SECTION 81

DOMESTIC WATER SUPPLY SYSTEM CONSTRUCTION

81-1 GENERAL- All potable water pipe, fittings, gate valves, fire hydrants, blow-offs and other appurtenances shall be installed in accordance with the requirements of the American Water Works Association (AWWA), these Construction Standards, and as recommended by the manufacturer. These Construction Standards and manufacturer's guidelines shall be present at the construction site at all times.

81-2 CONNECTION TO EXISTING FACILITIES- Connection to existing City water facilities may be made upon approval from the Environmental Utilities Department.

A. The Environmental Utilities Department has the option of making a system tap as required on the plans. Should the Environmental Utilities Department elect to perform the tap, the Contractor shall pay for such work on a time and materials reimbursement basis. The Contractor shall be responsible for the following tasks associated with the tap as determined by the Environmental Utilities Department:

1. Coordinating the work requested with the Water Division and the Environmental Utilities Department Inspector. This shall include discussions on provisions for materials and equipment required to complete the work.

2. Traffic control per the City's Public Works Department requirements.

3. Excavating the work area, as agreed upon by the Environmental Utilities Department Inspector.

4. Sheeting, shoring, and bracing as required.

5. Lighting as required if the tap is to be performed at night.

6. Backfilling, compacting, and pavement restoration of the excavation(s) upon tap completion.

B. The Contractor shall tie-in the new system to an existing stub under the following conditions:

1. With specific approval of the Environmental Utilities Department inspector.

2. Care shall be taken to provide a clean, sanitary tie-in site.

3. Dewatering of both the new and existing water mains shall take place in a way as to prevent contamination by trench water.

4. All material used in the tie-in shall be clean and swabbed with chlorine to the satisfaction of the Environmental Utilities Department inspector.

5. All tie-ins shall take place in the presence of the Environmental Utilities Department inspector.

6. Tie-ins may take place only after the newly constructed water system has successfully passed all required testing procedures as established in these Construction Standards and as determined by the Environmental Utilities Department inspector.

7. Under no circumstances shall anyone other than a representative of the Environmental Utilities Department Water Division open or close valves in a City-operated system.

81-3 CONSTRUCTION STAKING- The water main shall be staked prior to excavation. Staking shall provide the station and the offset to the water main, as well as the cut to the nearest one-tenth foot (0.1'). Stakes shall be provided at a minimum of every 50 feet in tangent sections, every 25 feet in curved sections, and every 10 feet in approved vertical curve sections.

81-4 EARTHWORK- Earthwork required to construct water facilities and appurtenances shall be performed to the lines and grades shown on the approved project plans and as specified below:

A. **Excavations-** Pipeline excavations shall be open-cut trenches, unless otherwise specified on the approved improvement plans, with vertical sides to the pipe crown as specified on Construction Standard Detail W-1. Excavations shall conform to all applicable Federal and State safety requirements. The contractor shall appoint a designated "competent person" during construction.

B. **Trench Width-** The trench bottom width to 6 inches above top of pipe shall comply with Construction Standard Detail W-1 or as approved by the Environmental Utilities Department.

C. **Compaction-** Compaction of the trench shall conform to Construction Standard Detail W-1. Compaction test results shall be supplied to Environmental Utilities Department upon request. Jetting of trenches is not allowed.

D. Weather- During inclement weather, trenches shall be excavated only as far as pipe can be laid and backfilled during the course of the day.

E. Existing Roadways- Trenching in existing roadways shall be limited to the length of pipe that can be laid that day. No open trenches shall be left overnight. Exposed trenches shall be plated and backfilled as approved by the Environmental Utilities Department inspector and the Public Works Department.

F. Excess Material- Excess material and materials determined unsuitable for backfill by the Environmental Utilities Department inspector shall be removed from the project site.

81-5 DEWATERING- Dewatering for the installation of structures and pipelines shall commence when groundwater is first encountered and shall be continuous until the excavation is backfilled. Best Management Practices including but not limited to scouring and erosion measures shall be used to eliminate sediment-laden discharges in accordance with the approved SWPPP.

81-6 PIPE BEDDING- Pipe bedding shall conform to Detail W-1 and the following:

A. Bedding shall provide uniform and continuous support along the barrel of the pipe. The minimum depth of bedding material shall be provided under the bell. Blocking of the pipe is not permitted.

B. Loose material shall be removed from the trench bottom and replace with imported material.

C. Where rocky, unyielding, or unsuitable foundation material is encountered, the subgrade shall be excavated a minimum of 12 inches below the pipe and the trench width shall be increased a minimum of 12 inches. The over-excavation shall be replaced with imported material.

D. Where the trench bottom is soft, yielding or unstable, the trench bottom shall be over-excavated. Three-quarter inch crushed rock shall be placed in the trench to provide a stable foundation. The rock is in addition to the required pipe bedding used in the pipe zone.

E. Bell holes shall be excavated per manufacturer's recommendations. The minimum depth of bedding material shall be provided under the bell. Care shall be taken to ensure that the bell hole is no larger than necessary to accomplish proper joint assembly.

81-7 CONCRETE CRADLES, ARCHES ENCASEMENTS and TRENCH DAMS- Concrete cradles, arches and encasements shall conform to Construction Standard Details W-23, W-24, and the following:

A. The pipe shall be placed in proper position on temporary cradles or arches consisting of concrete block or bricks. When necessary, the pipe shall be rigidly anchored or weighted to prevent flotation when the concrete is placed.

B. Cradles and arches shall be constructed with an ability to adjust the pipe to proper grade in order to avoid vertical joint pull. Cradles and arches shall be placed at one-third and half-way points along each pipe segment where specified. Concrete placed beneath the pipe shall be sufficiently workable to fill the voids without excessive vibration. The concrete shall be allowed to cure and remain undisturbed for a minimum of 24 hours prior to backfill and compaction of the trench.

C. Restrained pipe within casings, bridges, shall be fully extended or "stretched out" to remove the slack between the joints the entire length of the structure.

D. Water shall not be permitted to enter, seep or run onto the concrete while curing.

E. Trench dams shall be constructed of controlled density fill or clay as shown on the drawings or as directed by the Environmental Utilities Department inspector. Trench dam excavations shall be made into native earthen materials to the dimensions shown on the drawings or as directed by the Environmental Utilities Department inspector. Clay materials shall be moisture conditioned to near-optimum moisture content prior to placement in the excavation and compacted to the required relative compaction.

81-8 PIPE ZONE BACKFILL- Pipe zone backfill shall conform to Construction Standard Detail W-1 and the following:

A. Extreme care shall be taken when consolidating the backfill around the pipe zone. For pipe 12 inches in diameter and smaller, no more than one-half of the pipe shall be covered prior to shovel slicing the haunches of the pipe. For pipe greater than 12 inches in diameter, no more than the lesser of 6 inches or one-third of the pipe shall be covered prior to shovel slicing. Sufficient care shall be taken to prevent movement of the pipe and damage to the polyethylene encasement during shovel slicing. Shovel slicing shall be witnessed by the

Environmental Utilities Department Inspector prior to shading the pipe.

