

APPENDIX B

STANDARDS AND SPECIFICATIONS

Sewer Service Line Construction
Water Service Line Construction
and
Water Meter Installation

1. General: All water and sewer service line construction and water meter installation shall be done in accordance with these Specifications. Not all matters can be covered by this Appendix, and the Builder/Contractor shall consult with the District's Manager and Superintendent as to new or revised standards prior to construction and installation. The scope of these Specifications shall include all new service line installations from the District mains to the associated plumbing of the building or any other facility requiring service.

It shall be the Builder's/Contractor's responsibility to protect a meter from freezing or other physical damage during construction. After completion of the construction and acceptance by the Owner, it shall be the Owner's responsibility to protect a meter from freezing or other physical damage.

2. Licenses and Permits Required: All water service installations shall be done by a Contractor who has an individual working for him that possesses a current master plumbers card associated with the Plumbing Trade and that such individual personally accomplishes or directly supervises the installation work.

A connection permit shall be secured from the District a minimum of 24 hours prior to construction at which time the Contractor shall familiarize himself with these Standards and Specifications; select and obtain approval of the appropriate standard water service installation for the building or facility; submit an appropriate set of mechanical plans; inform District personnel of the intended schedule for construction and present the appropriate trade card. See service line plan drawing requirements herein.

Where a street cut is required for a water service, the Contractor shall rebuild the road base in accord with Douglas County Road and Street Specifications and provide a permanent hot mix asphalt patch and obtain the appropriate permit. If hot mix is not available due to the time of year, a temporary cold asphalt patch may be installed. The

permanent patch shall be installed by the Contractor not later than the first of June following construction.

3. Inspection: All work shall be inspected by the District's representative who shall have the authority to halt construction when in his opinion these specifications or proper construction practices are not being adhered to. Whenever any portion of these specifications is violated, the District representative shall order further construction to cease until all deficiencies are corrected. No line shall be covered without the District representative's approval.
4. Specifications: All specifications or standards; i.e., ASA, AWWA, ASTM, etc., made a portion of these specifications by reference shall be the latest edition and revision thereof.
5. Water Service Line Installation and Specifications:

5.1 Minimum Sizing Criteria for Service Lines and Meters in Residential Areas: Note: the table below give minimum size permitted by District only. Lines may have to be oversized for low pressure areas or for other specific reasons.

Step 1 - Find the required flow from the following table:

<u>Number of Units Served</u>	<u>Flow per Unit in GPM</u>	<u>Total Flow in GPM</u>
1	15.00	15.00
2	8.75	17.50
3	6.67	20.00
4	5.63	22.50
5	5.00	25.00
6	4.58	27.50
8	4.06	32.50
10	3.75	37.50
11	3.64	40.00
12	3.54	42.50

Step 2 - Determine the distance from the main to the structure.

Step 3 - With the GPM and length of service line, enter the following table and determine the minimum size of service line and meter size.

<u>Flow Required</u>	<u>Length of Service Line - Feet</u>		
	<u>25</u>	<u>50</u>	<u>75</u>
<u>GPM</u>	<u>Line/Meter</u>	<u>Line/Meter</u>	<u>Line/Meter</u>
15	3/4 - 3/4	3/4* - 3/4	1 - 3/4
20	3/4 - 3/4	1 - 3/4	1 - 3/4
25	1 - 3/4	1 1/2 - 3/4	1 1/2 - 3/4
30	1 - 1	1 1/2 - 1	1 1/2 - 1
35	1 - 1	1 1/2 - 1	1 1/2 - 1
40	1 1/2 - 1	1 1/2 - 1	1 1/2 - 1
45	1 1/2 - 1	1 1/2 - 1	1 1/2 - 1
50	1 1/2 - 1 1/2	1 1/2 - 1 1/2	1 1/2 - 1 1/2
75	2 - 1 1/2	2 - 1 1/2	2 - 1 1/2
100	2 - 2	2 - 2	2 - 2

<u>Flow Required</u>	<u>Length of Service Line - Feet</u>		
	<u>100</u>	<u>150</u>	<u>200</u>
<u>GPM</u>	<u>Line/Meter</u>	<u>Line/Meter</u>	<u>Line/Meter</u>
15	1 - 3/4	1 1/2 - 3/4	1 1/2 - 3/4
20	1 1/2 - 3/4	1 1/2 - 3/4	1 1/2 - 3/4
25	1 1/2 - 3/4	1 1/2 - 3/4	1 1/2 - 3/4
30	1 1/2 - 1	1 1/2 - 1	1 1/2 - 1
35	1 1/2 - 1	1 1/2 - 1	1 1/2 - 1
40	1 1/2 - 1	1 1/2 - 1	2 - 1
45	1 1/2 - 1	2 - 1	2 - 1
50	1 1/2 - 1 1/2	2 - 1 1/2	2 - 1 1/2
75	2 - 1 1/2	3 - 1 1/2	3 - 1 1/2
100	3 - 2	3 - 2	3 - 2

* Use 1 inch line where static pressure is less than 50 psi.

