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CHAPTER 7

WASTEWATER SERVICE INSTALLATION

7.01 Service Lines. All new service lines, replacement, repair or modification must be approved and inspected by the Colorado Springs Utilities, Inspection, LYSC, 1521 Hancock Expressway. [All necessary permits and fees must be obtained prior to inspection]. Bedding standards for service lines and stubs, reference Chapter 2 – Select Bedding Material.

Any alteration/modification to an existing wastewater service line requires that the developer/property owner obtain a (wastewater connection/disconnection) permit from Contract Administration, 2880 International Circle before commencing any work.

NOTE:

- (a) Call by 8:00 a.m. to notify of addresses for work each day, for same day inspection of service connections, a second call is required when the wastewater service line is ready for inspection. (Note: For same day inspection the call must be received before 2:00 p.m. the day of inspection)
- (b) Call dispatch at 668-3524



Service Lines Inspection after business hours:
For Emergency Service Line inspection during evening hours, weekends and holidays. Call the Colorado Springs Utilities, One-Call center at 448-4800 to arrange for a Service Line Inspector to be on-site.

Service Stub. The Wastewater Service line from the main to a point inside the property, see Wastewater Detail Drawings, C 5-2, 3, 6-7. (For deep basements, the elevation of the service stub shall be located or verified prior to construction to ensure correct grade and drainage).

1. Tracer wire is to be installed with all sanitary sewer main lines and service lines (from the main line to the building structure), reference Wastewater Detail Drawing C 3-2 for manhole configuration and detail C 5-4 – Sanitary Service Clean-out with tracer wire.
2. Wastewater service to be located in the center of lot or the center of the driveway for a flag lot. (Wastewater Detail Drawings C 5-1,3)
Alternate service location, is only with the approval of Colorado Springs Utilities shown on drawing C 5-1 i.e. 15' above the low property line (downhill to sewer main) and water services 1 foot above sewer services unless otherwise shown. (Note: Alternate service location to be used on sites with steep grades).
3. Re-design or re-grading of a lot after the service stub is installed requires re-submittal of a grading plan for review/approval by the Colorado Springs Utilities.

General Notes for Sanitary Sewer Service Lines

(To be added to Service plans, ref: Wastewater detail drawing C 5-1, 2, 3, 4)

The Contractor shall notify the Colorado Springs Utilities, Dispatch (668-3524) 48 hours prior to the start of construction to outline methods of construction, materials to be used, construction staking.

1. Wastewater services to be located in the center of the lot, or the center of the driveway for a flag lot. (per Wastewater detail drawing C 5-1)
Note: Alternate service location, is only with the approval of Colorado Springs Utilities shown on Wastewater detail drawing C 5-1.
2. Sanitary Sewer services to be installed a minimum of 7 feet into the property unless otherwise shown, Water service lines shall be installed to the property line i.e. curb stop box, See Note 8 below.
3. Property end of all sewer services to be marked with a 2"x 4"x12 foot wood post extending vertically from flow-line.
4. Final location of all sewer, water and gas services to be approved in the field by the Colorado Springs Utility Inspector.
5. Utility locations, whether or not shown on this plan, in no way relieves the contractor from the responsibility of calling for and obtaining utility locations from the appropriate authorities prior to beginning excavation.
6. Sanitary Sewer service connections to be connected at a minimum of 5 feet from any manhole on the main line and two (2') feet between taps center to center.
7. All cleanouts shall be the same size as the host pipe (i.e. 6" service line requires a 6" clean-out, to be installed per Colorado Springs Utilities standard detail C 5-4).

The proposed structure (as shown below) is to be indicated on the proposed development plan, based on its design, then the following service line connection will apply, with the approval of Colorado Springs Utilities. The services line shall be defined as public or private main connections on the proposed development plan, with the necessary signature blocks, a copy of the proposed homeowners agreement should be included with the development plan, prior to final signature by Colorado Springs Utilities (if required). (Reference City Code Chapter 12.5.407, Service Lines; Separate for each building; Exceptions)

Definition:

- Condominium – any of the separate owned units in a multiple-unit dwelling
- Townhouse – two story dwelling in a complex of such houses
- Apartment Building – a multiple-unit dwelling on a single lot
- Patio Home – a separate dwelling unit

<u>Type of Service</u>	<u>Type of Service Connection Required</u>
Condominium	*Combine service connection to main line (Common or manifold system acceptable with a clean-out on each lateral and on manifold)
Townhouse	Individual services to main line
Apartment Building	Combine service connection to main line
Patio Home	Individual service to main line
Commercial Building	Individual service to main line
School	Individual service to main line

* With Home Owners Agreement

Note: Separate lots require separate services, if lot is subdivided then additional services must be added.

