligned in the trench in such a manner as to relieve any stress or strain on the connecting pipe or flanged end being fitted with the pipe system resting in its final position and all fittings and valves plumb.

4-11 FLEXIBLE COUPLINGS WITH TIE DETAILS

Where Flexible couplings are to be installed on steel water mains, the coupling shall be provided with tie rods per detail as shown on **Plate 9**.

4-12 DRAIN ASSEMBLY INSTALLATION

Drain assemblies shall be installed at the location indicated on the Plans, at sites selected by the Tribe or its agent to be completely accessible and protected from possible damage from vehicles or equipment.

Drains shall be installed in accordance with details shown on **Plate No. 4-1** herein, in a workmanlike manner and in accordance with accepted water works standards.

Upon completion of the water main and system installations, drains shall be operated by opening and closing the control valve in the presence of the Field Inspector.

4-13 AIR AND VACUUM ASSEMBLY

Air and vacuum assemblies shall be installed at the locations indicated on the Plans at sites adjacent to the roadway or on back lot lines as selected by the Tribe to be completely accessible and protected from possible damage from vehicles or equipment. The assemblies shall be installed in accordance with details shown on **Plate No. 5 and 5-1** herein, in a workmanlike manner and in accordance with accepted water works standards. Pipe joints shall be assembled in a proper manner to assure that they are free of leaks.

4-14 CONCRETE INCASEMENTS

A concrete encasement shall be installed at all watercourse crossings. The entire encasement shall be installed in accordance with the detail shown on **Plate NO.8** herein. The blanket shall be installed in a manner to completely surround the pipe barrel and provide protection from flood flows and eliminate possible water infiltration. The entire procedure shall be in accordance with the pipe manufacturer's recommendations and approved plans. All concrete necessary for concrete blanket shall be furnished by the Contractor.

4-15 THRUST BLOCKS

Concrete thrust blocks shall be installed at all dead ends, tees, elbows, bends, crosses, and blow-offs drains and fire hydrants shown on the approved Plans. The thrust blocks shall be adequate in size to provide for a working pressure of 150 pounds per square inch on the size of pipe under consideration. The Contractor shall provide and install concrete and other materials required for thrust blocks as approved.

Thrust blocks shall be constructed on concrete between the fitting of the pipe and the trench wall and shall conform to the dimensions in **Plates 11-1 and 11-2**. Thrust block dimensions shown are the minimum required dimensions. Local conditions may dictate larger size thrust blocks. The concrete shall be placed so that it extends to the trench wall in a manner that enables the entire bearing area to be in contact with undisturbed freshly cut material. Concrete shall be kept behind the bell of the fitting and shall not be permitted to run against the pipe. Concrete shall be kept clear of all bolts on flanged fittings to enable proper future removal of all such bolts.

4-16 CORROSION PROTECTION FOR BURIED FLANGE BOLTS AND ACCESSORIES

Coat all buried sleeve couplings, flange couplings adaptors and buried bolts with 2 coats of Kippers bitumastic 505 or equivalent, 15 mils per coat dry film thickness.

4-17 CONNECTION WITH EXISTING SYSTEM

Tie-ins or connections to the Tribal system shall follow the procedure below:

- The method, procedure and materials for making tap or connection shall be approved in advance by the Tribe or its agent.
- The Contractor shall schedule, at least **72** hours in advance, a date and time for making the connection.
- The Contractor shall notify all water users affected by the shutdown, a minimum of **48** hours prior to the actual shutdown including the estimated duration which shall not exceed **8** hours.
- Upon completion of the connection with the Tribal system, the gate valve installed on the outlet of the connection shall be left in a closed position, unless otherwise authorized by the Tribe or its agent. Under no circumstances shall the outlet gate valve be opened without the express consent and approval of the Tribe or its agent.

4-18 BAFFLES

When the natural slope outside the traveled roadway or access roads is greater than 15%, baffles shall be installed at the top of the trench. These baffles shall be installed in accordance with details shown on **Plate no. 10** and constructed of 2" X 10" or 2" X 12" redwood plank set on edge at the top of trench. The plank shall be two (2) to three (3) feet wider than the trench and shall be held in place by 2" X 4" redwood stakes driven into the natural ground on the downhill side of the baffle. These stakes shall be driven a minimum of 2 feet into solid ground. The top of the baffle shall be set 2 to 3 inches above the surface of the adjacent ground and the trench backfill shall be increased as to be flushed with the top of the baffles throughout the area in which they are installed. Baffles shall start at the top of the slope with spacing based on the following schedule:

Details of baffle installations are shown on **Plate no. 10** herein.

SLOPE GRADIENT	BAFFLE SPACING
15%	20 feet
20% (5:1)	15 feet
25% (4:1)	12 feet
33% (3:1)	9 feet
50% (2:1)	7 feet
67% (1-1/2:1)	5 feet

4-19 BORED CROSSINGS

General - The work covered by this paragraph of the Tribal Standards includes all pipe, pipe fittings, casings, special appurtenances, and materials between the stations indicated as bored crossings on the drawings. Crossings shall be bored with an earth auger to the line and grade shown on the plans. The maximum allowable variation in line or grade will be two-tenths (.20) of a foot in the distance bored. Should voids be created outside the casing pipe, the voids shall be filled as directed by the Tribe or any governing agency. The pipe

shall be threaded through the crossing. Extreme care shall be taken not to break any of the connections. Any broken connection shall be replaced. After the pipe is in the casing, the space between the pipe and the casing shall be filled with sand, blown in. Seal the ends with cement grout.

4-20 ELECTRICAL INSULATION JOINTS

Electrical insulation joints shall be provided at all connections between dissimilar metals and ferrous and nonferrous pipe except where the nonferrous pipe is an electrical non-conductor. The joints shall be tested after completion to verify non-conductivity.

4-21 FIRE SERVICE INSTALLATION

Fire services shall be installed at locations shown on the accompanying plans, in accordance with details shown on **Plate NO.4**, as appropriate herein. It shall be positioned to provide complete accessibility and minimize the possibility of damage from vehicles, or injury to pedestrians.

The size of the fire service shall correspond with application or plans provided for construction. The entire fire service assembly shall be plumb. The street edge of the vault shall be placed no less than 18", and no more than 24", behind curb face. If a sidewalk exists, or is shown on plans, the fire service shall be placed directly behind the sidewalk. Extensions to the vault will be installed when needed to bring concrete vault (see page for vault type) to proper finish grade.

4-22 WATER SERVICE INSTALLATION

Water services shall be installed at locations shown on approved plans and in accordance with details shown on **Plate 6-1**. All services shall be copper "Type K" unless otherwise approved. All services shall be installed at a 45 degree angle, have a minimum of 30 inches of cover and extend 24 inches beyond the face of curb or designated property line.

4-23 WATER SERVICE PROTECTION BOX

Protection boxes shall be installed as shown on approved plans and in accordance with details shown on **Plate 12**. All boxes shall be at minimum plastic and have adequate room to turn on and off the water service inside the box. Where service is in a high traffic area, a concrete box with steel cover shall be installed to finished grade.

4-24 WATER MAIN AND SEWER CROSSING

Potable and Non-Potable water mains shall at NO time be buried in the same trench. They shall have at minimum 10 feet horizontal separation and 1 foot vertical separation. In any case the potable main shall be 1 foot minimum above the non-potable main. Where this is not possible, and NOT permitted, the potable main shall be incased or sleeved and NO joints shall be within 10 feet of the non-potable line. Where EPA or County jurisdiction prevails, their standards shall apply and be enforced. All inspections shall be done by the prevailing agency having jurisdiction.

SECTION 5

FIELD TESTS

5-01 GENERAL

After the pipe has been laid, backfilled and compacted, the pipe shall be given a pressure and leakage test. Before conducting the field tests, the pipe shall be completely filled with water, flushed, and all air shall be expelled from the line. Water to be used to fill the pipelines will be furnished by the Tribe. To ensure safety to existing system, the "Standards for Disinfecting Water Mains," AWWA C-651-99 shall apply. The Contractor shall provide a backflow protection valve, pumps and other equipment to properly fill the line with water and produce the required pressure test procedures. All equipment required to produce pressure tests shall be subject to inspection by the Field Inspector. The required pressures shall be measured at the point of lowest elevation in the line to be tested.

Should any section of pipe fail the field tests, the line shall be repaired and retested by the Contractor until the line passes all field tests.

The acceptance of the water system by the Tribe is subject to the written guarantee of the Contractor that any defects in the pipeline backfill and pavement which may develop within 1 year from the date of acceptance and dedication shall be repaired in accordance with the provisions of Section 6 entitled "Guarantee" herein.

5-02 PRESSURE TESTS

The pressure test shall be performed prior to conducting the leakage tests set forth in 503 below. The pressure test shall consist of maintaining a pressure of 225 PSI, unless higher test pressures are indicated on the plans, continuously for a period of at least 2 hours. The entire system, as installed by the Contractor, shall be tested. **All gate valves at points of connection to the existing system shall be blanked.**

5-03 LEAKAGE TESTS

The leakage test shall be conducted after completion of the pressure test prescribed in 5-02 above. The test pressure shall be 150 PSI (unless higher test pressures are indicated on the plans) and shall be held continuously for at least 2 hours. The leakage shall then be measured by determining the quantity of water required to refill the lines. Regardless of the rate of leakage, all visible leaks shall be stopped.

No pipe installation will be accepted for dedication by the Tribe until the leakage for the section of line tested is less than the rate of leakage specified herein. The maximum allowable leakage rate, based on mainline pipe length, shall not exceed that in Table 5-1.

TABLE 5-1
ALLOWABLE LEAKAGE FOR 1000 FEET OF PIPE
GALLONS/HOURS

<u>Diameter (inches)</u>	<u>Test Pressure (PSI)</u>	
4	0.37	0.43
6	0.55	0.64
8	0.74	0.85
10	0.92	1.06
12	1.10	1.28
14	1.29	1.48
16	1.47	1.70
18	1.66	1.91
20	1.84	2.12
24	2.21	2.55

For pressures other than those listed above the following formula shall be used:

$$L = \frac{SD\sqrt{P}}{133,200}$$

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)

5-04 SCHEDULING OF TESTS

Pressure and leakage tests shall be scheduled with the Field Inspector at least 48 hours in advance. Tests shall be witnessed by the Field Inspector.

5-05 DISINFECTION

During installation, pipelines shall be carefully protected against contamination, and all dirt and foreign material shall be removed. Before being placed in service, the lines shall be thoroughly flushed out and then disinfected in accordance with AWWA C-651-99, 'Standards for Disinfecting Water Mains.' All necessary chlorine shall be furnished by the Contractor. If the first application of chlorine is not sufficient to meet bacteria standards, the procedure shall be repeated until the water meets the bacteriological drinking water standards of the Environmental Protection Agency Safe Drinking Water Act.

5-06 COMPLETION

After satisfactory completion of all tests, the Contractor shall remove all gate valve blanks in the presence of the Field Inspector. Gate valves at connections to the existing system shall remain closed until dedication of system.

SECTION 6

GUARANTEES

6-01 PERFORMANCE BOND

The Contractor shall provide the Tribe or its agent with an approved Performance Bond in the amount of 100 percent of the estimated construction cost as determined by the Tribal Engineer.

6-02 TIMELY COMPLETION

In the event the Contractor fails to complete all the specified improvements, in accordance with the Contract Agreement, the Tribe may utilize any cash deposit to complete the work or call upon the Surety Company who provided the Performance Bond.