B. Compaction equipment shall not make direct contact with the pipe.

81-9 PIPE INSTALLATION- Water pipe shall be installed in accordance with the following provisions:

A. The contractor shall keep the pipe interior free from foreign materials and in a clean and sanitary condition until acceptance by the City. At times when pipe-laying is not in progress, the open pipe end shall be sealed with a tight cap or plug to prevent foreign matter from entering the pipe. Provisions shall apply to the noon-hour as well as overnight.

B. Trenches shall be in a reasonably dry condition when pipe is laid.

C. Care shall be taken when lowering pipe into the trench to protect the pipe from damage. Chains are not permitted. The pipe shall be laid carefully to the lines and grades shown without grade breaks, unless designed with such, or to minimum depths shown on the approved plans. If field conditions exist such that the pipe may not be laid to the specified grade, the approved plans will require revisions prior to proceeding with construction.

D. Pipe sections shall be closely jointed to form a smooth flowline. Care shall be taken in placing the pipe and making field joints.

E. No facility is to be backfilled without inspection by the Environmental Utilities Department. Improvements installed without proper inspection shall be exposed and inspected as required by the Environmental Utilities Department inspector.

F. All installations shall follow manufacturer's recommendations unless otherwise noted on the approved plans. The manufacturer's installation guide shall be on the job site at all times.

G. Pipes shall be mechanically restrained to the length specified in the approved plans, using materials specified herein.

1. Thrust blocks shall only be used where specifically shown on the plan /profile sheets and/or standard detail sheets. All fittings and appurtenances shall maintain a minimum of 18 feet of restrained pipe into the fitting from all directions. Plans should reflect the restraint lengths required for each segment and transition.

H. A continuous number 12 insulated tracing wire shall be attached to mains, service lines and appurtenances per the Construction Standard Details and the following:

1. Tracing wire shall be continuous between mainline valve boxes and fire hydrants. It shall be attached to the top of the pipe with 10-mil vinyl tape every 5 feet.

2. Tracing wires through valve boxes shall be placed outside of riser, but inside the box.

3. Tracing wire in manholes and vaults shall be attached inside the facility within one foot of the rim.

4. Wire splices shall be located above ground and inside of valve boxes, per Details W-16, W-17, and as follows:

4a. Twist the wire together with a minimum of 5 twists.

4b. Install a copper split bolt connector on the splice.

4c. Solder all connections.

4d. Cover the splice with mastic tape and wrap with vinyl tape.

I. A 12-inch wide, blue plastic non-detectable water pipe marking tape, marked "Buried Water Main Below," shall be placed in all main line trenches, 12 to 24 inches from the surface. Where a water main and recycled water main intersect, the plastic marking tape shall also be attached to the top of the pipe with nylon tie-wrap banded around the warning tape and the pipe every five feet on center. The warning tape shall extend to the nearest valves located on each side of said intersection.

J. Mains in unpaved areas shall be marked every 150 lineal feet with a blue composite utility marker having a decal stating: "Caution Water Pipeline." Appurtenances (valves, ARV's, test stations, etc.) and angle points shall also be marked. Mains in landscaped areas shall be delineated with a brass marker set in an 8-inch concrete cylinder 4 inches above finished grade. The brass marker shall state "City of Roseville Water Main."

K. All underground metal (ductile iron, valves, fittings, copper, brass, etc.) shall be wrapped in 8-mils minimum thickness polyethylene encasement with ends taped off with vinyl pipe wrap tape.

L. Polyvinyl Chloride (PVC) Pressure Pipe Installation- PVC shall be installed in accordance with the AWWA Manual M23 and the manufacturer's recommendations, except as otherwise provided herein:

1. PVC Pipe shall have been manufactured within the 18 month period prior to installation.

2. Pipe and gaskets shall be kept clean and protected against sunlight and heat damage.

3. Pipe showing signs of physical damage or excessive ultraviolet exposure will be rejected and shall be immediately removed from the job site.

4. The pipe shall be installed with the manufacturing label showing on the top.

5. The reference mark or stab line on the spigot end must be flush with the bell end and visible for inspection.

6. The beveled end of the pipe shall be cut off before placement into a mechanical joint.

7. Minimum length of pipe for installation shall be 5 feet.

M. Ductile Iron Pipe (DIP)- DIP shall be installed in accordance with the standards for "Installation of Ductile Iron Water Mains and Their Appurtenances" (ANSI/AWWA C-600) and the manufacturer's recommendations, and as provided herein:

1. DIP shall be polyethylene-encased in accordance with these Construction Standards and the standard for "Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids" (ANSI/AWWA C-105/A21.5). Polyethylene-encased pipe shall be bedded and backfilled with pea gravel to 4 inches above the crown of pipe.

2. At the direction of the City, the Contractor shall repair damages to the polyethylene encasement as described within ANSI/AWWA C-105/A21.5 or shall replace all damaged polyethylene film sections.

3. Metallic lines shall be exothermically welded and electrically continuous on DIP runs exceeding 100 feet or as approved by the Environmental Utilities Department Director. Each joint shall have two individually welded wires. Exothermic welds shall be installed per Detail W-20 and as follows:

3a. Weld only against bare metal on both the bell and spigot ends of pipe.

3b. Care must be taken not to remove excess metal when removing the pipe coating.

3c. After a solid weld is made, coat the bare metal with an acceptable bituminous coating material and cover with a plastic protective cap or approved equal.

3d. DO NOT weld onto valves.

4. Corrosion test stations shall be installed on metallic lines at intervals not to exceed 1,000 lineal feet or as specified on the approved plans.

5. DIP cuts shall be coated with an approved bituminous material.

6. Minimum length of pipe for installation shall be 2 feet.

N. Ductile Iron Pipe Fittings- In addition to requirements set by these standards, fittings shall be constructed per the following requirements. Mechanical joint fitting bolt threads and nut shall be coated with an approved bituminous material. Flanged bolt heads and threads shall be coated with an approved bituminous material.

O. Transitions between DIP and PVC shall be made as follows:

1. A PVC pipe spigot may be inserted into a DIP bell by cutting off the PVC bevel on the spigot, and leaving no more than a 1/2-inch taper. An Environmental Utilities Department Inspector shall be present to witness this process.

2. Transitions may be made by the use of DIP repair sleeve.

P. Boring - Borings for installation of water lines shall be made per Detail W-22 and as follows:

1. The equipment, method and sequence of operation and casing pipe grades shall be approved by the Environmental Utilities Department. A minimum of 48 hours notice shall be given prior to the start of work. Excavation for the boring operation shall be the minimum necessary to satisfactorily complete the work. Bracing, sheeting, and shoring shall be adequate to protect workers and any adjacent structure or roadbed.

2. Casing - Welded steel casing pipe shall have a minimum wall thickness of a ¼-inch for pipe 24 inches in diameter and under, and 5/16-inch for pipe 27 inches through 36 inches in diameter. Casing material larger than 36 inches shall be engineered on a case by case basis. The inside diameter of the casing shall be a minimum of 10 inches larger than the outside diameter of the pipe bell or joint, as approved by the Environmental Utilities Department. A minimum of 4 inches clearance shall be required between the conducted pipe and the casing taking the skids into consideration.