7.02 Connections (All new service lines, taps, service stubs and, where applicable, service line replacements).

- a. Colorado Springs Utilities (and service inspections) must approve all Service plans. The maximum length of a service line shall be four (400') hundred feet from the main line connection, to the final clean-out at the building, unless otherwise approved by Colorado Springs Utilities. **as defined in the City Code, Chapter 12.5.401 (Connection required:).**All fees and connection charges due must be paid before connection can be made.
- b. **Permits.** Permits must be applied for at Contract Administration, 2880 International Circle, and paid for at least twenty-four (24) hours prior to connection. An additional permit is required for any excavation in the right-of-way, paved or unpaved, required from City Engineering, County, State, or controlling authority. Upon approval of such application, the permit shall only be issued to a licensed **master plumber** as defined in the City Code, **Chapter 12.5.402 (Connection or Disconnection; Permits :).**
- c. All service connections on wastewater mains within the City of Colorado Springs Collection System shall be made by the Contractor, and inspected by Colorado Springs Utilities.
- d. No wastewater taps or service lines shall be made unless property corners are clearly marked so measurements of taps can be made, at the time of tapping. (Reference Wastewater detail drawing number C 5-1)
- e. Excavation of the tapping hole is the responsibility of the licensed Excavator/Contractor.
- f. Minimum size tap for a wastewater service shall be four (4") inches and shall be performed with a hole saw, core drill, **size, four and one-half (4 ½") inches.**
- g. **Disconnection and Reuse of Existing Service line:** In the event that a user desires to disconnect user's premises from the wastewater system, the contractor shall expose the service line seven (7') feet inside the property line unless otherwise specified by Springs Utilities and shall be capped with a water tight/air tight plug.

Reuse of disconnected sewer services is at the sole discretion of Springs Utilities. Springs Utilities will only consider the reuse of existing services under the following conditions.

- 1.) The existing service is the appropriate size to provide the needed capacity to service the proposed land use.
- 2.) If the Property Owner wishes to reuse a service that is disconnected but not abandoned the owner at their expense shall clean and CCTV the service pipeline to the tap at the public main. After review of the CCTV tape by Springs Utilities, Planning and Engineering staff it is found that the service has no deficiencies as defined by NASSCP standards or that the deficiencies are corrected (All repairs shall be completed per section 7.05) the Owner may reuse the existing service line.

Service lines will be reviewed for pipe materials, structural integrity, and operational effectiveness. Examples of unacceptable conditions that would not allow the service to be reused are, Materials such as "orangeburg" pipe, Structural integrity such as offset joints or fractured pipe and Operational effectiveness such as heavy root intrusion. Reuse of an existing sewer service is at the owner's risk.

Services found to be unacceptable shall be abandoned by being capped or plugged with a watertight/air tight permanent plug at the public main at the expense of the owner. Colorado Springs Utilities shall inspect the work prior to the backfilling of the excavation.

- h. Abandoning Existing Connections.** Where an existing wastewater service is to be abandoned, the owner of the property shall be totally responsible for expenses. A service shall be considered abandoned when the service has been capped or plugged with a water tight/air tight permanent plug at the public main or the service has not been in use for more than (10) ten years. Otherwise the service shall be considered disconnected with the intent to be reused. See 7.02 (g).
- i. Individual Service Pumps.** Where site conditions require the external installation of individual pumps to service a structure, the Contractor shall submit to Colorado Springs Utilities Inspections Section a set of shop drawings detailing the installation and shall include:

 - 1. A site map showing the location of all the facilities to be installed including the location of the tap to the public wastewater main.
 - 2. A complete listing of equipment to be installed; including the number and type of pumps, controls, alarms and valves. A Colorado Springs Utilities Inspector shall inspect any pump station outside of a building; the Regional Building Department shall inspect all service pump lines inside a building.