6-03 GUARANTEE AND MAINTENANCE

The Contractor shall, by virtue of a cash deposit or an approved bond, guarantee the completed work against repairs caused by defective workmanship or materials furnished and installed for a period of **1** year from the date of the Dedication of the water system to the Tribe. The Contractor shall furnish to the Tribe a satisfactory bond based on the following scale of the total installation cost or otherwise approved.

30% of the first \$100,000.00
20% of the second \$100,000.00
10% of installation cost over \$200,000.00

SECTION 7

PREPARATION OF WATER SYSTEM PLANS

7 -01 GENERAL

All plans for water systems shall be prepared by a Civil Engineer registered in the State of California, experienced in the design of water systems. Prior to submittal for approval, the plans shall be signed by the Contractors Engineer. The Engineer shall be retained and paid for by the Contractor.

7-02 FORMAT

Plans shall only be prepared on reproducible sheets not greater than 24" X 36". Road construction, grading or other base maps, as approved by the Tribe may be used. Profiles shall be provided for all main lines.

All drafting shall be done in a manner that will produce a clear, legible reproduction. All symbols, weight of lines, size of letters and the like shall provide a product that is acceptable. Symbols, as shown in Legend on **Plate D-1**, shall be used where applicable.

North arrows and scale shall appear on all plans.

The vertical scale shall permit the determination of all high and low points along the alignment of the proposed water line. Top of pipe or invert elevations shall be shown at all vertical angle points, all pipe tees and crosses, and at all important points. Profile scale shall be 1" - 4' except in areas where the ground slope is steep in which case 1" 8' may be used.

The horizontal scale shall permit proper display of the improvements to be made. Distances between fittings along the pipe shall be shown together with the use of "stations" along the alignment of the pipeline. Scale shall not be smaller than 1"- 40'.

The location, description and elevation of at least one approved Benchmark on USGS datum shall be shown on the upper left hand corner of the title sheet.

Plans shall show tract and lot numbers together with all existing property lines along the alignment of the water main to be constructed.

The plans shall show the limits and types of all existing and proposed pavement together with other items such as sidewalks, gutters, culverts, drainage ditches or structures and their relationship to the street or improvement centerline.

Proposed and existing underground utilities such as sewer, gas, telephone, electrical, culverts and drainage structures or other known facility that cross or parallel within 15 feet of the proposed water lines shall be designated in plan and profile with dashed lines and have appropriate symbols to designate their size and type. The invert elevations of all

sewer and storm drain lines shall be shown in the profile where such utilities cross the water lines.

All proposed water service lines shall extend to the property lines and their location shall be shown on the plans.

All necessary easements shall be shown on the plans. Natural ground surface or finished grade in easements shall be shown in profile.

7-03 LOCATION

Water mains shall be designed to have a minimum of 3 feet of cover unless approved otherwise by the Engineer. Water main profile shall be sloped to minimize high points and low points. Combination air release-vacuum valves shall be installed at all high points and to the extent possible, fire hydrants shall be located at low points to serve as flush-outs.

To the extent possible, water mains shall be at least 10 feet clear of sewer lines when paralleling sewer lines and shall be at least 1 foot above sewer lines when crossing sewer lines. Separation requirements and standards are shown in **Plate D-4**. Where special permission from the Tribe is necessary, it shall be the Contractors responsibility to obtain that permission in writing prior to approval of the Plans.

7-04 DEAD END MAINS

All mains shall be looped to the extent possible. Dead end mains will not be allowed unless approved by the Tribes Engineer or agent.

7 -05 EASEMENTS

It is the policy of the Tribe to have all water lines placed within dedicated right-of ways, whenever practicable. Where installation of water mains is not within a dedicated right-of-way, the Contractor shall obtain approval from the Tribe regarding necessity and location of said easements.

7-06 CERTIFICATIONS AND SIGNATURES

The following items shall appear on the first sheet of water system plans.

Tribal Engineer Certificate

This certifies that on _____ , 20 __, I have reviewed the

plans of domestic water system for and they meet the requirements of the of the American Water Works Association, and the Riverside County Standards (where the installation is within said County), for minimum requirements for safe practice in the production and distribution of water for domestic use.

Tribal Engineer

Date: _____ Signature: _____

Fire Chief Approval

Date: _____ Signature: _____

Water Department Manager Approval

Date: _____ Signature: _____

7-07 PLAN APPROVAL

Plans shall be signed by the Tribal Engineer upon satisfactory completion of all plan requirements. After approval, and prior to start of construction, submission of 3 sets of blue line prints will be required to the Tribe.

Approval of the plans by the Tribal Engineer does not constitute a representation as to the accuracy of the location or existence or nonexistence of any utility or structure within the limits of the project.

7-08 CHANGE OF PLANS

Any changes to the approved plans shall only be with the written approval of the Tribal Engineer.

Morongo Band of Mission Indians

The following general notes and requirements must be on the first sheet of all water plans submitted to the Tribe for approval.

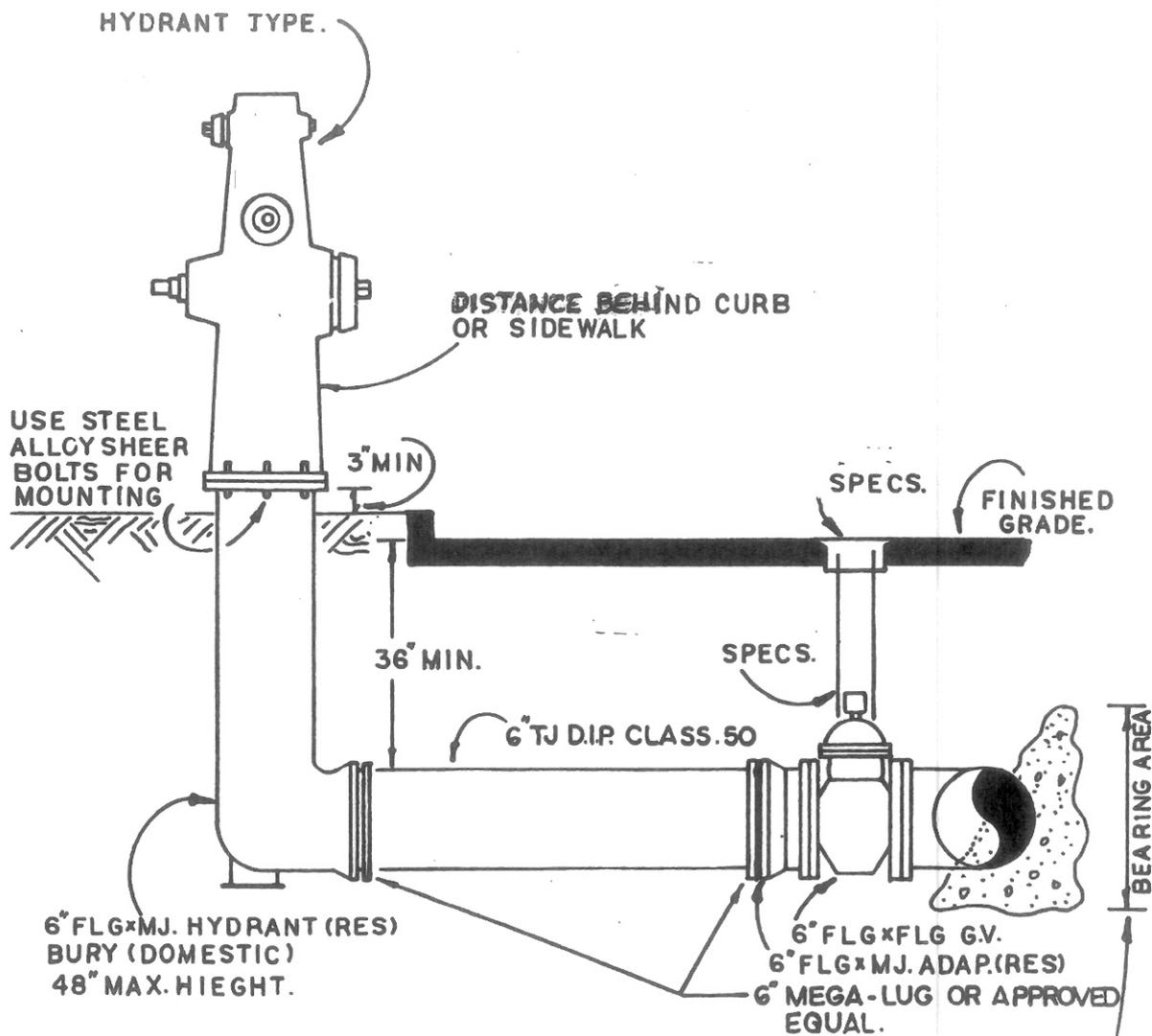
GENERAL NOTES

1. All work shown on these plans shall be performed in accordance with “STANDARDS AND MATERIAL FOR THE CONSTRUCTION OF WATER FACILITIES”
2. Work shall be performed by a Contractor licensed in the State of California, experienced in water utility construction.
3. Contractor shall pay ALL necessary fees and deposits prior to commencement of work.
4. Unless otherwise indicated, all pipes shall be ductile iron pipe thickness Class 50, gauge or wall thickness as appropriate and as approved.
5. For separation requirements between water and sewer lines, see County Standard No. 609.
6. Contractor shall contact Underground Service Alert of Southern California at 800422-4133 for location of all underground utilities.
7. Contractor shall obtain necessary permits prior to construction.
8. All fire hydrants shall be installed in accordance with Standard Plate No. 1-1 (1-2) and shall be STANDARD with 1, 4-inch and 2, 2 1/2-inch outlets.
9. Contractor shall notify the Tribe 48 hours prior to commencing work.
10. No existing distribution system valve shall be operated by the Contractor. Tribal personnel will operate all necessary valves.
11. No deviations from these plans shall be permitted without the written approval of the Tribe or its agent..
12. Existing water mains shall not be taken out of service for more than 8 hours.

Contractor shall notify all water users affected by the shutdown, a minimum of 48 hours prior to the actual shutdown. Indicate the date and precise hours that the main will be taken out of service.
13. Fire flow for this project is _____ GPM at 20 PSI residual.
14. Contractor shall conform to the street excavation replacement standards.