3. **Installation of Casing** - The casing shall closely follow the boring operation. The bored hole shall not be more than one-tenth foot (0.10') larger in diameter than the outside diameter of the casing. Guide rails shall be accurately set to line and grade to insure installation of the casing within allowable limits.

4. **Placing Pipe in Casing** - Pipe shall be fully restrained ductile iron pipe and shall be supported by a minimum of two sets of synthetic skids per stick of pipe, or as required by the Environmental Utilities Department. Skids shall be tightly banded to pipe with steel straps. Pipe sections shall be joined outside of the conductor. The skids and casing entrance shall be lubricated prior to sliding the conducted pipe into place. The height of the skids may be adjusted to meet specified grades.

   The space between the conducted pipe and casing shall be completely filled with clean, dry silica sand, blown into place. First, both ends of the casing shall be plugged with non-shrink grout a minimum of 12 inches into the casing. Both ends shall have a pipe of sufficient diameter placed through the mortar plug and parallel with the conducted pipe. One pipe shall be used for blowing the sand into the annular space. The other pipe shall remain open for venting. Prior to starting, the method of placing sand in the void shall be approved by the Environmental Utilities Department.

5. **Backfill of Voids** - When in the opinion of the Developer's design engineer or geotechnical engineer, the nature of the soil indicates the likelihood of ground loss which would result in a greater space between the outer surface of the casing than allowed, the Contractor shall take immediate steps to prevent such occurrences by installing a jacking head extending at least 18 inches from the leading edge of the casing.

   The jacking head shall cover the upper two-thirds of the casing and project not more than 1/2-inch beyond the casing outer surface. Excavation shall not be made in advance of the jacking head. Voids greater than allowable shall be filled with sand, soil, cement, grout,

or as approved by the Environmental Utilities Department. Where voids are suspected, the design or geotechnical engineer may direct the Contractor to drill the casing, to pressure inject grout to refusal and repair the drilled hole. Grouting pressure shall not exceed 50 pounds per square inch at the nozzle

6. Utilizing the City's drainage system for residual discharge from boring operations without the required measures is prohibited. This discharge is a violation of the City's Stormwater Ordinance and the Clean Water Act. Discharge fluid shall be recovered, contained and discharged at an appropriate location, or if the situation allows, fluid may be discharged into an open area with the pre-written approval of the property owner and approval from the Regional Water Quality Control Board provided it does not impact sensitive areas such as wetlands, creeks, or other natural water conveyances.

All street borings shall include adequate measures to mitigate sediment laden water discharge. An acceptable measure is pumping the discharge fluid into a tanker and hauling it away. Other measures suggested by the Contractor will be considered by the City.

Q. Vertical Elevation Change- Mains designed with a vertical elevation change using angle fittings shall use ductile iron pipe with an approved restraint system between the two angle fittings.

R. Bridges and Casings- Pipe within bridges and casings shall be fully restrained and fully extended prior to closure.

81-10 SERVICE INSTALLATION- Water services shall be installed in accordance with manufacturer's recommendations, the Construction Standard Details and with the following provisions. Refer to the Table 1 or "Meter Application Table" for meter lay lengths.

A. Services shall be continuous from the main line to the service box. Bends in copper tubing shall be made in a manner that does not crimp or flatten the tubing.

B. Taps, service saddles and fittings attached to mains shall be separated from each other by a minimum of 24 inches.

C. Service saddles shall be wrapped and sealed in 8-mil minimum thickness polyethylene and backfilled with sand. Use pipe wrap tape to secure and seal the polyethylene wrap.

D. Service lines shall be encased in 8-mil minimum thickness poly tubing and backfilled with clean washed well graded sand (100% passing #4

sieve and less than 10% passing #100 sieve. Use pipe wrap tape to secure and seal the polyethylene wrap.

E. Service manifolds shall be constructed per the following criteria:

1. Where a service line is extended a distance greater than 40 feet, a construction jumper shall be installed per Construction Standard Detail W-15. The new service line and manifold shall be tested in accordance with these Construction Standards.

Where a service line is extended a distance less than 40 feet, the extension shall be cleaned, swabbed with chlorine and flushed in the presence of the Environmental Utilities Department Inspector. The new service line and manifold shall be pressure tested in accordance with these Construction Standards.

In both cases, the installation shall be fully restrained by an approved restraint system, starting at the main and as required by the approved Improvement plans.

2. Service lines and manifolds 3 inches and larger shall be ductile iron.

3. No water shall be drawn through a service prior to installation of the water meter and testing of the backflow assembly.

F. A backflow assembly shall be required for construction and sales trailers having a landscape irrigation system or a septic holding tank.

G. Backflow assemblies shall be covered with a freeze protection insulated bag per these Construction Standards.

H. The curb in front of residential water services shall be stamped with a "W."

I. Service saddles shall be installed with zinc caps on all bolts, per these Construction Standards.

81-11 ABANDONMENT OF SERVICES AND MAINS- All water services requiring abandonment shall be disconnected from the main line at the corporation stop unless otherwise approved by the Environmental Utilities Department. Mainline stubs shall have the valve removed and replaced with a blind flange or as approved by the Environmental Utilities Department. The abandoned piping shall be removed or left in place as approved by Environmental Utilities Director

81-12 APPURTENANCES INSTALLATION- All appurtenances, including fire protection, blow-offs, sample stations, air release valves and fire

hydrants shall be installed in accordance with manufacturer's recommendations, these Construction Standards and the following provisions:

A. All valves, fittings, DIP, cooper and underground brass shall be wrapped and sealed in a 8-mil minimum thickness polyethylene encasement. Use pipe wrap tape to secure and seal to the polyethylene encasement. Damaged or scratched surfaces on epoxy coated valves and appurtenances may be repaired with an epoxy kit per manufacturer's recommendations and to the satisfaction of the Environmental Utilities Department Inspector prior to wrapping. Otherwise, the damaged valve shall be replaced with a new valve.

B. Gate valves shall be centered in a one-piece riser stock. An operator nut extension shall be installed on valves where the operation nut exceeds 40 inches in depth from final grade. Valve extensions shall be continuous and within 24 inches of finished grade.

C. Buried nuts and bolts shall be coated with a bituminous material. This includes exposed bolts found on a manufactured appurtenance (i.e., valve bonnets, etc.) "T" bolt heads do not require coating.

D. Break-away bolts shall be used in connecting the fire hydrant to the hydrant break-off spool. Bolts shall be installed nut side up with the bolts filled and covered with silicone caulking. Clearance shall be made for removal of all bolts.

E. Fire hydrants shall be marked with a blue reflector placed 1 foot off of street centerline on the fire hydrant side of the street. Fire hydrants located at intersections shall be marked on both streets.

F. Fire hydrants shall be painted with two coats safety yellow enamel paint. "When used as blow-offs, the top 2 inches shall be painted white and marked with an "X" with black enamel paint. Private hydrants shall be painted white.