7.03 Wastewater Service Line Excavations (all new and replacement service lines).

- a.** Excavation, safety, and backfilling, to include proper compaction of wastewater service line ditches, are the responsibility of the Plumbing or Pipeline Contractor, in accordance with these standards and those of the governing body in whose jurisdiction the work is being done, i.e. City of Colorado Springs, El Paso County or State of Colorado.
- b.** Wastewater service line ditches must enter the lot as near ninety (90) degrees to the street as is practical and not at an extreme angle unless otherwise approved by Colorado Springs Utilities. The standard location for the service line will be the center of the lot unless it is in a Hillside Overlay Zone and/or approved by Colorado Springs Utilities. (Reference Wastewater detail drawing number C 5-1)
- c. Water Service Line Ditches and Separation of Water Service and Building Sewer.** The water service line and the building drain or building sewer shall be not less than ten (10') feet apart horizontally and shall be separated by undisturbed or compacted earth. The water service line may be placed in the same trench with the

building drain or building sewer provided approval is given by Colorado Springs Utilities and the following conditions are met:

1. The bottom of the water service line at all points shall be at least twelve inches (12”) above the top of the sewer line at its highest point. (Reference Wastewater detail drawing C 5-5) The water service line shall be placed on solid shelf excavated at one side of the common trench (Reference Wastewater detail drawing C 5-5).
 2. The number of joints in the wastewater main or wastewater service line shall be kept to a minimum.
 3. The materials and joints of sewer and water service lines shall be installed in such a manner, and shall possess the necessary strength and durability, to prevent escape of solids, liquids and gases therefrom, under all known adverse conditions such as corrosion, strains due to temperature changes, settlement, vibrations and superimposed loads. All service laterals shall be installed at a forty-five- (45) degree angle to the axis of the pipe.
 4. The water and wastewater service lines can be at the same elevation providing that the sewer service material Schedule 40 PVC and type “k” copper and materials approved for the water service pipe by Colorado Springs Utilities. (Reference Wastewater Construction drawing C 5-5)
- d. **Boring wastewater service lines.** Boring, pipe-bursting or micro-tunneling of wastewater service pipelines require prior approval by Colorado Springs Utilities (Reference Chapter 8.03 - Rehabilitation of Sanitary Sewer mains and services by the Pipe Bursting and Trenchless pipe replacement method and Wastewater Construction drawings C 1-9,1-10). The contractor shall be responsible for the construction and installation of the service line to ensure that the line has no high or low sections within the line. The contractor shall be responsible to repair any deficiency found during inspection, before approval is granted by Colorado Springs Utilities.

7.04 Service Line Installation and Material (all new and replacement service lines).

- a. **Minimum Size.** Wastewater gravity service lines shall be a minimum of four inches (4") in diameter (excluding 3" lines used with grease and sand/oil interceptors). Service lines eight (8") inches and greater shall require a designed plan and profile drawing; and shall conform to main line standards, reference Chapter 3 of these standards. The designing engineer shall specify pressure pipelines.
- b. **Material.** Wastewater service lines shall be constructed of the same material as the public main or Colorado Springs Utilities approved material. (Reference Chapter 5 – Materials)
- c. **Tapping Saddle.** Wastewater service lines shall be constructed with a Colorado Springs Utilities approved wastewater service tapping saddle tee. The service line shall be connected to the main sanitary sewer line and a minimum distance from the manhole of five (5') feet; service lines shall not be connected directly into a manhole. Individual service line taps shall be a minimum of twenty four (24") inches apart center to center. Service taps shall be made above the spring line of the wastewater main. At no time shall the service be side tapped into the main without specific approval of the Wastewater Planning and Design Section. No pre-manufactured wye fittings are to be installed in-line. The tapping saddle shall be installed as per detail D 1-1. No "side taps" shall be allowed without approval of the Wastewater Planning and Design.
- d. **Installation Method.** All wastewater service lines shall be installed using the same methods as the public main.
Service line materials for shallow depths, in traffic areas.
 Flowable fill shall be used for service lines from the "spring line" to one (1') foot above the crown of pipe.