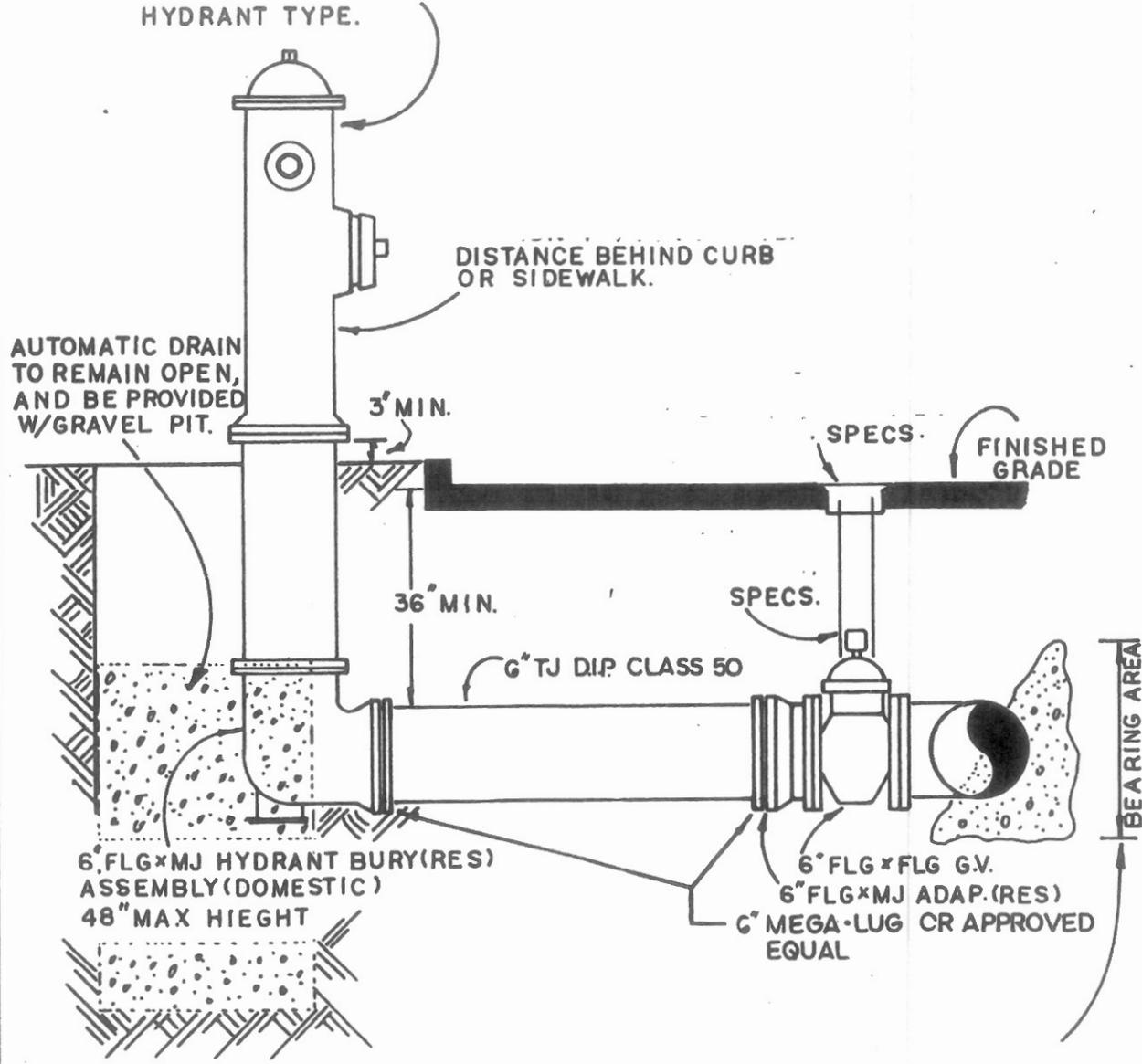
15. Air and Vacuum release assemblies per Tribal Standard Plate No. 5 shall be installed at all high points on the water main. Additional assemblies over those shown on the Drawings may be necessary when substructures require a change in line or grade of the water line.
16. Contractor to provide all materials for construction per plan as provided.
17. Contractor to install all service laterals in accordance with Tribal specifications shown on **Plate 6-2** or approved plans. Contractor's personnel to make all reconnections with consumer's pipeline.
18. Contractor will coordinate all reconnects with the Tribes personnel prior to any retirement of lateral on mains.
19. All materials shall be domestic and not a foreign manufacturer.

STANDARD WET BARREL FIRE HYDRANT FOR USE BELOW 3000 FEET ELEVATION

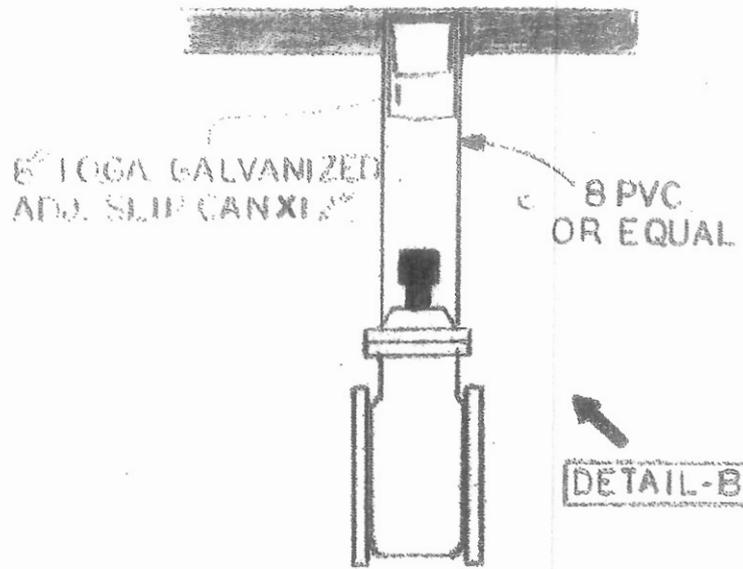


N.T.S

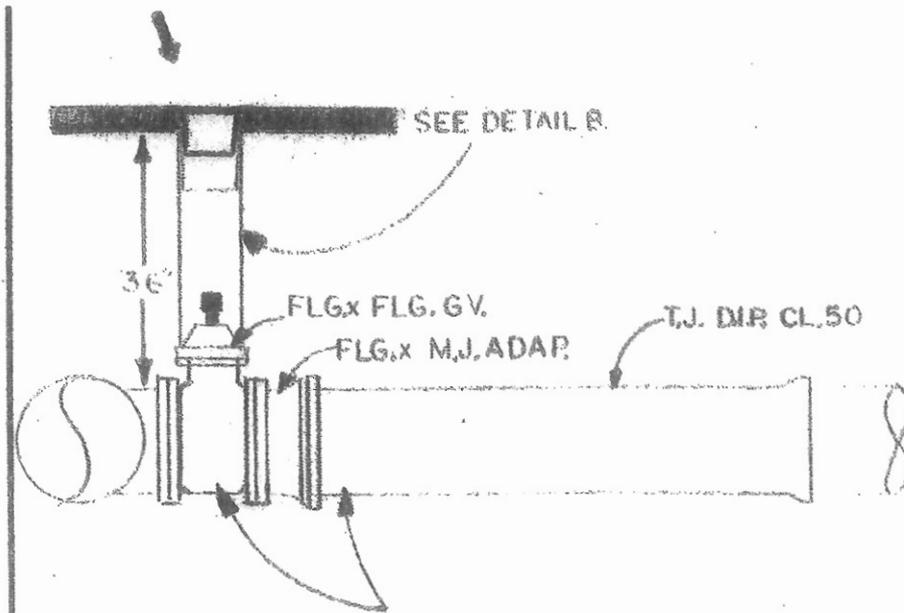
STANDARD DRY BARREL FIRE HYDRANT
FOR USE ABOVE 3000 FEET ELEVATION
N.T.S.



GATE VALVE/VALVE CAN INSTALLATIONS N.T.S.