G. Dead-end lines, permanent and temporary, shall have a blow-off constructed per Construction Standard Detail W-4 and marked with a Carsonite marker.

H. Insulating kits shall be installed at transitions between dissimilar metal pipe per the Construction Details and as required by the Environmental Utilities Department.

81-13 TESTING PROCEDURES-Testing of the water system may proceed only after joint utility crossings are completed, the sewer mains and services have passed pressure test and TV inspections, the recycled

water system has passed testing, and subgrade elevations have been met. Road bases to be lime-treated shall be pressure tested before and after the lime treatment process. Testing prior to subgrade placement may be subject to additional pressure tests at the discretion of the Environmental Utilities Department inspector. The new system shall be filled with potable water through an approved backflow device.

A. Pressure Test:

1. Contractor shall verify with the Environmental Utilities Department inspector that all system valves are open prior to testing.

2. The Environmental Utilities Department inspector will be present during the duration of the test.

3. Pressure testing shall be conducted for two hours at 150 pounds per square inch or at one-and-one-half times the operating pressure, whichever is higher, as measured from the system high point. The test gauge shall be liquid-filled and capable of testing up to 300 psi.

B. Chlorine Disinfection- Chlorine disinfection shall comply with the American Water Works Association Standard for Disinfection of Water Mains (C651-92) and as specified below:

1. Disinfection inspections shall begin only after passing the pressure test.

2. Prior to chlorination, pre-flush water mains and services. Pre-flushing is not permitted if using the Tablet Method for chlorination.

3. Chlorine shall be drawn through all mains, hydrant runs and services. The Environmental Utilities Department Inspector shall verify that a minimum chlorine residual of 50 parts per million (ppm) has been achieved.

4. After a 24-hour holding period, the Environmental Utilities Department inspector will verify that a minimum chlorine content of 25 ppm remains in the system.

5. Upon approval by the Environmental Utilities Department inspector, the water system shall be flushed to remove concentrated chlorine. Flushing shall be continued until the remaining water has a chlorine residual below 1 ppm and a turbidity equal to or less than 1 NTU. Chlorinated water shall be neutralized to 1 ppm chlorine residual or less prior to discharge. Discharge location and neutralization methods shall be documented in the SWPPP and

coordination with and approved by the Environmental Utilities Department inspector.

6. Chlorinated water resulting from flushing newly installed water lines may be discharged into the City's sewer system with the specific permission of the Environmental Utilities Department.

Prior to discharging into the sewer system, the Contractor shall sign a form authorizing the Environmental Utilities Department to bill for the amount of water discharged into the system. At the end of each flushing exercise, and prior to tying into the City water system, the Environmental Utilities Department inspector shall prepare a bill for water usage based on the meter reading. This bill must be paid before the project is signed off by EUD.

The discharged chlorinated water shall be classified as "low-strength metered commercial users" under Title 14.16.220 of the City of Roseville Municipal Code. The sewer unit for low-strength metered commercial users shall be one sewer unit per 1,000 cubic feet. The Environmental Utilities Department shall determine the volume of discharge. Chlorinated water shall not be disposed of into environmentally-sensitive areas (i.e., under oak trees, vernal pools, man-made or natural streams, drainage systems, etc.) during any time of the year.

All discharges into the sewer system shall be governed by the following conditions:

6a. Water used for the purpose of flushing shall be metered.

6b. Discharge into the sewer system shall be done in such a manner as to avoid surcharging the sewer system.

6c. No discharge into the sewer system shall be permitted on rainy days.

6d. No discharge shall be permitted upstream of a small lift station.

6e. An approval air gap shall be maintained at all times. Air gap distances shall be calculated as 2.5 times the pipe diameter. In no case shall the air gap be less than 12 inches.

C. Water Quality Testing- Water quality samples shall be taken per the following procedure:

1. Once flushing has lowered the chlorine residual below 1 ppm and the turbidity is equal to or less than 1 NTU, the water system shall observe a minimum 24 hour detention time. Water may not be drawn during this time period.

2. After the 24-hour holding period has elapsed, water quality samples shall be collected by the Environmental Utilities Department Inspector for testing by the City's laboratory.

3. The laboratory shall conduct a final chlorine and turbidity test. If the sample lot does not meet the minimum chlorine residual and turbidity criteria, additional flushing shall be required. The procedure shall be repeated until the criteria are met.

4. The laboratory will require 48 hours to complete total coliform and total plate count tests. Actions allowed based on test results are as follows:

Pass Coliform Test		
(Coliform not present?)	**Plate Count Results**	**Action**
Yes	0-1,000	Connect to City
Yes	1,000-1,250	Flush water system and re-test
Yes	1,250+	Flush and re-chlorinate water system and re-test
No		Flush and re-chlorinate water System and retest

D. Tying Onto The City System- A tie-in procedure shall be submitted and approved by the Environmental Utilities Department prior to the proposed work. The Contractor shall allow for up to seven days review of the procedures by the Environmental Utilities Department. The water system shall be tied into the City system within 10 working days upon completing and passing all the testing procedures. Tie-ins shall be conducted a specified in Section 81-2 of these Construction Standards. After the tie-in has been made, the Contractor shall flush the segment tied-in to the approval of the Environmental Utilities Department Inspector.

1. If the new water system cannot be tied into the City system within 10 working days, the new system shall maintain a chlorine residual of 0.5 to 1.0 ppm or be subject to water quality testing and re-chlorination. This shall be discussed with the Environmental Utilities Department Inspector.

2. On-site private systems may connect onto the City System upon passing all testing procedures, backflow tests, and meters have been paid for and installed. A tie-in procedure shall be required per this section.

E. Continuity Testing- The Environmental Utilities Department will test continuity of the tracing wire with City standard locating equipment upon request for testing by the Contractor. Discontinuity in the tracing wire shall be repaired. It is recommended that the Contractor request continuity testing after subgrade is made, but before asphalt is placed. Final continuity testing will take place after asphalt is placed and all valve boxes are raised. Costs for said inspection shall be borne by the Contractor. Preliminary inspections may be performed by outside Contractors, but shall not be accepted by the Environmental Utilities Department as an official record.

F. Corrosion Protection System Testing- At the completion of the pipe installation and prior to curb and gutter, the corrosion engineer shall conduct a test of the corrosion monitoring system in the presence of the environmental utilities Department inspector. A report showing the test results shall be submitted to the Environmental Utilities Department for review and approval. The report shall include test station locations as called out on the approved plans, appurtenance tested, test result, and recommendations for future monitoring and maintenance.

81-14 REPAIRING INSTALLED IMPROVEMENTS- All PVC and DIP water mains shall be repaired per the following procedures:

A. Damaged or failed pipe sections shall be removed and replaced with new pipe in the presence of the Environmental Utilities Department inspector. Replacement can be accomplished by the use of City approved ductile iron mechanical joint repair sleeves. Pipe restraints will be required.

B. After the repair has been completed, the excavation shall be backfilled and compacted to grade as specified. The repairs shall then be retested per these Construction Standards.