0' – 2' deep	Cast or Ductile Iron with select bedding
2' - 4' deep	Schedule 40 pipe with select bedding
4' – 6' deep	Schedule 35 pipe with select bedding
- e. **Slope.** Wastewater service lines shall be installed at the following minimum slopes:

4" PVC	2.08% or 1/4" per foot
4" Ductile Iron or Cast Iron Pipe	1.04% or 1/8" per foot
6" Pipe	1.04% or 1/8" per foot
8" or larger pipe	1.04% or 1/8" per foot – Plan and profile required

- f. **Alignment.** Changes in alignment for service lines shall be accomplished with preformed bends not to exceed 45 degrees. When changes in direction exceed 45 degrees, a two-foot (2') section of pipe shall separate the fittings necessary to make the needed change of direction. All wastewater services shall be extended seven (7') feet inside the property or two (2') feet inside the easement line and be marked/located with a 2"x 4" post. (Refer Wastewater detail drawing number C 5-1, 2, 3)

- g. **Clean Outs.** All wastewater service lines shall have a clean out every one-hundred (100') feet, and shall be the same size as the host pipe (i.e. 4" service line requires a 4" clean-out). All clean outs shall be constructed with standard fittings and have a screw cap located at the ground or paving surface. All residential buildings shall install a two way clean out, located approximately two (2') feet outside the house foundation. (Reference Wastewater detail drawing C 5-4, Typical Sanitary Sewer Service Clean Out Detail) Clean outs on sanitary sewer main lines are prohibited. The size and location of clean-outs shall be shown on Commercial Service plans.

- h. **Connecting Clamps.** All wastewater service line connecting clamps shall have the "UPC" designation and be made for the pipeline materials used, and be encased with 6" concrete around the clamp.

- i. **Inspection.** All wastewater service lines shall be inspected and approved by Colorado Springs Utilities, Inspection, LYSC, 1521 Hancock Expressway.

7.05 Repair and Replacement of Existing Service Lines.

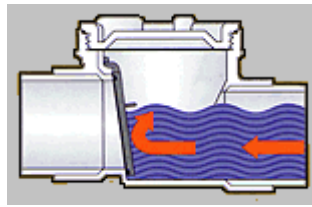
- a. **Property Owner's Responsibility.** The property owner is responsible for the repair and maintenance of the wastewater service line from the house or other building to the public main, including the service tap.
- b. **Pipeline Contractor's Responsibility.** The Pipeline Contractor shall make the necessary excavations and barricade all excavations in accordance with the barricading instructions of the governing body, make the necessary repairs and contact Colorado Springs Utilities for an inspection.
- c. **Surface Restoration and Maintenance.**
 1. **Surfaced Areas.** The contractor shall obtain the necessary permits and remove pavement and road surfaces as part of the trench excavation. **As a minimum, cuts in a Public right-of-way shall be required to be restored as-per the conditions of the Excavation Permit issued by the City of Colorado Springs, Engineering Division or the controlling authority.**

The contractor shall restore all pavement, sidewalks, curbing, gutters or other surface structures removed or disturbed as part of the work, to a condition meeting the standards of the governing authority, and shall furnish all incidental labor and materials.
 2. **Unsurfaced Areas.** All surface cuts shall be restored to a condition equal to that prior to construction.
 3. **Damaged Surfaces and Property.** If any pavement, street, shrubbery, sod, rock, fences, poles or other property and surface structures have been damaged, removed or disturbed by the contractor, whether deliberately or through failure to carry out the requirements of the controlling agency or the specific directions of Colorado Springs Utilities, or through failure to employ usual and reasonable safeguards, such property and surface structures shall be replaced or repaired to the original condition, at the expense of the contractor. The property owner is responsible for all damages that may occur to other property, real or personal, including property of the City that was caused by failure to repair and maintain the wastewater service line.
 4. **Inspection.** Colorado Springs Utilities inspection section shall inspect all wastewater service lines. The inspection shall include an inspection of the sewer service line from the public main, including the tap, to the house.

7.06 Backwater (Backflow) Valve for Sanitary Sewer Service Lines.



Open Backwater Valve (normal flow)



Closed Backwater Valve

General – The purpose of this specification is to provide information for the design, layout and construction of Backflow Prevention Devices that will meet the requirements for access, cleaning, and repair.

Typical Design – Backwater (Backflow) Prevention Device shall be made up of:

1. Backwater (Backflow) Valve
 2. Clean Out(s)
 3. Standard four (4') foot diameter manhole
 4. Minimum of eight (8') feet of PVC Service Line.
- a. Fixture Branches. Backwater valves may be installed in the branches of the building sanitary sewer service lines, which are below grade.
 - b. Diameter. Backwater valves, when fully opened, shall have a capacity at least that of the pipes in which they are installed.
 - c. Location. Backwater valves shall be installed to be accessible for maintenance.
 - d. All backwater valves shall conform to ASME/ANSI A 112.14.1-1975, IAPMO PS 38-99.
 - e. Backwater valves shall have all bearing parts of corrosion resistant material.
 - f. Use for gravity flow only, not for pressurized applications.