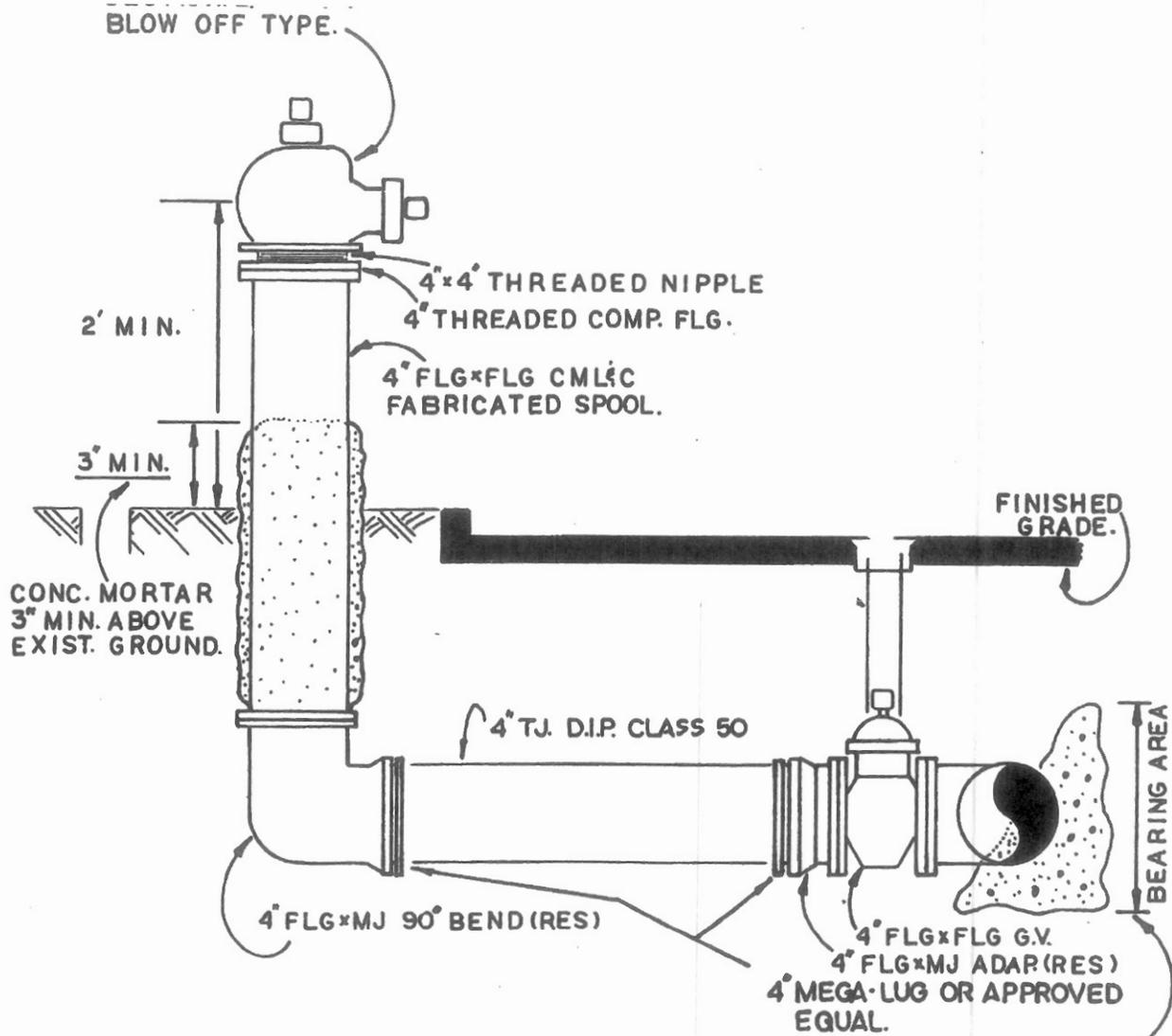


DETAIL - A



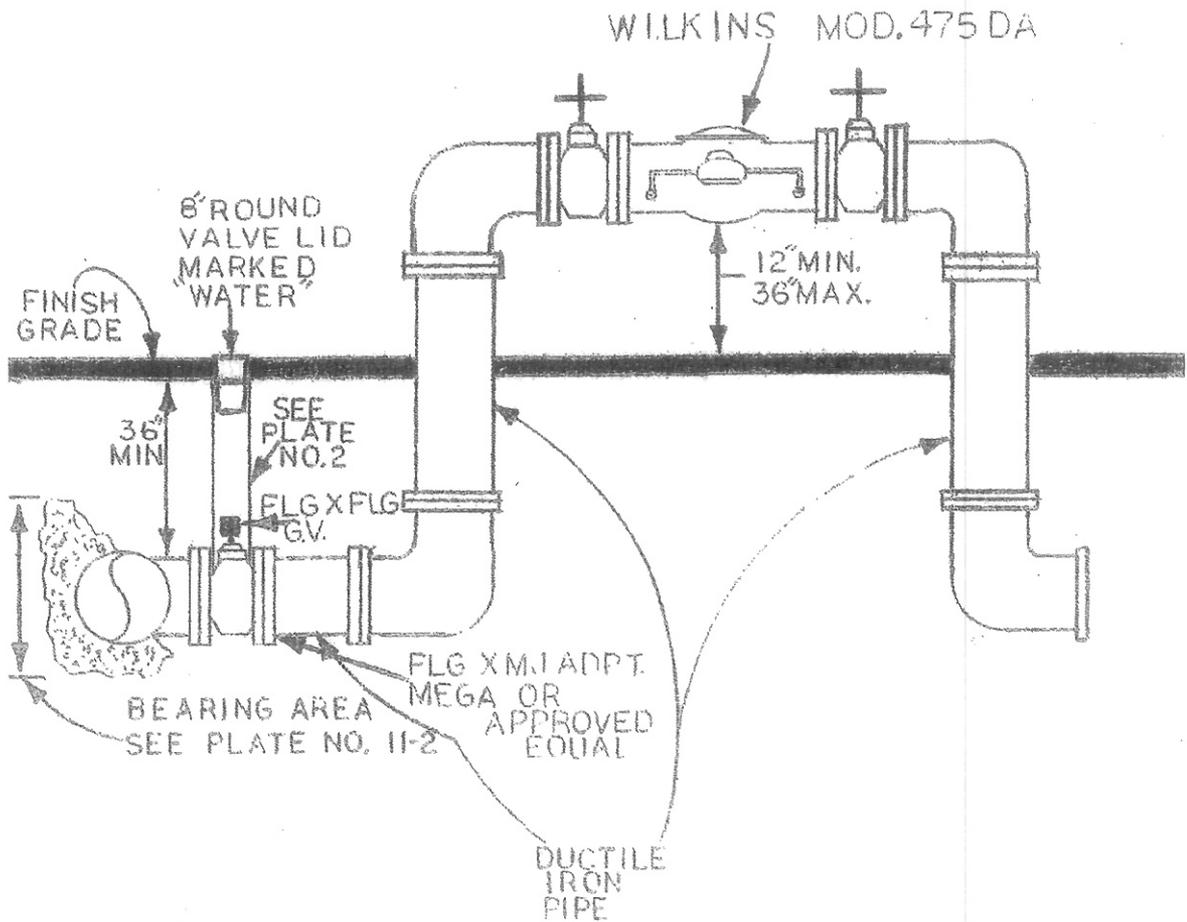
VALVE INSTALLATION

4-INCH BLOWOFF DETAIL N.T.S.

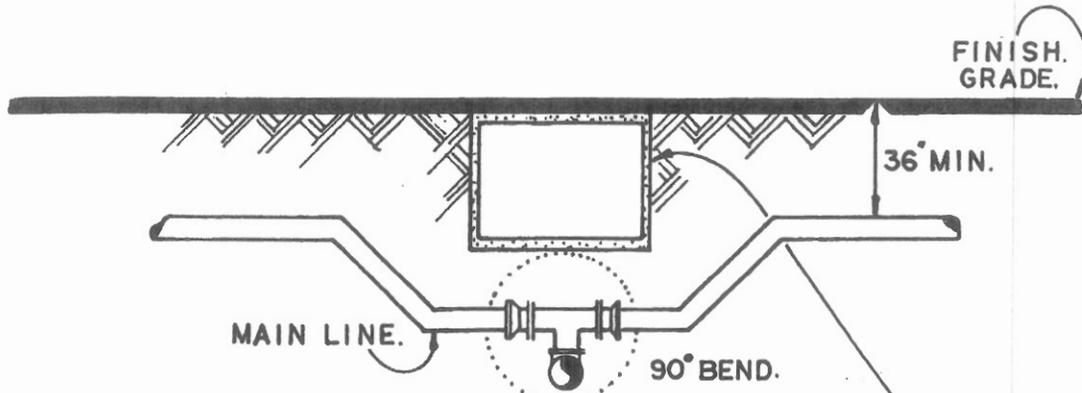


FIRE SERVICE DETAIL
N.T.S.

**FIRE SERVICE MATERIALS
(G.V., D.I.P, ADAP. E.T.C)
MAY VARY IN SIZE, ACCORDING
TO PLANS OR APPLICATION.**



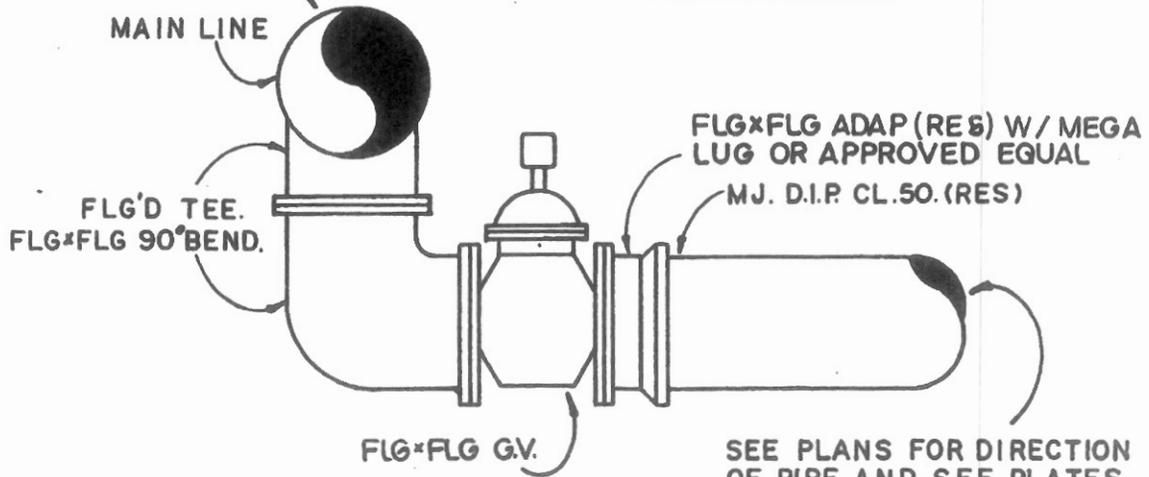
DRAIN DETAIL
N.T.S.



DRAINS TO BE INSTALLED
AT LOWEST POINT.

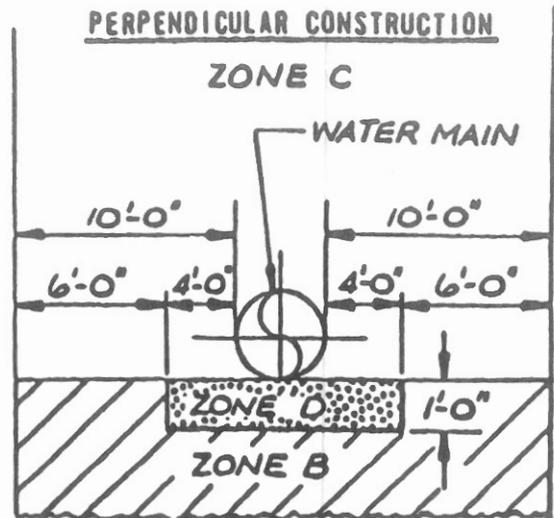
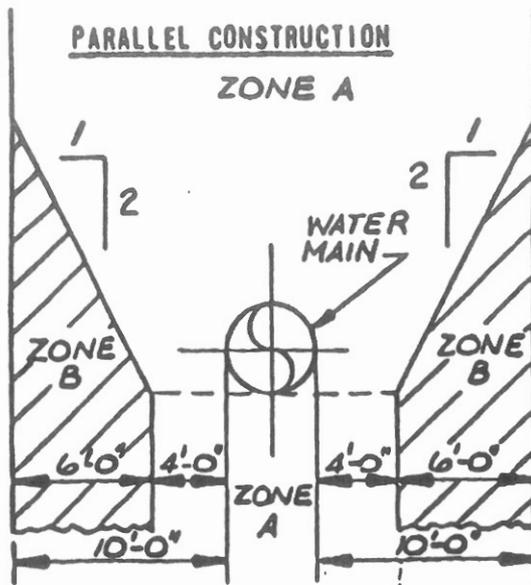
WHEN CROSSING UNDER WASHES,
BOX CULVERT, STORM DRAINS, ETC.
DRAIN ASSBLY'S ARE REQUIRED.

DRAIN. SIZE.	
P. SIZE	D. SIZE
4"-18"	4"
18"-UP	6"



SEE PLANS FOR DIRECTION
OF PIPE, AND SEE PLATES
NO. 3, 7 FOR BLOW OFF
RISER DETAILS.

WATER-SEWER SEPARATION REQUIREMENTS



NEW OR EXISTING WATER MAIN AND NEW SEWER

ZONE **SPECIAL CONSTRUCTION REQUIRED FOR SEWER**

- A. Sewer lines will not be permitted in this zone without special permission
- B. Extra-strength vitrified clay pipe with compression joints: or cast iron pipe with compression joints.
- C. or D. Class 150 or heavier cast-iron pipe with hot dip bituminous coating and approved mechanical joints; or any sewer pipe within a continuous steel casing, which casing shall have a thickness of not less than one-fourth inch and with all voids between sewer pipe and casing pressure grouted with sand-cemented grout.

Note: Dimensions are from outside of water main to outside of sewer.

NEW WATER MAIN AND EXISTING SEWER

Zone A

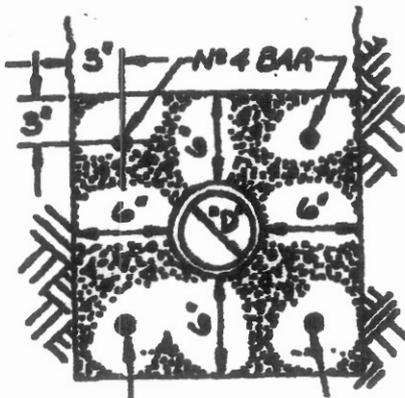
- A. No water mains shall be constructed without prior approval.
- B. If the sewer does not meet the Zone B requirements given above the water main shall be of Class 200 pipe or equivalent.
- C. No water mains shall be constructed without special permission from the Tribal Water Department. If permission is granted the sewer shall be encased with reinforced concrete and the water main shall be Class 200 pipe or equivalent.
- D. The sewer shall be encased with reinforced concrete.

House Laterals

The special construction requirements shall apply to house laterals that cross above a water main, but not to those house laterals that cross below a water main.

Definitions

1. Compression joints are rubber ring or gasket joints
2. Mechanical joints are bolted joints.
3. Acceptable reinforced concrete encasement is as follows:



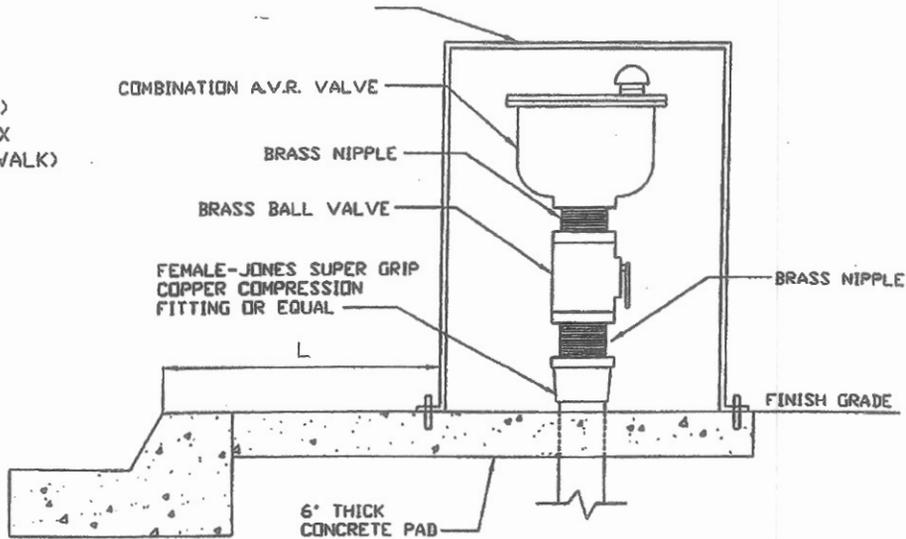
Concrete shall have a 28-day compressive strength of 3000 PSI

1" AND 2" COMBINATION AIR-VAC ASSEMBLY DETAIL

N.T.S.

