

JOHNSON COUNTY  
UNIFIED WASTEWATER DISTRICT  
SERVICE LINE DESIGN AND CONSTRUCTION STANDARDS  
FORWARD

The following Design and Construction Standards adopted by the Board of County Commissioners on June 2, 1988 are intended as an update guideline for the design and construction of building (house) sewer lines. These standards replace, in part the present building sewer line specifications adopted the 30th day of November, 1959, and the Service Line Design and Construction Standards adopted October 14, 1982.

SECTION 1. MATERIALS

A. Pipe, Fittings, Joints

1. Acrylonitrile-Butadiene-Styrene (ABS) Sewer Pipe & Fittings.
    - a. ASTM D 2751-83a SDR 23.5
    - b. ASTM D1527-77 Schedule 40
    - c. ASTM F628-84 Foamed Core DWV
    - d. ASTM D 2661 DWV

ABS Joints  
Joints shall be solvent-cemented. The cement shall meet the requirements of ASTM D 2235.
  2. Ductile Iron Gravity Sewer Pipe (DIP) ANSI/ASTM A746/747 class 50 or class 51  
DIP Fittings/Joints ANSI A 21.11
    - a. Pipe and fittings shall have mechanical or push-on joints (Hub-less is not allowed)
    - b. Gaskets shall be neoprene or other synthetic rubber

DIP Coatings  
c. All DIP pipe and fittings shall be furnished with a 1 mil (.025mm) thick bituminous coating.
3. PolyVinyl Chloride (PVC) Pipe & Fittings Cell Class 12454 B.
  - a. ASTM D 2241 SDR-26
  - b. ASTM D 1785 Schedule 40
  - c. ASTM D 3034 SDR-26

PVC Joints  
Joints shall be of a push-on type with a bell-end grooved to receive a synthetic rubber gasket. Solvent welded joints are not allowed. The joint shall be made in accordance with ASTM D 3212.
4. Vitrified Clay Pipe (VCP) ASTM C 700 extra strength  
VCP Fittings
  - a. Fittings shall conform to ASTM C 700 extra strength

VCP Joints  
b. Joints for VCP pipe shall be compression type with synthetic rubber seals.

B. Pipe Embedment

1. Bedding Aggregate
  - a. All material used for pipe bedding shall be crushed stone with 95% passing 3/4" sieve and 95% retained on a No. 4 sieve (1/2" to 3/4" clean crushed rock)
2. Haunching and Initial Back fill aggregate
  - a. Where granular material is required for haunching and initial backfill, it shall conform to the bedding specification.
3. Groundwater Interruption Barrier.
  - a. A groundwater interruption barrier shall be installed for a minimum length of four (4) feet as measured along the sewer service line. The upstream end of the barrier shall begin at a point where the sides of the sewer trench consist of undisturbed earth, not previously excavated for footing or foundation construction.
  - b. The groundwater interruption barrier shall consist of one of the following:
    1. Concrete Encasement. The service line shall be fully encased in concrete having a minimum compressive strength of 2500 pound per square inch (psi). Encasement shall be poured against undisturbed earth on the bottom and sides of the trench and poured to a depth of 6 inches above the top of the pipe. Encasement shall begin and end at a pipe joint, fitting, or other point of flexibility for deflection. The pipe shall be anchored to prevent flotation during the placement of concrete. Backfill above the concrete encasement wall consist of compacted earth material only; no gravel shall be used for a depth of at least two feet over the top of the pipe.
    2. Compacted Clay. The service line shall be installed on clay embedment compacted to a minimum of 95% standard density as established by AASHO Standard Method T-99. The clay embedment shall be free of rocks and stones having a dimension larger than one inch, and shall be compacted by hand tamping under and around the sides of the pipe in lifts not to exceed six (6) inches. The pipe shall be fully supported by the clay embedment to the springline for rigid pipes and to the top of pipe for flexible pipe materials. Above the support limits, the clay shall be compacted to a minimum of 90% standard density (AASHO Std. Method T-99) in lifts not to exceed eight (8) inches, and shall continue to a testing laboratory may perform in-situ density tests to verify compaction in accordance with specified limits. The cost for tests whose results indicate failure to achieve the specified compaction limits shall be paid for by the permit applicant.