C. At the direction of the City, the Contractor shall repair damage to the polyethylene encasement as described within ANSI/AWWA C-105/A21.5 or shall replace all damaged polyethylene film sections.

81-15 PUNCHLIST PROCESS- When the Contractor is satisfied that all improvements are substantially complete, a punchlist of final outstanding items may be requested. With the assistance and presence of the Contractor, the punchlist shall be generated by the Environmental Utilities

Department Inspector and Water Distribution Division. The cost of generating the punchlist shall be borne by the Contractor/Developer.

81-16 MATERIALS

A. Approved Equal- The words "approved equal" shall mean any material deemed by the Environmental Utilities Department to be acceptable for use within the City's water system as compared to products of specified manufacturers. Contractors proposing to use materials which are not specifically named shall submit all necessary documentation to allow review of said material for use as an approved equal. The submittal shall include a letter with:

1. Product- A description of the product and the appropriate materials specification section number. A sample of the product may be required for review and testing.

2. Contact- The name and telephone number of the contact person for the proposed product.

3. Reference- A list of a minimum of three agencies that are using the proposed product (include names and telephone numbers).

4. Performance- Information and reference for three locations with a performance record of three years in operation of the installation.

5. Address the letter to the Environmental Utilities Department Engineering Division at 2005 Hilltop Circle, Roseville, CA 95747 Attn: EUD, Engineering Manager. City staff may request a sample of the product for review.

6. The contractor shall submit all material for review 35 days prior to contract award. All submittals shall include documentation verifying contract award date. Contractors shall allow two to four weeks review time by the Environmental Utilities Department.

B. Conditionally Approved Material- Materials or products that have met the reference and performance requirements shall be conditionally approved for a minimum trial period of 2 years. Upon completion of the two year period, the product may be approved, the evaluation period may be extended, or the product may be denied approval as determined by the Environmental Utilities Director. A list of conditionally approved products may be obtained from the Environmental Utilities Department.

C. Material Defects and Failures- Defective material and failures shall be reported immediately. The date of sale, manufacturing dates,

lot numbers, and all other identifications shall be provided to the Environmental Utilities Department.

D. Unapproved Materials- Materials not approved for use on the project shall be removed from the site within 24 hours as requested by the Environmental Utilities Department Inspector.

E. Water Main- Unless noted on the approved plans, all water mains shall be either Polyvinyl Chloride Pressure Pipe (PVC) or Ductile Iron Pipe (DIP).

1. PVC Pressure Pipe-PVC Pressure Pipe shall be manufactured to a minimum Class 150 rating and shall conform to the "Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 6 inches through 12 inches, for Water" (AWWA C-900), and shall also include the following:

1a. PVC Pressure Pipe shall be blue or white in color and shall have been manufactured with 18 months of installation. The pipe shall be manufacturer date coded and the City provided the manufacturer's coding for translation. Sun damaged pipe may be rejected at the inspector's discretion.

1b. Rubber rings shall conform to the "Standard Specifications for Elastomeric Seals (Gaskets) for Joining Plastic Pipe" (ASTM F-477).

1c. Approved PVC Pressure Pipe manufacturers include: Certain Teed Certa Lock, Diamond Plastics Corporation, J-M Manufacturing, Pacific Western Pipe, Vinyl Tech-White Knight, Pressure – Flex Pipe, PW-Eagle or approved equals.

2. Ductile Iron Pipe- DIP shall be manufactured to conform to the standards ANSI/AWWA C-150/21.50 thickness design of ductile iron pipe and to "Ductile Iron Pipe Centrifugally Cast in Metal Molds or Sand-Lined Molds for Water and Other Liquids" (ANSI/AWWA C-151/A21.51) and shall also include the following:

2a. DIP shall be cement-mortar lined in accordance with the standard for "Cement-Mortar Lining fro Ductile Iron Pipe and Fittings for Water"(ANSI/AWWA C-104/A21.4).

2b. Approved DIP manufacturers include: Pacific States, Tyler, US Pipes, Griffin, or approved equals.

D. Services

1. Brass Material -In compliance with California State Assembly Bill 1953 and any amendments thereto, all brass components and pipe in contact with potable water intended to convey or dispense water for human consumption through drinking or cooking shall contain a maximum of 0.25% lead by weight. Compliant brass product shall be marked indicating the product is manufactured from a low-lead alloy. Non-compliant product shall be immediately removed from the construction site.

1a. Brass pipe - Brass pipe shall conform to ASTM B-43 standards. A listing of approved pipe include: Hallstead ¾ "through 2" Red Brass, Cambridge-Lee, Federal WW—351, Wolverine, or approved equal.

1b. Brass fittings - Brass fittings shall conform to ANSI Standard B16.15, B16.24, B2.1, T-94-1 and be a minimum of Class 125. A listing of approved manufacturers include: Lee Brass, Merritt Brass, New England Union Co., or approved equal.

1c. Brass fittings for Copper Tubing - An approved listing for brass fittings for copper tube includes: Jones, Mueller, Ford or approved equal. Parts reference numbers are shown below:

i. Jones (3/4" through 2")
Jones Super Grip CTS x CTS E-2609SG
Jones Super Grip CTS x MIP E-2605SG
Jones Super Grip CTS x GIP E-2607SG
(2"- Compression x Compression)

ii. Mueller (3/4" through 2"):
Mueller-110-CTS H-15403N
Mueller-110-CTS H-15428N
Mueller-110-CTS H-15451N

iii. Ford (3/4" through 2"):
¾"- Ford Quick Joint CTS x CTS C44-33-Q-NL
1" – Ford Quick Joint CTS x MIP C84-44-Q-NL
2" – Ford Quick Joint CTS x FIP C14-77-Q-NL
(2"- Compression x Compression)

2. Copper Tubing - Copper tubing shall be seamless, annealed copper tube and shall conform to ASTM B88 "Standard Specification for Seamless Copper Water Tube" and shall be Type K. Copper shall be grade UNS-C12200. For diameters ranging from ¾" to 1", use Type K Roll Soft Copper. For diameters ranging from 1.25" to 2", use

Type K Soft 20' Sticks. Approved tubing includes: Cambridge Lee, Mueller Streamline, Aqua Shield or approved equal.

3. Corporation Stops

3a. Corporation Stops shall be male, iron pipe thread by compression and full throat ball valve design. A corporation stop shall be installed at the water main for all service laterals 2 inches and smaller. Approved manufacturers of corporation stops include: Jones, Mueller, Ford, or approved equal. Part reference numbers are as shown below:

i. Jones: Part #E-1935SG (3/4-inch to 2 inches)

ii. Mueller:
Part #B-25028-MIPTXCTS-110N (Compression ¾-inch to 2 inches)
Part #N-35028-MIPTXCTS-110N (Compression ¾-inch to 1 inch)

iii. Ford: Part # FB1100-x-Q-NL (3/4-inch to 2 inches)

4. Curb Stops

4a. Approved curb stop manufacturers include: Jones Mueller, Ford, or approved equal. Part reference numbers are shown below:

i. Jones: Part #E1921WSG (3/4-inch to 2 inches)

ii. Mueller:
Part #B-25172-FIPTXCTS-110N (Compression ¾-inch to 2 inches)

iii. Ford: Part # B41-xxx-Q-NL (3/4-inch to 2 inches)

5. Dielectric Tape- Approved manufacturers for dielectric tape include Polyken #932 Hi-Tack joint wrap tape or approved equivalent flexible dielectric tape.