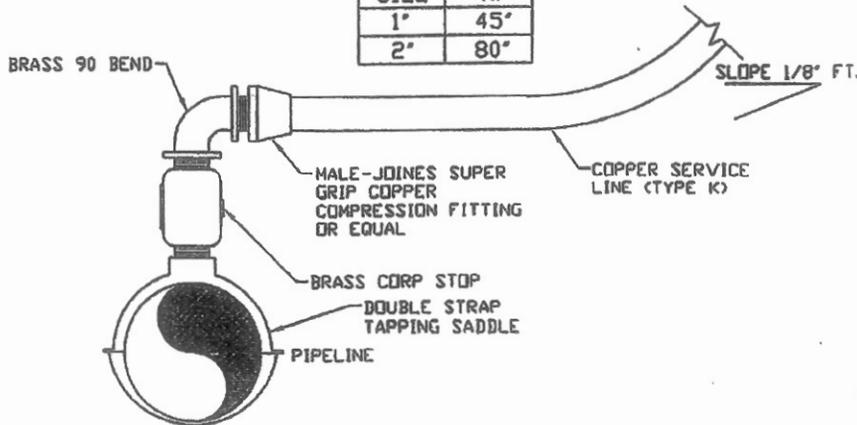
GALVANIZED STEEL VENTED A.V.R.
PROTECTIVE ENCLOSURE, W/ RED
OXIDE PRIMER.

L = 2'-0" (NO SIDEWALK)
0'-6" MIN - 1'-6" MAX
(BEHIND SIDEWALK)

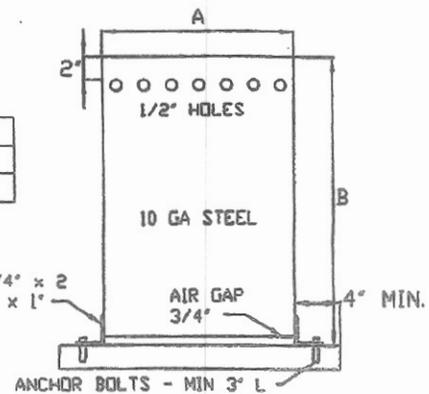


MINIMUM RADIUS

SIZE	R.
1"	45"
2"	80"



VALVE	A	B
1"	18"	32"
2"	20"	36"

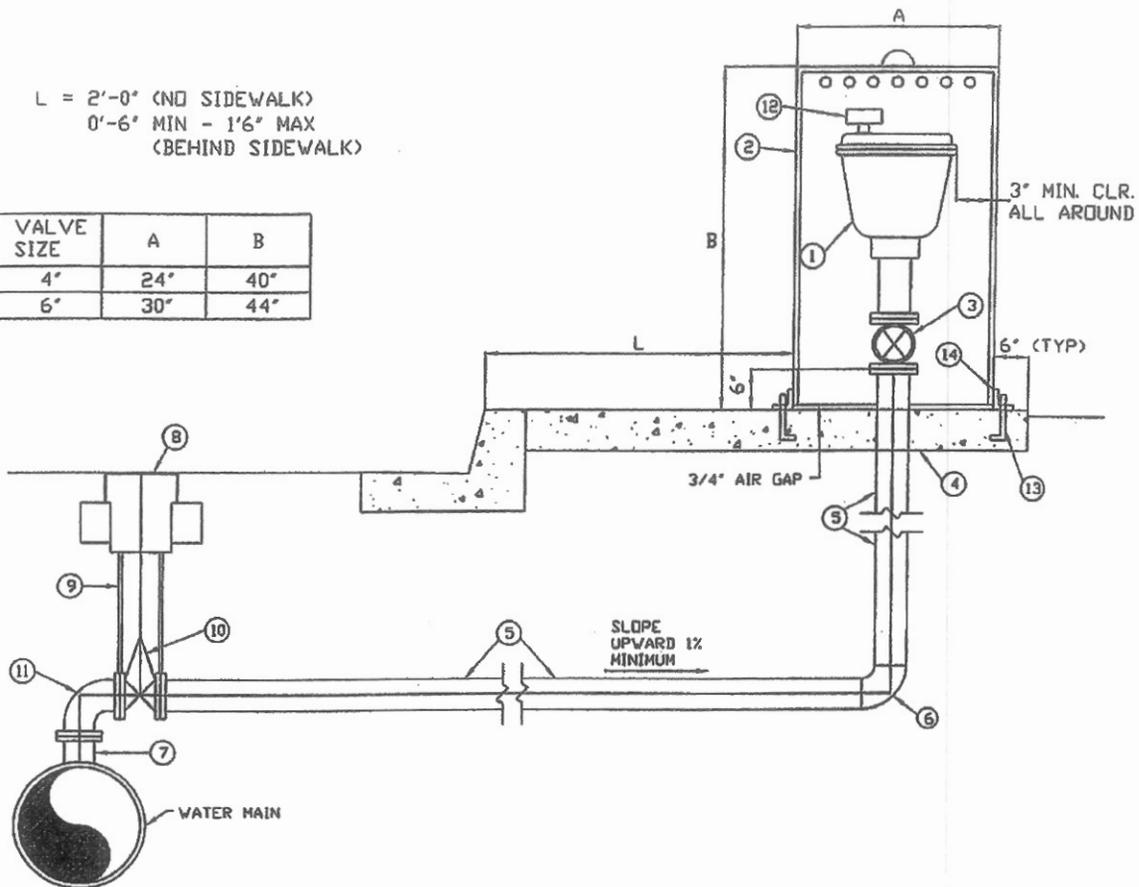


3- L CLIPS 1/4" x 2
1/2" x 2 1/2" x 1"

4" AND 6" COMBINATION AIR-VAC ASSEMBLY DETAIL N.T.S.

L = 2'-0" (NO SIDEWALK)
0'-6" MIN - 1'6" MAX
(BEHIND SIDEWALK)

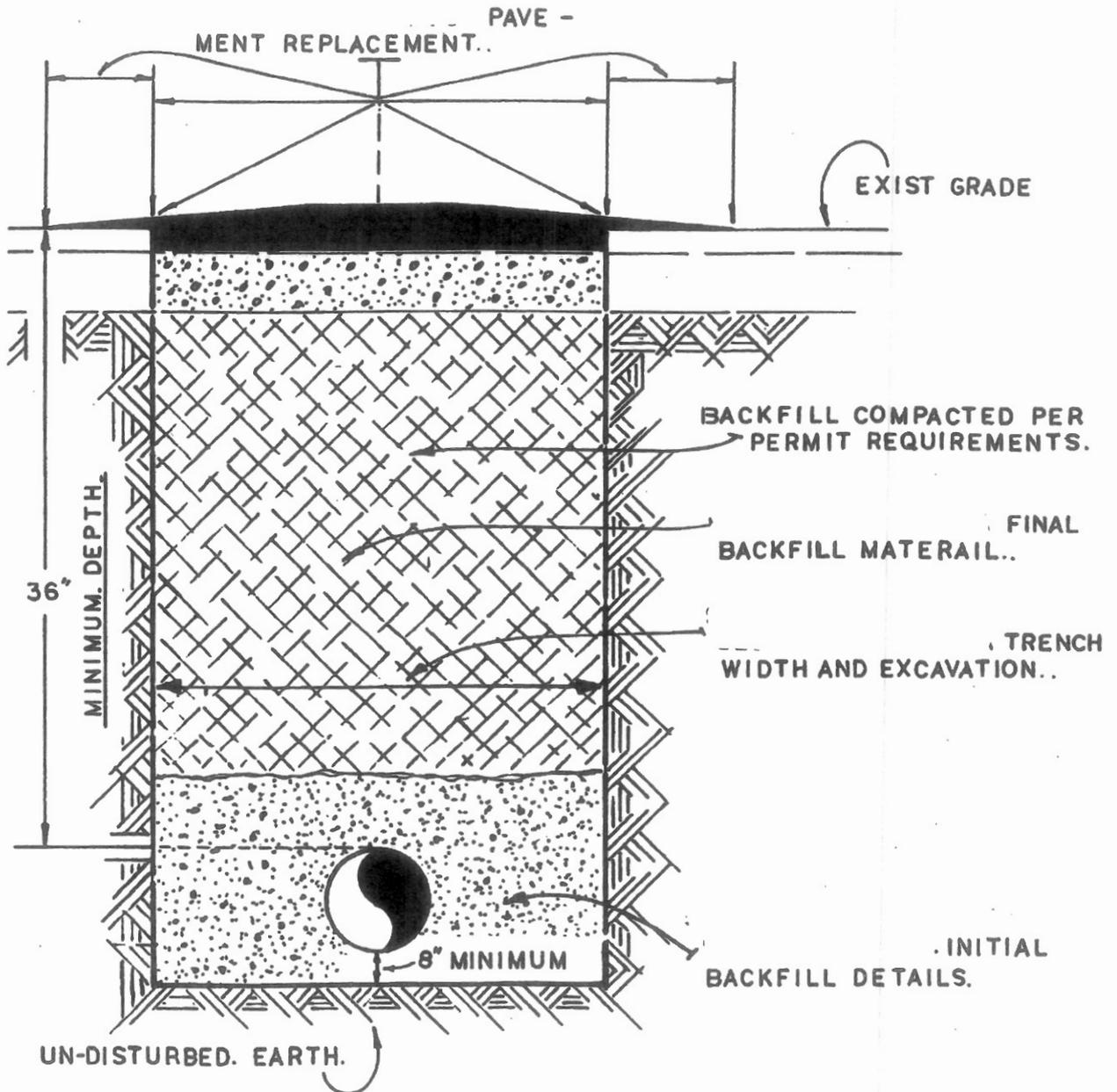
VALVE SIZE	A	B
4"	24"	40"
6"	30"	44"