SECTION II. INSTALLATION

A. Maximum Trench Width

1. The maximum allowable trench width below a horizontal plane 6" above the top of pipe shall be 30 inches.

B. Pipe Bedding

1. The thickness of bedding material below any type of pipe shall be a minimum of 4 inches. The bedding material shall be placed before installation of pipe in the trench and shall be prepared to provide a continuous pipe support between pipe bells and joints. If unsuitable subgrade conditions are encountered, additional granular material shall be added to provide support for the pipe.

C. Pipe Jointing

1. ABS (Solvent Weld Only)
  - a. Apply cement to the outside of spigot and inside of coupling in sufficient quantity so that when the spigots fully inserted into the coupling a bead of excess cement will form around the pipe. Make joint within one minute by shoving spigot home with one-quarter rotation. Care should be taken to keep the joint free of water and dirt while making the connection. Make sure that the pipe marking is visible for material verification by the District. Remove excess cement from joint exterior with a clean, dry cloth. The joint shall not be disturbed for 15 minutes after assembly.
2. PVC (Gasket Joint Only)
  - a. Clean and dry surfaces of all joint components. Apply approved pipe lubricant immediately before jointing. Lubricate according to manufacturer's recommendations. Keep the lubricant and joint surfaces free from foreign material.
  - b. Align the pipe section and insert the spigot straight into the bell until the spigot insertion mark is flush with the entrance of bell. Do not swing or stab the joint.
  - c. Check for proper jointing and gasket seating after joint assembly by rotation of the spigot by hand for one-fourth (1/4) to one half (1/2) turn. Make sure that the pipe marking is visible for material verification by the District.
3. DIP (Push-On Joint)
  - a. Clean the groove and bell socket and insert the gasket, making sure that it faces the proper direction and is correctly seated.
  - b. Clean any dirt or foreign material from the plain end and apply the lubricant as recommended by the pipe manufacturer.
  - c. Push the plain end into the bell of the pipe keeping the joint straight while pushing. Make any necessary deflection after the joint is assembled.
4. DIP (Mechanical Joint)
  - a. Clean the socket and plain end of all dirt and foreign materials.
  - b. Lubricate the plain end, bell socket and gasket as recommended by manufacturer.
  - c. Place the gland on the plain end with the lip extension toward the plain end. Follow gland installation by placing the gasket with the narrow edge toward the plain end of the pipe.

- d. Push the pipe into the bell socket. Press the gasket around the entire socket. Push the gland up to the bell and center on the pipe.
  - e. Insert and hand-tighten the bolts until all are even. Tighten the bolts evenly with a torque wrench to the manufacturer's torque specifications.
5. VCP (Plain End)
- a. Clean joint contact surfaced prior to jointing. Use manufacturer's recommended lubricant.
  - b. Align the pipe section and insert the spigot straight into the premolded joint ring until insertion mark is flush with the joint ring.
6. Special Joints
- a. Where two different types of pipe material are to be joined or where the pipe size is enlarged or reduced, fittings (See Section I Materials) designed for such use shall be utilized. Flexible couplings of an approved design (i.e. Mission Couplings, etc.) will be allowed.
  - b. No right angle (90°) bends shall be installed. When making a bend that is equal to 90° two (2) 45° bends with a minimum of one (1) foot of pipe between the bends is required.
- D. Taps and Saddles
- 1. Permission, Usage, Type
    - a. No taps shall be made on the District's lines without approval by the District.
    - b. Taps will not be allowed on any pipe 18 inches or larger.
    - c. Taps shall be made on the main above the center line of the pipe at 45° from the horizontal.
    - d. Saddles shall conform to the strength and dimension requirements outlined in the Material section of this document and shall be a design approved by the District.
    - e. The service line should be ready for inspection when the inspection of the tap hole is made.
  - 2. VCP Tap
    - a. All taps made on a VCP main shall be machine tapped.
    - b. The main shall be exposed six (6) inches in all directions from the tap hole for inspection by the District before the saddle is installed.
    - c. Saddles shall be joined to the main with a DFW/HPI elastomeric PVC flexible saddle or approved equal.
  - 3. ABS Composite Tap
    - a. Taps made on an ABS Composite main shall be made by a keyhole or saber saw.
    - b. Exposed pipe filler material shall be sealed with an epoxy coating.
    - c. The main and tap hole shall be inspected by the District before an approved saddle is installed.
  - 4. ABS and PVC Tap
    - a. Taps made on ABS and PVC solid wall main shall be made by a keyhole or saber saw.
    - b. The main and tap hole shall be inspected by the District before an approved saddle is installed.
- E. Allowable Grades
- 1. Service lines shall be installed on a straight alignment and at a uniform grade of not less than 1/4 inch of fall per foot of pipe except where 1/8 inch may be approved by the District when special conditions exist.
  - 2. Anchors will be required where the service is installed at a grade of 30° or greater.
  - 3. No lines shall be installed with a grade greater than 45°.
- F. Haunching and Backfill
- 1. Haunching of the pipe shall be done by placing bedding aggregate above the bedding to the centerline of all types of pipe. The bedding aggregate shall extend from the exterior of the pipe to the trench walls and densified by shovel slicing or rodding.
  - 2. Bedding aggregate shall be placed from the centerline of the pipe upward to the top of ABS, ABS foam core and PVC pipe.
  - 3. Before backfilling the remainder of the trench, the Wastewater District must inspect and approve the service line installation.
  - 4. For VCP and DIP, the initial backfill material from the centerline of the pipe to a point three (3) feet above the top of the pipe shall be material free of rocks or stones having a dimension larger than six (6) inches.
  - 5. The remainder of the trench shall be backfilled with job excavated material free of large rocks, debris and vegetation.
  - 6. Backfill in public street right-of-way shall be installed in accordance with the entity having jurisdiction.