NOTE: Builder should review all sizing over 1" to determine if adequate for specific use proposed.

5.2 Materials: Following are the materials approved for water service lines in the District, subject to the minimum standards thereafter referred to:

5.2.1 Corp. Stops: Mueller #H-15000, or Ford F-600, or equivalent.

5.2.2 Curb Stops: 3/4" and 1" Mueller #H-15200 or Ford Type 300, or equivalent.

5.2.3 Curb Boxes: Mueller #H-10350 1 1/2" shaft 4' X 5'6" exten., or equivalent.

5.2.4 Meter Settings:

5.2.4.1 Exterior pit type installation:
3/4" X 1" meters: Ford Copper
setter series, or equivalent. 80
with copper pack joint assemblies
(see Std. Dwg.)

1 1/2" and larger: Per Standard
Drawings.

5.2.4.2 Interior installation: 3/4" X 1"
meters: Ford Copperhorn with Ford
Ball Valve at meter inlet, Ford Ball
Valve with handle and drain at
outlet and pack joint assemblies for
upper tubing, or equivalent. Ball
Valve: Ford B-41-333 or BM-21-333,
or equivalent. Stop and Waste:
Ford B-11-233 or equivalent.

5.2.5 Meters:

5.2.5.1 Full 3/4" to 1 1/2" "BADGER" Read-o-
Matic, self-generating remote
readout and frost protection base,
or equivalent. Mounted between 1
foot and 5 feet of floor elevation.
Maximum remote readout distance -
125 feet.

5.2.5.2 2" meters and larger - compound as
approved by the District Manager.

5.2.6 Meter Pits:

5.2.6.1 Standard for 3/4" and 1" meters
without pressure reduction.

a. Pits 20" I.D. X 5' (5 cement
rings)

b. Covers: Cast iron 24" - double
lids (Comco Inc. or equivalent.)

5.2.6.2 Standard for 3/4" and 1" meters with
pressure reduction

a. Pits: 30" I.D. X 6' (3 cement
rings)

b. Covers: Cast iron 24" - double
lids (Comco Inc. or equivalent.)

- 5.2.6.3 For 1 1/2" meters with and without pressure reduction (see Standard Drawings)
- 5.2.7 Service Saddles: Smith Blair #323 - double strap (cc thread), bronze, or equivalent.
- 5.2.8 Backflow Protection Device: Watts No. 7 Double Check Valve.
- 5.2.9 Pressure Regulating Valves: Watts USB, Watts 25AUB, or Wilkins #70 Series with thermal bypass.
- 5.2.10 Service Lines: Main to House: Type K copper (ASTM B251) with flared connections, tested to main pressure before covering.
- 5.2.11 Water Meters and all required accessories Purchased from the District
- 5.2.11.1 The District has in stock 3/4" water meters, regulators, meter horns, wire, calves, for the typical house meter installation as required by the District. Other size meters and costs are available upon request.

Plumbers, contractors, and property owners may purchase water meters from the District for use within the District's service area.

5.3 Installation

- 5.3.1 Remote Readouts: All water service installations shall have a remote readout located near the similar power and gas service installations. The readout unit shall be installed on the building at a height of 5'0" above the ground. The maximum remote distance from the meter shall be 125 feet.
- 5.3.2 Location and Alignment of Service: Water service lines shall be located so as to take the shortest, most direct path (preferably perpendicular to the main) from the curb box, if existing, or the water main to the house. The water line shall not be located under any paved driveway or service road. If curbs exist, the curb shall be marked with a chiseled "V" at the point where the line

crosses under the curb. All water service lines shall have a minimum cover 6 1/2 feet and shall be insulated in rock formation with Armaflex or comparable insulation. Water service is not allowed across property other than that being served, without prior approval of the District. Water and sewer services shall have parallel path separation of at least ten feet.

- 5.3.3 Service Stub-ins: Curb stops and boxes are required in all service installations, with the curb box located on public right-of-way or District easement. All lines shall extend from the curb box to the building/facility utility area and terminate with the standard meter mounting horn. Mounting horn to be installed not less than one (1) foot from floor and not higher than five (5) feet above floor. Meters must be installed in such a manner to allow accessibility to the meter and to shut-off valves on either side of the meter. Exterior pit type installations shall be allowed only when a meter would otherwise have to be mounted in an unheated and inaccessible crawl space, in which case the service line terminates at the meter pit and horn assembly. Commercial service stub-ins (1 1/2 inch line or larger) shall terminate at a curb stop and box. Curb boxes shall be three(3) inches above grade if located in earth. If curb boxes are located in a driveway or any other area, they must be flush with the surface.
- 5.3.4 Main to Curb Stop: Service lines from the main to the curb stop and from curb stop to meter horn assembly shall be one continuous length of pipe without joints or connections.
- 5.3.5 Meter Horn to House: The service line (authorized pit installations) from the horn assemble to the house shall be continuous without joints.
- 5.3.6 Remote Signal Cable: Shall be installed by the Contractor. If an interior meter installation, the signal cable shall be roughed in the shortest path from the utility room (meter location) to the location where all other utilities are to be read, and daylight to the outside of the building at a

height of 5 feet above the ground surface. If an exterior installation, the cable shall be laid in a 3/4" plastic conduit underground with 12 inches of cover and in the shortest path from the meter pit to the location on the building where other utilities are to be read and at a height of 5 feet above the ground surface.