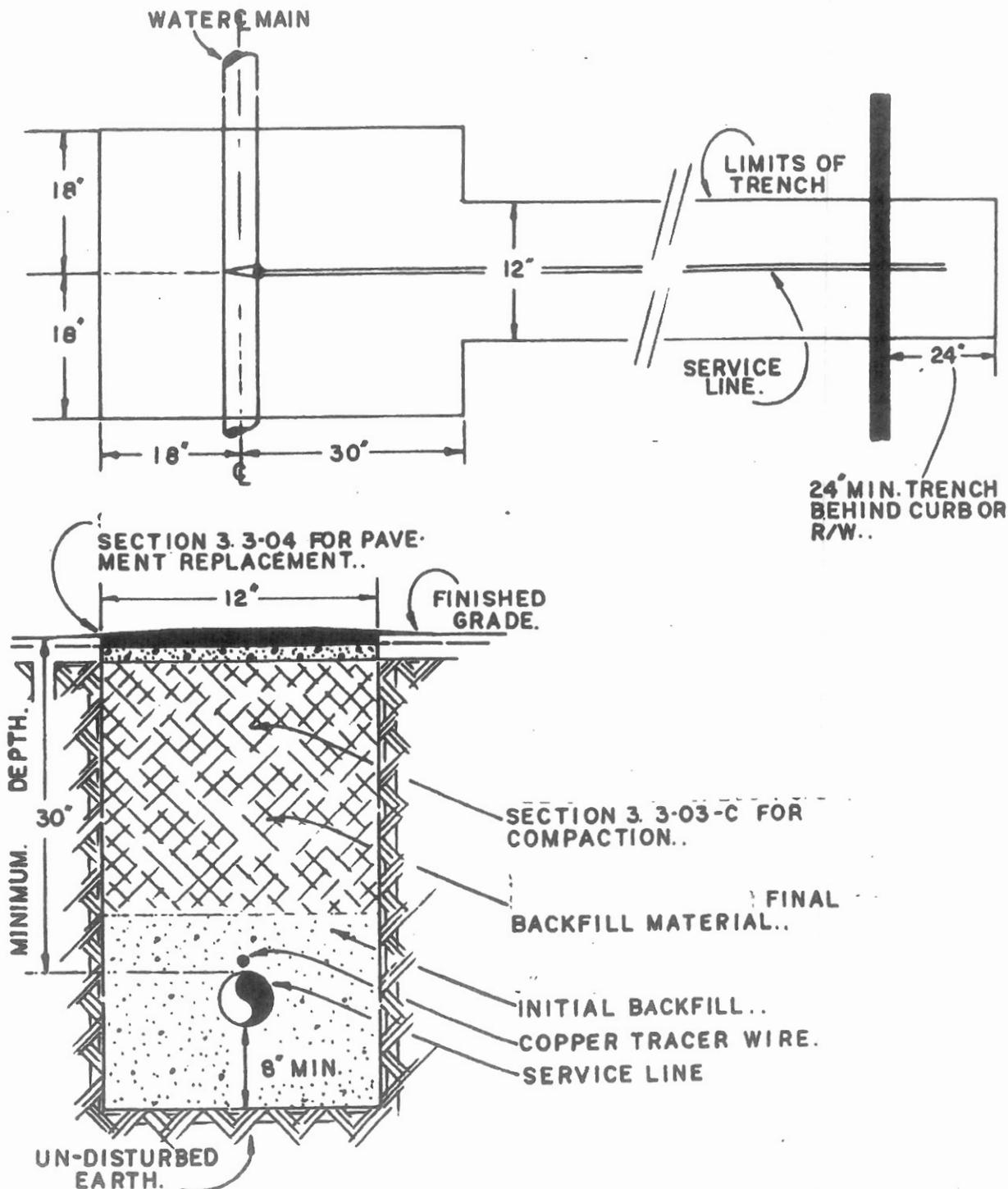
DETAIL NOTES:

- ① COMBINATION AIR/VACUUM VALVE. SEE DISTRICT STANDARDS
- ② GALVANIZED STEEL VENTED ENCLOSURE, 10 GA, WITH ACCESS DOOR
- ③ FLANGED GATE VALVE
- ④ 6" THICK CONCRETE PAD
- ⑤ DUCTILE IRON PIPE. ALL JOINTS RESTRAINED.
- ⑥ 90° BEND. RESTRAINED
- ⑦ FLANGED OUTLET
- ⑧ VALVE BOX ASSEMBLY PER DISTRICT STANDARD PLATE NO. 2-1
- ⑨ 8" RISER PIPE PER DISTRICT STANDARD PLATE NO. 2
- ⑩ RESILIENT SEATED GATE VALVE, FLANGED
- ⑪ 90° BEND. FLANGED
- ⑫ THREADED PRE-FAB PVC SCREEN OUTLET WITH RIGID STAINLESS STEEL SCREEN
- ⑬ 4-5/8" X 3" ANCHOR BOLTS (EQUALLY SPACED)
- ⑭ 4-2"x2"x1 1/2"x1/4" L-CLIPS

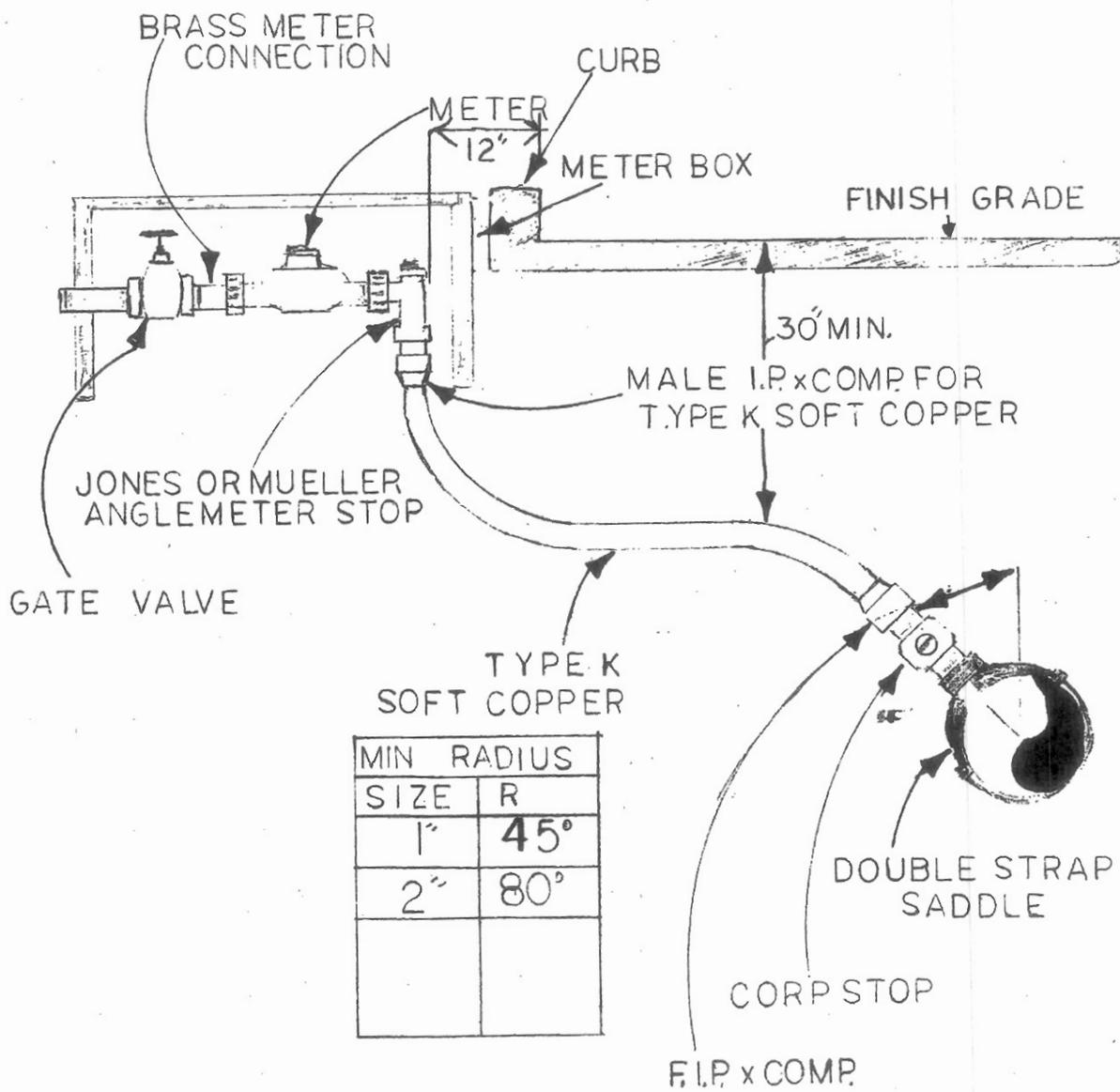
TRENCH DETAIL
N.T.S.



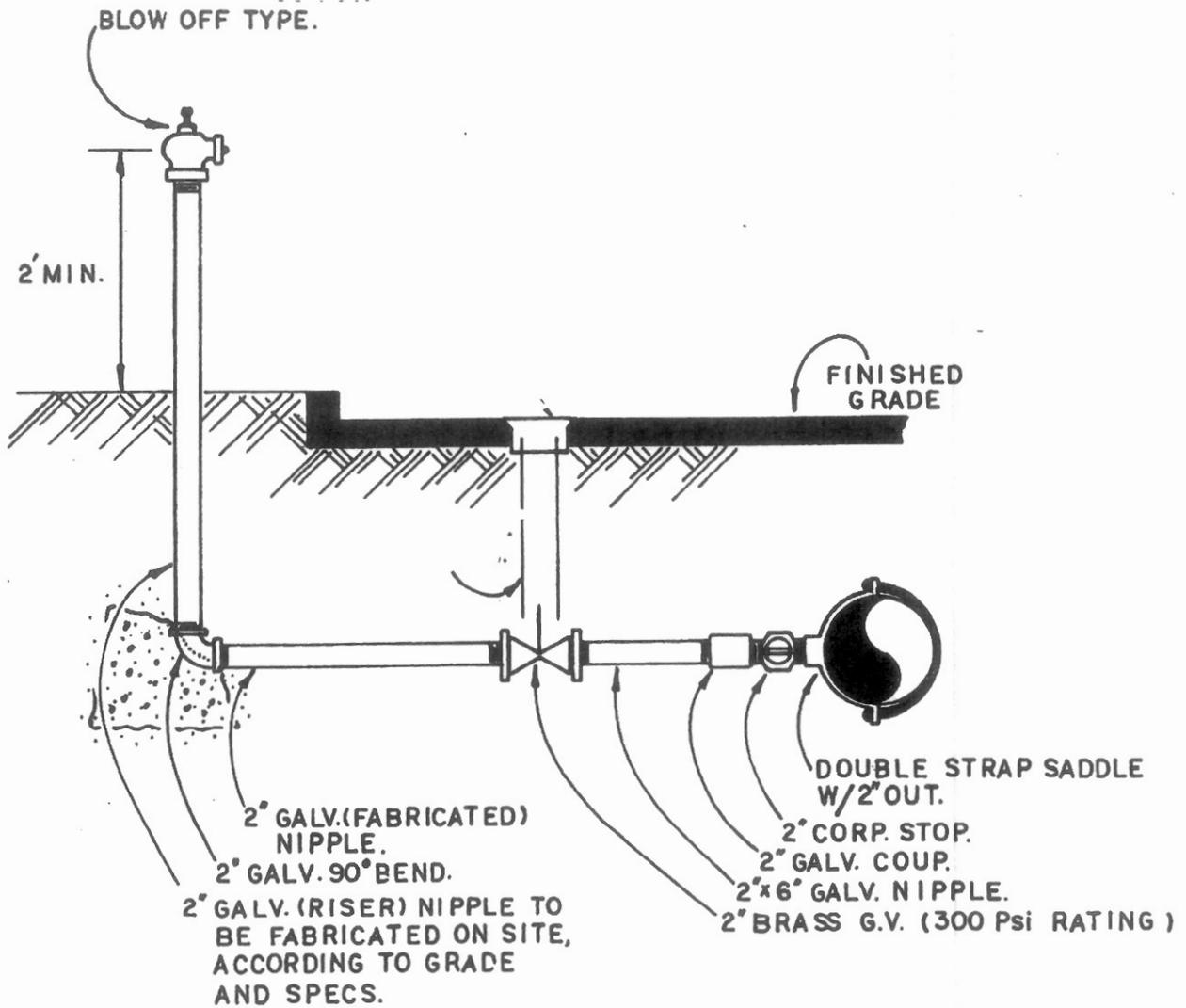
SERVICE TRENCH DETAIL N.T.S.