### SECTION III. DESIGN STANDARDS

#### A. Allowable Connections

- 1.
  - a. It is recommended that duplex and multiple unit dwellings have a separate service line for each unit unless maintenance of a shared service line is provided by a homes association or other responsible parties.
  - b. An individual structure may have more than one service line or may have two or more service lines externally connected to the prime service line. (Separate permits are required for each connection to the main)
- 2. Motels, Hotels, Hospitals, Restaurants, Laundries, Car Washes, Automobile Service/Repair Shops, Nursing Homes and Commercial Buildings require special permits and additional fees to connect to the Wastewater District's main.

#### B. Non-Allowable Connections

- 1. No roof, areaway, garage, foundation or swimming pool drains; nor storm sewers shall connect to the District's facilities either directly or indirectly.

#### C. Service Line Sizing

- 1. Single family and duplex dwellings shall use 4 inch or 6 inch pipe(s) as service lines.
- 2. Pipe diameters for the service lines of multi-family, commercial and industrial structures shall be sized according to the rate of wastewater discharge. The minimum diameter service line is 4 inches.
- 3. The maximum length of service line shall be 200 feet. Cleanouts of a design acceptable to the District will be required when the service line length exceeds 100 feet. Placement of the cleanouts should be at the service line mid-point where possible.

#### D. Manhole Connections

- 1. Internal or external drop connections will not be allowed. Exceptions to this rule may be made by the engineering department where unusual conditions or circumstances are encountered.
- 2. The top of sewer service pipe should be set equal to the top of the upstream main sewer. A concrete invert directing the service line's flow toward the downstream main sewer is required.
- 3. When connecting plastic pipe to a manhole for which no service stub was provided, the connection shall be made by one of the two following methods:
  - a. A minimum two-foot long section of clay pipe shall be grouted into the opening in the manhole wall using a non-shrinking grout. A concrete cradle shall be poured under the clay pipe to within 6 inches of the end of the clay pipe section. The plastic pipe shall be joined to the clay pipe as specified in "Section II, Item C.6.a."
  - b. The plastic pipe shall be inserted into a Fernco Concrete Manhole Adapter or approved equal. The adapter shall be centered in the opening in the manhole wall, and the annular space shall be completely filled with non-shrinking grout.

### SECTION IV. INSPECTION PROCEDURE

Before calling the Wastewater District for a service line inspection, the line should be completely installed but not backfilled as outlined under "Section II, Item F". When requesting an inspection the caller is required to know the permit number, correct address and the name of the plumber. All requests for inspections should be made before 4:00 PM. A copy of the sewer connection permit shall be posted in front of the building in a weatherproof and clearly visible manner prior to the start of excavation for the sewer service line. Failure to post the sewer permit or failure to completely and properly install the sewer line shall require re-inspection of the sewer line and payment of a partial inspection fee in accordance with a current fee schedule.

Johnson County, Kansas, 1988