6. Service Saddles (Exempt)

6a. PVC Pressure Pipe Service Saddles manufacturers include: Jones, Mueller, or approved equal. Part reference numbers are as indicated below:

i. Jones: 4-inch through 12-inch saddles with ¾-inch through 2-inch tap, Part #J-996

ii. Mueller:

	Saddle Size	Part#
iia.	4-inch	H-13490
iib.	6-inch	H-13491
iic.	8-inch	H-13492
iid.	10-inch	H-13493
iie.	12-inch	H-13494

6b. DIP Service Saddles manufacturers include: Jones, Mueller, or approved equal. Part reference numbers are as indicated below:

i. Jones: 4-inch through 12-inch saddles with ¾-inch through 2-inch taps: Part # J-979

ii. Mueller: ¾-inch through 2-inch taps:

	Saddle Size	Part#
iia.	4-inch	BR2B0474Ip*
iib.	6-inch	BR2B0684IP*
iic.	8-inch	BR2B0899Ip*
iid.	10-inch	BR2B1104IP*
iie.	12-inch	BR2B1314IP*
iif.	16-inch	BR2B1732IP*

*the last three numbers denote tap sizes
(0.75”=075, 1”=100, 1.50”=150, 2”=200)

E. Appurtenances -In compliance with California State Assembly Bill 1953 and any amendments thereto, all brass components and pipe in contact with potable water intended to convey or dispense water for human consumption through drinking or cooking shall contain a maximum of 0.25% lead by weight. Compliant brass product shall be marked indicating the product is manufactured from a low-lead alloy. Non-compliant product shall be immediately removed from the construction site.

1. Air Release Valves – Air release valves shall be epoxy coated vacuum break type. A listing of approved manufacturers includes: Crispin, Valvematic, or approved equal. Part reference numbers are as shown below:

Crispin	Part#	Valvematic	Part #
1a. 1”	UL10	1”	201C
1b. 2”	UL20	2”	202C

1c. 3”	UL31	3”	203C
1d. 4”	UL41	4”	204C
1e. 6”	UL61	6”	206C
1f. 8”	Ul81	8”	208C

2. Backflow Assembly – A listing of approved manufacturers and products include:

2a. Watts:
- **i.** 009 and 909 Series, ¾” to 3”
- **ii.** 909 Series, 4” to 10” (OS&Y or NRS)
- **iii.** 709 DCDA Series, 3” to 10” (OS&Y)
- **iv.** 909 RPDA Series, 3” to 10” (OS&Y)

2b. Wilkins:
- **i.** 975 Series, ¾” to 2”

2c. Ames:
- **i.** 3000 DCDA Stainless Steel Series, (OS&Y), 3” to 10”
- **ii.** 4000 RP Stainless Steel Series, (OS&Y or NRS), 3” to 6”
- **iii.** 4000 RP Epoxy Series, (OS&Y or NRS), 8” and 10”
- **iv.** 4000 B Series ¾” to 2”
- **v.** 5000 RPDA Epoxy Series, (OS&Y), 4” to 10”

2d. Conbraco:
- **i.** 40-200 Series, ¾” to 2”

3. Backflow Assembly Support Stands – Placer Waterworks series PW/PS or approved equal.

4. Backflow Assembly Support Stand Saddles – Placer Waterworks series PW/SDL or approved equal.

5. **Backflow Assembly Color:** All Backflow Preventer Assemblies shall be painted a “Forest Green” color to provide a deterrent to theft with the proper outreach to recyclers. The paint color code shall be RAL6004.

6. Blocking for Boxes – A listing of approved materials includes: Slump Block- 4”x4”x15-1/2”, or approved equal.

7. Blow-Off – Approved manufacturers and products include: Kupferle, Eclipse #78 (2-inch) or approved equal.

8. Cadwelds – A listing of approved materials includes:

8a. #4 jumper cable, CP cable, 18” long with 1” bare end

8b. #4 cadweld copper sleeve
8c. #4 cadweld shot with thermite mastic weld cap-t-cap

9. Fittings

9a. PVC- Unless otherwise specified or shown on the approved plans, all fittings to be used with PVC Pressure Pipe shall conform to the standard for "Ductile Iron Compact Fittings for Water and Other Liquids" (ANSI/AWWA C-153/A21.53 for MJ compact fittings; C110 for flange fittings). Approved fitting manufacturers include Sigma, Star, Tyler, Union and US Pipe.

i. All ductile iron fittings shall be mortar lined in accordance with the standard for "Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water" (ANSI/AWWA C-104/A21.4).

ii All fittings shall be wrapped and sealed in accordance with these Construction Standards.

iii. The Contractor may use a ductile iron mechanical joint flange adapter designed for AWWA C-900 pipe with connecting PVC Pressure Pipe to flanged fittings or flanged valves. Pipe ends must be cut smooth and square with no bevel. The joint shall be restrained to the PVC pipe using an approved restraint method.

9b. Ductile Iron Pipe- Unless otherwise specified or shown on the approved plans, all fittings to be used with DIP shall employ either mechanical joints or restrained joints conforming to the standard for "Ductile Iron Compact Fittings for Water and Other Liquids" (ANSI/AWWA C-153/A21.53). Approved fitting manufacturers include Tyler, Union, and US Pipe.

i. All ductile iron fittings shall be mortar lined in accordance with the standard for "Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water" (ANSI/AWWA C-104/A21.4 – Double thickness mortar).

ii. All fittings shall be wrapped and sealed in clear polyethylene encasement in accordance with these Construction Standards.

10. Freeze Protection for Backflow Assemblies – The backflow assembly freeze protection materials shall be comprised of the following:

10a. Laminated fabric conforming to Herculite #10 by Herculite Products (fabric shall be a minimum of 10.6 oz/sq. yd.), or approved equal.

10b. Brass Rolled Rim Grommet and spur washer by Astrup, or approved equal.

10c. Polyester thread with a minimum strength of 14.2 pounds, Coats American's Star Ultra product line, or approved equal.

10d. Fiberglass insulation R-19 rated, 6-inch minimum thickness.

10e. Two-inch minimum width Velcro, or approved equal.

10f. Nylon zip ties.

11. Gaskets-Gaskets shall conform to the following specifications:

11a. Flange Gaskets – Flange gaskets shall be neoprene rubber, red rubber, US Pipe, Flange Tite, or approved equal.

11b. Push On Gaskets - Manufacturers recommendations.

11c. MJ Gaskets - Manufacturers recommendation.

11d. Insulting Flange Gaskets-Insulating flange gaskets shall be USSO Standard B.16.21 insulation flange kits, Type E Full Face Gasket with two-side insulation as manufactured by Calpico, or approved equal.