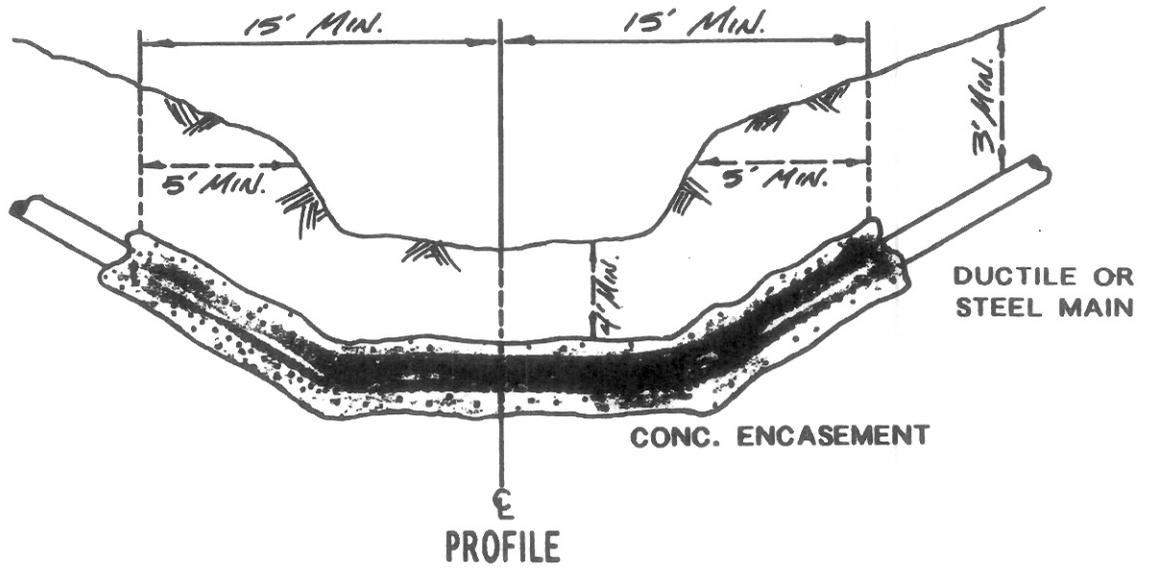
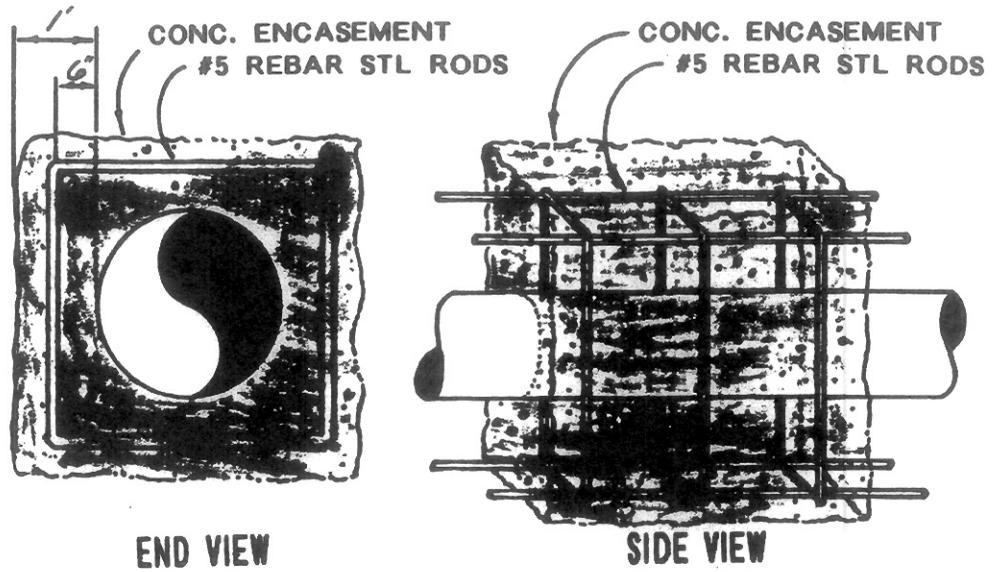
SERVICE LINE DETAIL
N.T.S.



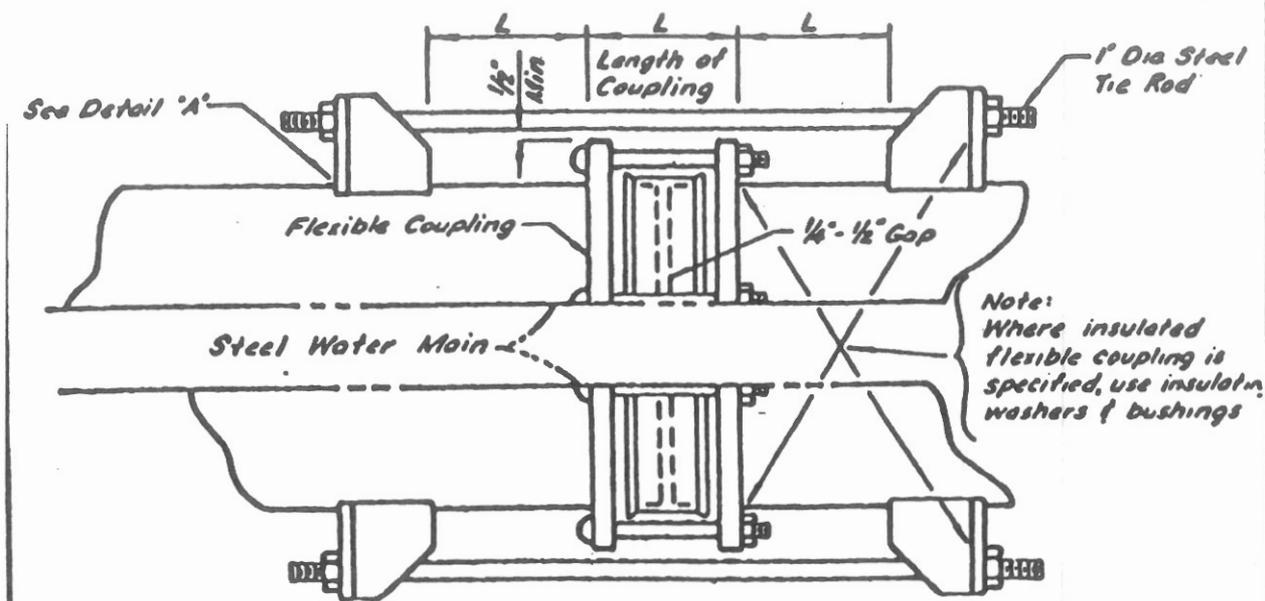
2 - INCH BLOWOFF DETAIL N.T.S.



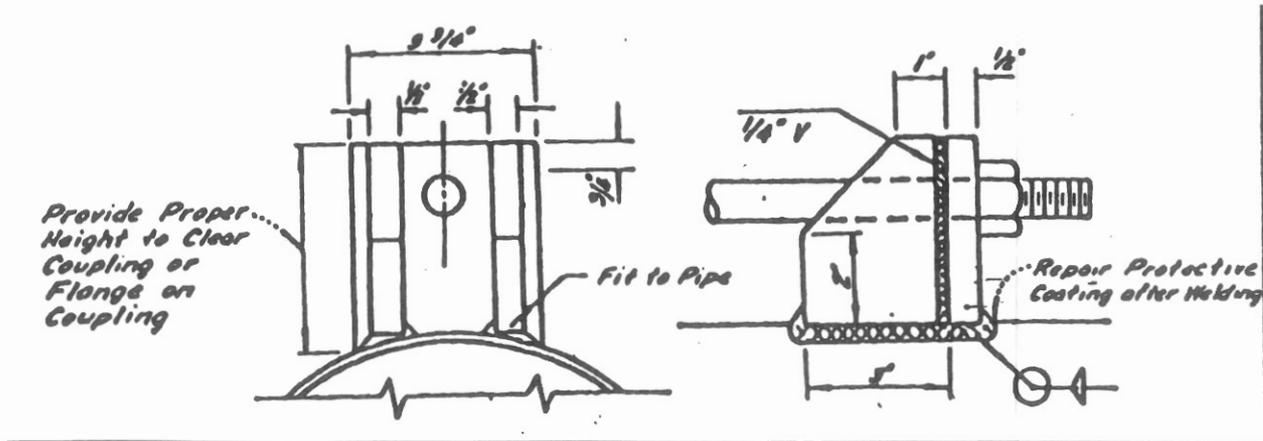
CONCRETE ENCASEMENT DETAILS
N.T.S.



FLEXIBLE COUPLING TIE DETAILS
NO SCALE



PLAN VIEW

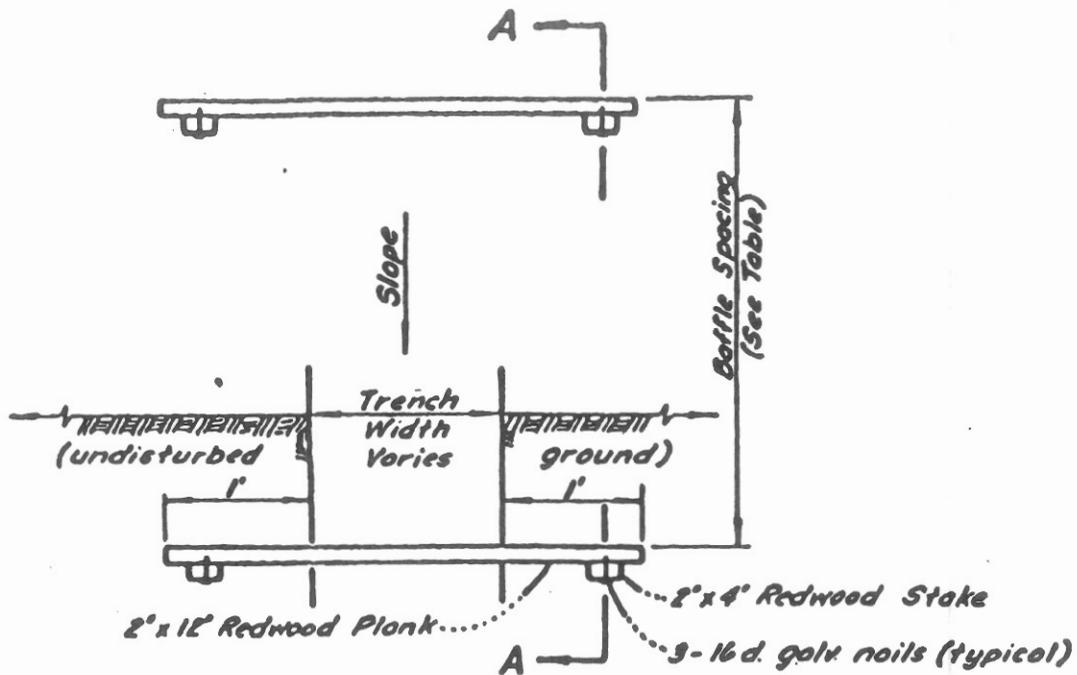


DETAIL "A"

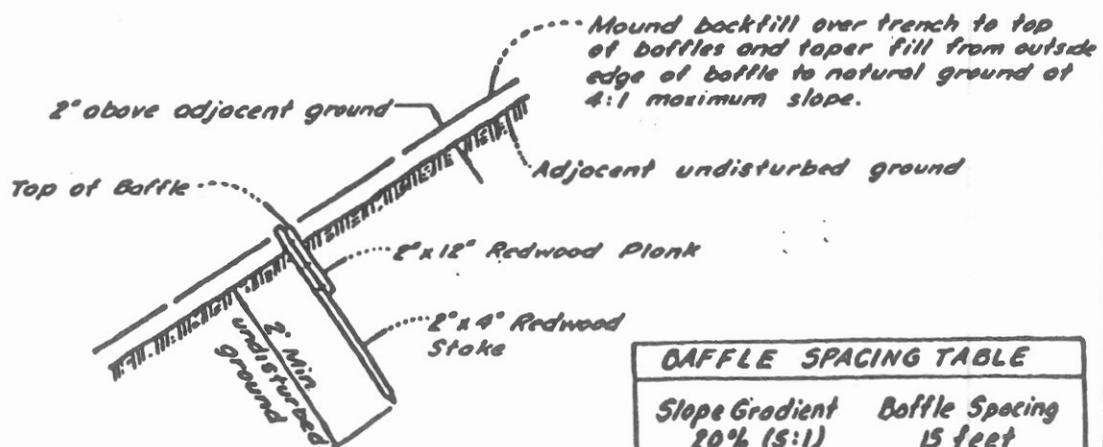
Notes:

1. Install ties along the horizontal axis of pipeline.
2. Contractor to furnish cool tar enamel and paint all exposed surfaces

BAFFLE INSTALLATION DETAILS
NO SCALE



PLAN



SECTION A-A

BAFFLE SPACING TABLE	
Slope Gradient	Baffle Spacing
20% (5:1)	15 feet
25% (4:1)	12 "
33% (3:1)	9 "
50% (2:1)	7 "

**THRUST BLOCK SIZE FOR
HORIZONTAL PRESSURES
(BASED ON 2500 LB/SQ.FT. BEARING PRESSURE)**

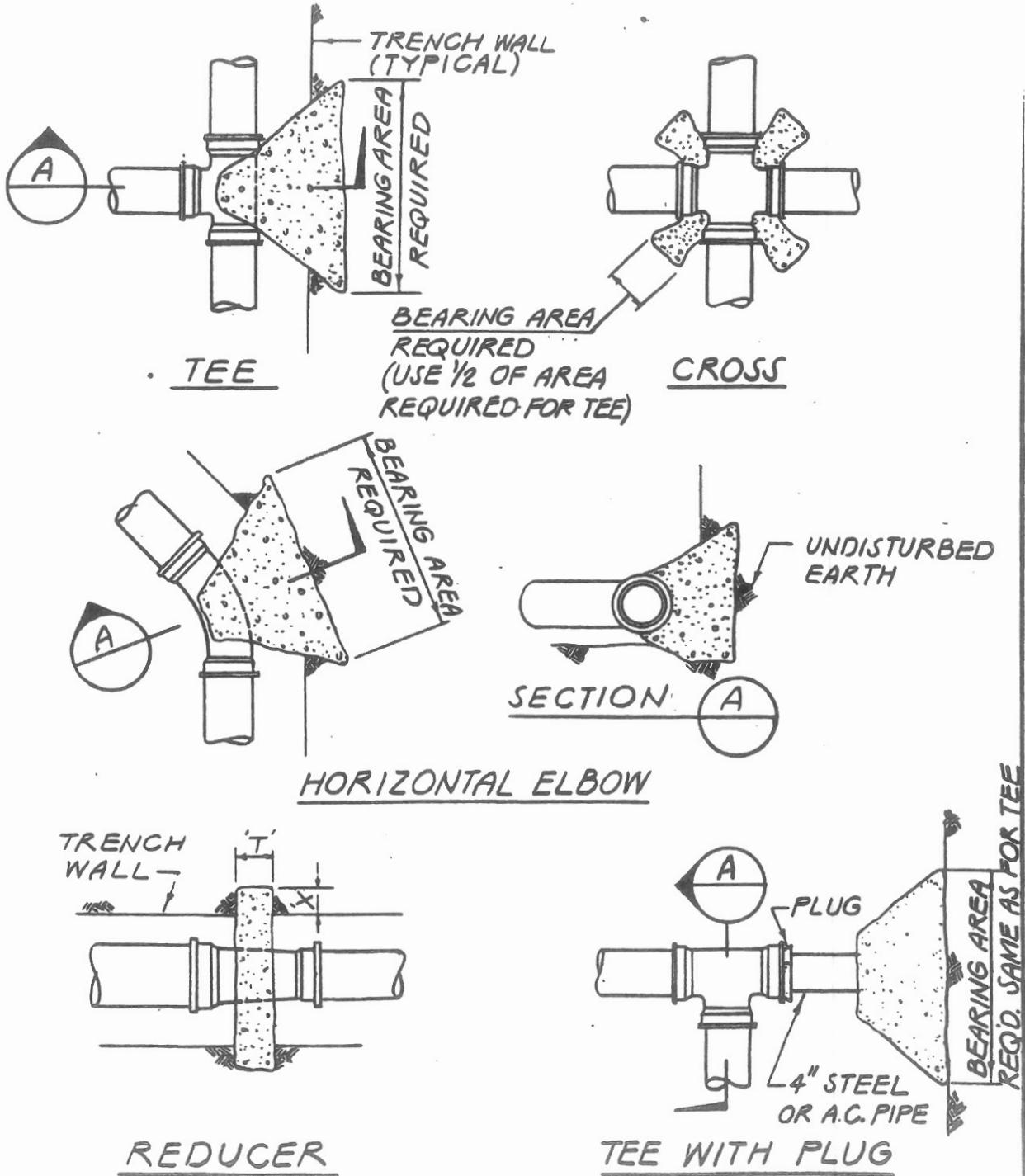
PIPE DIA	PIPE CLASS	PRES PSI	AREA IN SQUARE FEET				
			TEES	90° BEND	45° BEND	22½° BEND	11¼° BEND
6	150	150	2.5	3.5	2.0	1.0	0.5
		200	3.0	4.5	2.5	1.5	1.0
8	150	150	4.0	5.5	3.0	1.5	1.0
		200	5.5	7.5	4.0	2.0	1.0
10	150	150	6.5	9.0	5.0	2.5	1.5
		200	8.5	12.5	6.5	3.5	3.0
12	150	150	9.0	13.0	7.0	3.5	1.5
		200	12.5	17.5	9.5	5.0	2.5
14	150	150	12.5	17.5	9.5	5.0	2.5
		200	16.5	23.5	13.0	6.5	3.5

REDUCERS

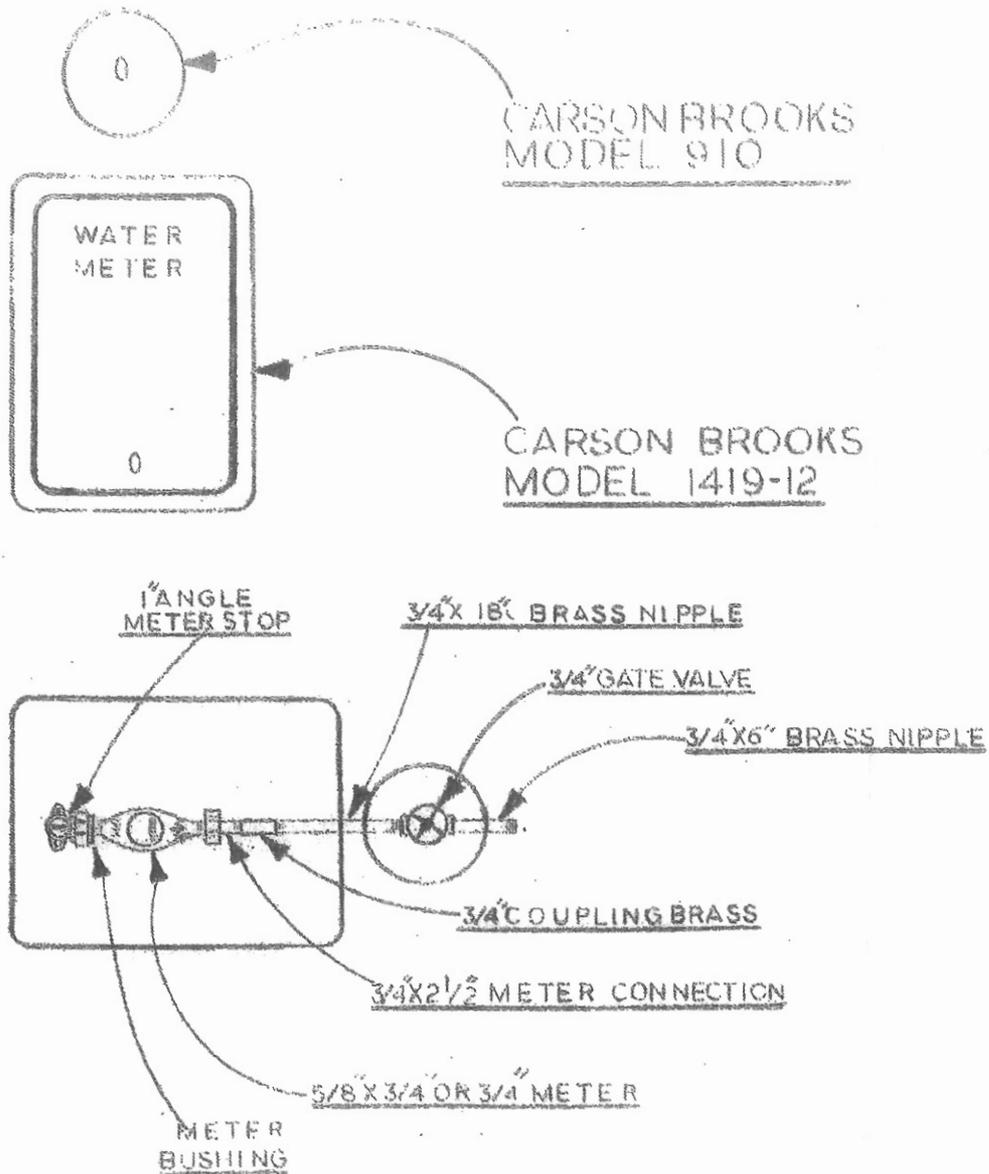
REDUCER SIZE	PIPE CLASS	PRESS PSI	DIMENSIONS		
			X	HEIGHT	T
8 X 6	150	150	9"	2' - 6"	12"
		200	9"	2' - 6"	12"
10 X 8	150	150	12"	3' - 0"	12"
		200	12"	3' - 0"	12"
12 X 10	150	150	12"	3' - 0"	12"
		200	12"	3' - 0"	12"
14 X 12	150	150	12"	3' - 4"	12"
		200	12"	3' - 4"	12"

**THRUST BLOCK DETAILS
NO SCALE**

NOTE: FOR THRUST BLOCK SIZES SEE PLATE No. 11-2



METER BOX INSTALLATION



$\frac{5}{8}$ " X $\frac{3}{4}$ " & $\frac{3}{4}$ " METER INSTALLATIONS FOR THIS SIZE BOX ONLY. LARGER METERS 1" 1220-12, 1 $\frac{1}{2}$ " & 2" 1730-12 BOXES.

DRAFTING LEGEND

	EXISTING WATER PIPELINE
	EXISTING SEWER LINE
	EXISTING GAS LINE
	EXISTING ELECTRICAL CONDUIT
	EXISTING STORM DRAIN
	EXISTING TELEPHONE CONDUIT
	PROPOSED WATER PIPELINE FIRE HYDRANT ASSEMBLY
	GATE VALVE BLOWOFF ASSEMBLY
	DOMESTIC SERVICE □1" DENOTES SIZE AIR AND VACUUM RELEASE ASSEMBLY
	FLANGED FITTINGS
	BLIND FLANGE
	INVERTED ELEV OF PROPOSED PIPE
FLG.	FLANGED
R.T.	RING TITE
M.J.	MECHANICAL JOINT
C.M.L.†W.	CEMENT MORTAL LINED AND WRAPPED S.T.L. PIPE
C.M.L.†C.	CEMENT MORTAR LINED AND COATED S.T.L. PIPE
AWWA	AMERICAN WATER WORKS ASSOCIATION
(RES)	RESTRAINED FITTINGS