Layout – The standard layout shall be that the four (4') foot diameter manhole be centered over the eight (8') foot section of PVC service line and that the back flow prevention device and the Clean Out be located inside the manhole. The Clean Out shall be twelve (12") inches upstream of the Backflow device. (Reference: Wastewater detail drawing C 2-5 for schematic of manhole configuration)

Installation – The manhole and service line shall be installed as per the Wastewater Line Extension and Service Standards for the installation of Sanitary Sewer mains and Services. The installation of the Backflow device shall be per the manufacture's recommendations. All installations shall be able to be accessed by a sewer cleaning truck and shall not be blocked by walls, landscaping or other structures. A licensed plumbing or pipeline contractor shall do all installations. After significant rainfall events or at least once every 6 months the backwater valve should be inspected.

Inspection – All work shall be inspected by Colorado Springs Utilities Inspection at LYSC, telephone 668-3524. **The Contractor shall give the Colorado Springs Utilities Inspection, 48 hours notice prior to the start of any work.**

Materials –

- Pipe, 4 inch or 6 inch PVC SDR 35
- Manhole, 4 foot inside Diameter Pre-cast manhole with cast iron ring and cover (Reference: Wastewater detail drawing C 6-1, if required)
- Clean out, All clean out shall be constructed with standard fittings and have a screw cap (Reference: Wastewater detail drawing C 5-4)
- Connecting Clamps, all wastewater service line clamps shall have the “UPC” designation and be made for the pipeline materials used.

Colorado Springs Utilities approved manufacturer. The following are approved for installation within the Colorado Springs Utilities Wastewater Collection System:

Jones Stephens Corp. - PlumBest Backwater Valves (4” or 6”)
4” PVC – B04-400
6” PVC – B04-600

Sioux Chief Manufacturing Co., Inc - DWV Backwater Valve (4” or 6”)
4” PVC – 869-4P
6” PVC – 869-6P

Canplas Inc - DWV Backwater Valve (4” or 6”)
4” PVC - 223284W
6” PVC - 223286W

Alternative Backwater Valve system (for shallow pipes) with the approval of Colorado Springs Utilities.

Clean Check™, Inc. – Extendable Backwater Valve (to be inserted into 6” PVC pipe)
4” PVC – EBV –P401

Canplas Inc - Clean Check™, – Extendable Backwater Valve
4” PVC – 223274W

(Check manufacturer installation guidelines prior to installation)

Recommended Installation procedure for the Extendable Backwater Valve

1. Install the valve body in the sewer lateral with the “FLOW” arrow on the body pointing downstream. Use an approved solvent cement as per the manufacturer’s recommendations.
2. Rotate the valve body until the 6” opening is facing directly upward. A level may be used across the top of the body valve to verify horizontal positioning.

3. Cut the 6" riser pipe to the required length. Insert and cement while keeping the inside of the valve body clean of debris.
4. Cut the 4" insert pipe to a length (3 ½ ") shorter than the uninstalled 6" riser pipe.
5. Cement the flapper assembly to one end of the 4" insert pipe.
6. Cement the collar to the other end of the 4" insert pipe. Align the center of the finger hole with the center of the flapper on the opposite end.
7. When dry, slide the 4" insert pipe - flapper assembly first - into the 6" riser pipe with the flapper facing the inlet side of the valve body. Lower the 4" insert pipe until it rests on the seating area of the valve body. Seat the flapper assembly by rotating as necessary until it locks in place. Visually inspect that the flapper assembly is installed correctly.
8. Prior to installation of the 6" threaded adapter (with the 4" insert pipe properly installed) cut a reference notch into the 6" riser pipe. This saw cut notch should be aligned with the molded notch in the 4" collar. For future removal, alignment of the notches will quickly indicate that the flapper is seated correctly.
9. **Important:** Tighten the 1/4" Stainless Steel thumbscrew until it seats snugly against the 6" riser pipe, fixing the 4" insert pipe in place.
10. Cement the 6" threaded adapter to the 6" riser pipe to complete installation and screw the 6" threaded plug into the threaded adapter.