12. Hydrants – Hydrants shall be wet barrel type bronze. Exterior shall be painted with one coat primer any two coats "safety yellow" enamel paint. Caps shall be cast iron. Approved hydrants include: James Jones (Bronze) Part # J3762-Z13, Clow 2060, or approved equal.

13. Hydrant Bury- Hydrant buries shall be ductile iron mechanical jointed cross flange, cement-mortal lined per AWWA C104. A list of approved hydrant buries include: South Bay Foundry MJ x Size, Clow MJ x Size or approved equal.

14. Hydrant Bury Extensions- Hydrant bury extensions shall be grooved and cement-mortar lined per AWWA C104. A list of

approved hydrant bury extensions include: South Bay Foundry, Clow Part # CW-EXT-BO (6" x 6" through 6" x 36"), Tyler (6" x 6"through 6" x 32"), or approved equal.

15. Location Stakes – A list of approved off-sit location stakes include: Carsonite-# CUM375, 4" x 5" with anchor barb kit, Caution stickers attached-# CW-112 and organization decal # P101, City of Roseville-Call Before Digging-(916) 774-5750, or approved equal.

16. Main Line Valve Lock-Out- A list of approved manufacturers and part reference numbers include: SW Services PC800, DC600, or approved equal.

17. Manhole Frame and Cover- A listing of approved manufacturer and part reference number includes: South Bay Foundry (SBF1957-W), or approved equal.

18. Meters- All meters shall be purchased through the Environmental Utilities Department, Water Division. Call (916) 774-5750 for information.

19. Meter Idlers- A listing of approved meter idler manufacturers include: Ford, Jones, Spears, or approved equal. Part reference numbers are shown below:

19a.	Ford	Part #
i.	¾"	IDLER #3-NL
ii.	1"	IDLER #4-NL
iii.	¾" x 9"	884-090-NL
iv.	1.5"	IDLER #6-NL
19b.	Jones	Part #
i.	5/8" x 3/4"	E-2208
ii.	1" to 2"	E-2208
19c.	Spears(no lead/low lead)	Part #
i.	¾" x 7.5"	884-075
ii.	1" x 10.75"	885-107

20. Meter Setters – A listing of approved meter setter manufacturers include: Ford, Jones, Mueller, or approved equal. Part reference numbers are shown below:

20a.	Ford 40 Series	Part #
i.	¾" to 1"	VBHH43(4)-12WH-NL-FP
ii.	1.5"	VBB76-18HB-11-66-NL-FP
iii.	2"	VBB77-18HB-11-77-NL-FP

20b.	Jones	Part #
i.	¾" to 1"	E03-B-(C)-MT X MT-BV-SC-12
ii.	1.5"	E02E-FIP-FIP-BV-SC-12AS
iii.	2"	E02F-FIP-FIP-BV-SC-12AS

20c.	Mueller	Part #
i.	¾" to 1"	B-24118-2N
ii.	1.5" to 2"	B-2423-99000N

21. Meter Spud Couplers – A listing of approved meter spud couplers manufacturers include: Ford, Jones, Mueller, or approved equal. Part reference numbers are shown below:

21a.	Ford	Part #
i.	3/4"	C38-33-NL (4" and 8-1/2" Spud)
ii.	1.5"	CF31-66-NL
iii.	2"	CF31-77-NL

21b.	Jones	Part #
i.	1.5" to 2"	E-129
ii.	¾" to 12"	**E-130** (3/4" or 1" use 4" and 8-1/2" Spud)

21c.	Mueller	Part #
i.	1"	H-10890N
ii.	Size	10-H90-99029N(4" and 8-1/2" Spud)

22. Nuts and Bolts

22a. Flange Bolts and Nuts-Flange bolts and nuts shall conform to a minimum ASTM #A307. Bolts less than ¾ inches in diameter shall be a minimum Grade B (heavy hex). Bolts ¾ inches and larger in diameter shall be a minimum Grade A (standard hex).

22b. Hydrant Bolts-Hydrant bolts to be Hollow Break Away, 5/8" x 3", conforming to ASTM-A307 Grade A & B Low Carbon Steel. Insulating flange bolts, nuts, and washers shall be stainless steel Grade 316.

22c. Meter Bolts-are to be stainless steel, Grade 316 with brass nuts

22d. Tee Bolt-Steel bolts are to be ¾" high strength, low alloy steel with a heavy nut, conforming to AWWA Standard C-111-90

23. Nylon Bushings – Nylon bushings shall be 76-76R, 2 ½" MIPT x 2" FIPT.

24. Patching Material – A listing of approved manufacturers and part reference numbers for patching of Dip include: Cop-Coat Carboline Company (Bitumastic No. 50, Coal Tar), Coppers Coat 50, or approved equal.

25. Pipe Wrap Tape – 10-mil vinyl tape manufactured by Calpico Inc. (Calpico VI-10) or approved equal.

26. Polyethylene Encasement- "Clear" non-colored polyethylene film shall be used. The polyethylene film shall have a minimum thickness of 8 mils. The thickness shall not be less than 10 percent of the nominal thickness. The polyethylene shall be in either tubular or in sheet form. Polyethylene film shall be manufactured from a Type 1, Class A raw polyethylene material conforming to "Polyethylene Encasement for Ductile-Iron Piping for Water and Other Liquids" (ANSI/AWWA C-105/A21.5). Approved manufacturers include: Fee Spec's-LP378D Northtown, Fulton Enterprise Inc., Global Polymer Tech, Unisource, or approved equal.

27. Pressure Regulators- A listing of approved all brass pressure regulator systems include: Watts (3/4" through 2", UB5-series), Wilkens (3/4"through 2"-600 series, 2.5"through 3"-500YSBR), or approved equal.

28. Restraints

28a. PVC - Approved restraint systems for PVC Pressure Pipe include: Certain Teed Certa Lock (for straight runs only), Romac Grip Rings, EBAA Iron Series 2000 PV, sigma One Lok Series "SLC" or approved equal.

28b. DIP - Approved restraint systems for DIP include: Field Lock Gaskets (3 inches through 12 inches diameter only), Mega Lug 1100 Series, TR Flex, sigma One Lok Series "SLD", or approved equal.

29. Riser Aligners - A listing of approved products include: Davis & Associated Riser Aligners (8"), or approved equal.

30. Riser Stock For Curb Stops - Riser stock schedule 40 PVC. The riser shall be 4-inch diameter inside meter boxes, and 6-inch diameter for curb stop type valves in valve boxes.