5.3.7 Meters and Remote Readouts: Shall be installed in the presence of the District representative. The operational testing of the meter and readout shall be demonstrated at this time.

5.3.8 Minimum Cover Requirement: 6 1/2 feet over the pipe.

5.3.9 Pressure Reduction: A pressure reducing valve shall be installed in the copper service line just ahead of the meter installation when the meter elevations are less than 7,739 feet above sea level.

6. Sewer Service Line Installation and Specifications:

6.1 Materials:

CIP - Class 22 ASA Specs A21.6 or A21.8
PVC - ASTM Specs D-30 34-73 and SDR-35
No clay pipe permitted.

6.2 Minimum cover required: 30 inches.

6.3 Clean out required at foundation and then for each 100 feet of length: extend 3" above grade and cap as approved by the District.

6.4 Saddle Tap requires: 2 stainless steel bands, 45 degree saddle with rubber gasket or PVC compatible adhesive ASTM #D=2564.

6.5 Size: 4" gravity, 2" pressure (pressure lines have different specs than those listed above).

6.6 Backfill: exclude rocks, ice, trash, for a minimum of 12 inches above each side of the pipe. Pipe should be bedded according to manufacturers recommendations.

6.7 Grade: at a minimum a uniform drop of 1/4 inch per lineal foot.

- 6.8 Cast iron pipe must extend 5' through foundation wall; minimum cover - 30 inches.
- 6.9 Inspection must be made by District representative before backfilling.
7. Maintenance of Traffic: to avoid interference with traffic, the following conditions shall be met:
- 7.1 Street service cuts shall be open only between 8:30 a.m. and 4:00 p.m. Only one side of a street in a block may be closed at any one time.
- 7.2 Adequate barricades, signs and warning devices as required by the District shall be placed and maintained during the progress of the work.
- 7.3 Permit to cut pavement must be obtained from the Douglas County Highway Department prior to installation of lines. Permit must be shown to the District's Superintendent or Manager before commencing construction.
8. Excavation: Excavation of the trench shall be done in a workmanlike manner providing a trench that is straight and true with a flat bottom containing no rock or other deleterious material that would damage the pipe, and providing for a minimum of 6 1/2 feet of cover over the pipe. All excavated material shall be stockpiled in a manner that will not endanger the work nor obstruct sidewalks, driveways or streets, and the work shall be carried on in such a manner as to cause the least possible interruption to traffic.
9. Tapping the Main: Tapping of all mains and installation of corporation stop, to and including two-inch diameter, shall be coordinated with District personnel. Notification shall be given to the District 24 hours prior to need to provide ample time for the District personnel to respond.
10. Backfill: Backfill material in streets shall be "Special Backfill Material" as required by the Douglas County Engineering Department. Colorado Department of Highways, Class 5 or 6 base course may be used in lieu of "Special Backfill Material."
11. Surface Restoration: Paving, curb and gutters, sidewalk, improved surfaces, or other street improvements removed, damaged or destroyed during construction shall be replaced to the same elevation and alignment, with the same type and dimensions of units removed, and shall be equal to and consistent with the undisturbed portions of the improvements

existing prior to trench excavation. Subgrade for all restored surfaces shall be thoroughly compacted by mechanical or hand tampers weighing not less than 20 pounds, by vibratory rollers, or by other proposed means of compaction acceptable to the District representative.

Debris shall be removed from the site of the work at the expense of the contractor.

12. Maintenance of Backfill and Surface Warranty: All backfill shall be maintained in a satisfactory condition, and all places showing signs of settlement shall be filled and maintained during the life of the contract and for a period of one year following the date of final acceptance for all work performed under this contract, except the warranty period for settlement in asphalt surfaced streets shall be two (2) years. When the developer or contractor is notified by the District that any backfill is hazardous, he shall correct such hazardous condition at once.

13. Prohibited Practices:

- 13.1 Grounding electrical system to the water service line.
- 13.2 Turning on the water service at the curb box by other than District personnel.
- 13.3 Connecting storm drains into sewer system.
- 13.4 Crossing of water and sewer service lines, unless approved by the District.
- 13.5 Sweated or solder fittings ahead of the pressure reducing valve.
- 13.6 Connecting to existing pig-tail at curb stop.
- 13.7 Clay pipe for sewer service lines.

14. Service Line Drawing Requirements:

- 14.1 Service line drawings showing the location of these lines and facilities shall be prepared by the contractor or owner, which drawings will be kept on file at the District's office.