31. Riser Stock For Main Line Valves - Riser stock shall be 8-inch diameter PVC C-900 for all main line valves.

32. Sampling Stations - Max Fusion or approved equal.

33. Service Boxes and Lids - All box lids are to be permanently marked with the appropriate label (i.e., Water, ARV, Blow-Off, CPT, etc.). Lids shall have a 1-7/8" hole offset at upper 1/3 portion of lid measured along the long axis. In commercial project, meter lids shall be stenciled with the number address it serves. The numbers shall be painted using white enamel paint and 2-inch stenciling. A list of approved box manufacturers include: Christy, BES, Armorcast, CDR, Placer Water Works, or approved equal. Part reference numbers are shown below:

Christy	Part #
¾" and 1" services	N-16 Box (10k load) N-30 box (10k load) B-16-61DP Cover (10k load) B-16CP Cover (10k load) FL16P001 (10k load) FL 30 cover (10k load) Placer Water Works PWW-F16 (20k load) (w/1-7/8" hole, off-set at upper 1/3 portion of lid, measured along the long axis) B-16-12 Box Extension
1.5" to 2" services	B-40 Box B-40-61D CoverB-40-61D Cover (w/1-7/8" hole, off-set at upper 1/3 portion of lid, measured along the long axis) B-40" x 10" Box Extension
3" meter box	B-40 Box
4" meter box	B-48 Box B-48-62DP P48-10 Extension
6" to 10" meter boxes	B-48 Box P48-10 Extension R-17P24 PIT R-17-52DP Lid R-17"x 24" Extension

6" to 8" compound meter Boxes	R37 Box and Extension R37-54H Lid
Armorcast ¾" to 1"	Part # A6000492 Box (20k load) P000492 Box (20k load) A6000489-T-H5 (20k load) A6000489-H5 (10k load) A-6000 489-TI Non Traffic Lid with 2" probe hole and metal detection device. Label "RSVL WATER"
1-1/2" to 2" services	A-6001 643-TI Non Traffic Lid with 2" probe hole and metal detection device. Label "RSVL WATER"
CDR ¾ "to 1" services	Part # WB03-1121-12 Box WC00-1121-02RR Lid (10k load)
Placer Waterworks All sizes	Part # All standard lids listed above (10k and 20k load)

34. Silicone – Silicone shall be clear, 100% silicone with a 25-year life, or approved equal.

35. Traffic Boxes – A list of approved traffic box manufacturers include: Bes, Christy, or approved equal. Parts reference numbers are shown below:

35a. BES
- **i.** C-17" x 30" Box-Full Traffic Concrete
- **ii.** G-5 Box

35b. Christy
- **i.** V-64 Box
- **ii.** V-64 Box x 6" Extension
- **iii.** V-64 Cover Traffic Load
- **iv.** G-5 Box with D & L Lid # K6004
- **v.** G-5C Lid

35c. Placer Water Works
- **i.** PW/G5 Lid

36. Tracing Wire-Tracing wire shall be minimum 12-gauge solid copper with UF rated plastic insulation.

37. Tracing Wire Connectors-Tracing wire connectors shall be copper split-bolt type connectors. A listing of approved products include: Perminate Seal-Wire Connectors-Part #97811, Christy's (S-X), or approved equal.

38. Tracing Wire Mastic Tape Seal- Tracing wire mastic tape shall be 3M Mastic Tape #2229 or approved equal.

39. Valves

39a. Butterfly Valves- Butterfly valves to be used on diameters ranging from 16" to 72". A list of approved valves include: Pratt Ground Hog (Holiday free epoxy, interior lining and standard black asphalt varnish exterior), Mueller Lineseal III (Holiday free epoxy, interior lining and standard black asphalt varnish exterior), or approved equal. Certification shall be provided by the valve manufacturer stating the epoxy lining is holiday free. The epoxy coating shall be spark tested and approved for installation by the Environmental Utilities Department inspector.

39b. Gate Valves- Gate valves for 2"-21/2" services shall be N1BCOT-113 Bronze, or approved equal. Gate valves to be used on diameters ranging from 3" to 12" shall be grey cast iron or approved equal. A list of approved valves includes: M & H 4067 RW Gate Valve, Mueller-A-2360 RS Gate Valve, Clow, or approved equal.

39c. Two part epoxy repair kit shall be provided by valve manufacturer.

40. Valve Boxes- All valve boxes in street and other traffic areas shall be designed to H-20 loading conditions. A list of approved manufacturers and part reference numbers include: Christy (Type G5, Type B 17 by 30 H-20), BES, D&L (#K-6004), or approved equal.

41. Valve Extensions-Placer Waterworks extensions model PW/VE or approved equal.

42. Water Pipe Marking Tape-Approved manufacturers and materials include: Cal Pico Inc. (Tracer Tape-non-Detectable 12" width), Reef Industries Inc., Terra Tape Extra Stretch 450 Material, or approved equal.

43. Zinc Caps-A listing of approved manufacturers include: Mars, or approved equal. Part reference numbers are shown below:

43a. Mars:

- **i.** 7/16" to ½"—2.5 ounce weight
- **ii.** 5/8" to 1"—6.0 ounce weight

METER APPLICATION TABLE 1

Size	Classification	Meter Type [3,4]	Mtr Length	Meter Box [2]	Top of pipe to finish grade	-residential Dom.	-commercial Dom.	-residential Irrig.	-commercial Irrig.	Meter lid [1]
3/4"	PD	SRII TR/PL	9"	N-16	8"-10"	x	x	x	x	CI incert / Checker plate
3/4"	PD	SRII TRC	7 1/2"	N/A	Fire bypass					Fire backflow bypass
1"	PD	SR II TR/PL	11"	N-16	8"-10"	x	x	x	x	CI incert / Checker plate
1 1/2"	PD	SR TR/PL	13"	B-40 w/ext	10"-14"		x			Checker plate
1 1/2"	TURBO	W-120 w/strainer	13"	B-40	8"-10"				x	Checker plate
2"	PD	SR TR/PL	17"	B-40 w/ext	10"-14"		x			Checker plate
2"	TURBO [3]	W-160 w/strainer	17"	B-40	8"-10"				x	Checker plate
3"	TURBO [3]	W-350 w/strainer	19"	B-40 [5]	8"-10"		x		x	Checker plate
4"	TURBO [3]	W-1000 w/strainer	23"	B-40 [5]	8"-10"		x		x	Checker plate
4"	COMPOUND [4]	SRH Compound w/strainer	29 1/8"	B-48 w/ext	14"-16"		x			Kristy split-lid
6"	TURBO [3]	W-2000 w/strainer	27 1/8"	B-48	8"-10"		x		x	Checker plate/Split-lid
6"	COMPOUND [4]	SRH Compound w/strainer	33 1/8"	B-48 w/ext	18"-20"		x			Checker plate/Split-lid
8"	TURBO [3]	W-3500 w/strainer	30 1/8"	B-48	8"-10"		x		x	Checker plate/Split-lid
8"	COMPOUND [4]	SRH pre-fab pac	76 3/4"	10'x5' vault	18"-20"		x			H-20 2door spring load lid
10"	TURBO [3]	W-5500 w/stainer	41 1/8"	B-48	8"-10"		x		x	Checker plate/Split-lid
10"	COMPOUND [4]	FIRELINE-COMPACT	68"	9'x7' vault	30"-32"		x			H-20 2door spring load lid

Notes:
[1] Lid shall have probe hole for TR sensor
[2] Standard meter box for City of Roseville
[3] Turbo meters require internal strainers sizes 1 1/2"- 4"
[4] All compound meters require bronze bolt-up strainers
[5] Recycled water meters 3" and larger use B-48

by Mitch Prather