

APPENDIX R

	Plans must be stamped by a Registered Engineer of the State of Georgia.
	<p>Plan and profile sheets are required to show:</p> <ol style="list-style-type: none"> existing and future grade depths of bury or cuts invert elevations and manhole elevations distance between manholes, not to exceed 400 feet (must be numbered) type and size of pipe (pvc sdr 26, no sdr 35) class of bedding size of lines clean-out to property right-of-way lines (service connections) and clean-out to edge of easements d.i.p. at creek crossings, under pavings, storm drain crossings, water line crossing, and drainage ways percent of fall and manhole depth other pertinent features (e.g., storm drain crossings, water line crossings, creeks and drainage ways, existing and proposed streets/roads, special construction, etc.)
	<p>A detail sheet is required to show:</p> <ol style="list-style-type: none"> Bedding detail (Class B or better when applicable) Manhole detail: outside drop, invert construction (solid concrete or precast concrete with rubber boots) at Influent/effluent openings. STUB OUT detail (service line connections) Highway, railroad, and major road crossings when applicable Creek and drainage way crossings when applicable Other, as appropriate
	Bedding is to be Class B (to spring line of pipe) or better, depending on soil conditions. Bedding is to be #57 stone or smaller and to be a minimum of 4" under pipe. This includes service lines as well as main lines.
	Grades and direction will change at manholes only. Where possible and except as otherwise approved, manholes and sanitary sewer lines shall be located underneath the street pavement preferable centered with the pavement. Manholes are to be installed at the end of each line; at all changes in grade, size or alignment; at all intersections; and at a distance of a maximum of 400 feet between each manhole. When placed outside streets and rights-of-way, a minimum 20-foot wide permanent easement shall be shown on the plans and dedicated to the City of Fayetteville. Easement shall not be obstructed by any permanent structure, fencing, or other obstructions preventing access for maintenance of the sewer system.
	<p>Cover Depth. The top of all sewers entering or crossing streams shall be at a sufficient depth below the natural bottom of the stream bed to protect the sewer line. In general, the following cover requirements must be met:</p> <ol style="list-style-type: none"> One foot of gravel cover where the sewer is located in rock; Three feet of cover in other material; In major streams, more than three feet of cover may be required; and In paved stream channels, the top of the sewer line should be placed below the bottom of the channel pavement.
	Manholes shall be set on each side of road bores.
	Road bores require minimum .250" wall thickness steel casing.
	Creek crossings: .250" wall thickness steel casing "coated" with DIMJ solid sleeves with transition gaskets or steel casing .250" weight with PVC SDR 26 carrier pipe. 40' DIP can be used along with steel casing. After carrier pipe is set at proper grades, concrete anchors shall be installed at each end of the crossing. Additional center anchors may also be required for longer spans.
	The minimum slope in feet per 100 feet for an 8" diameter sewer is 0.40; a 10" diameter sewer is .28; a 12" diameter sewer is .22.

TECHNICAL REQUIREMENTS OF SEWER LINES (CONTINUED)

	Service lines shall have a clean-out at the property right-of-way line or located within the easement with a 4-foot minimum piece of 4" or 6" temporary capped pipe exposed for ease in locating. This temporary riser pipe shall be cut off and capped (threaded cap or equal) at four inches minimum above the final ground line after the service line is tied in and final grading is completed. The cap shall have a brass or metal plate for ease in locating if necessary. After the curb has been installed, an "S" or "L" shall be cut into the gutter using a circular pipe saw immediately behind the curb or at the edge of the pavement and shall be painted green according to standardized color.
	Alignment. Sewers crossing streams should be designed to cross the stream as nearly perpendicular to the stream flow as possible and shall be free from change in grade. Sewer systems shall be designed to reduce the number of stream crossings.
	Sewers entering or crossing streams shall be constructed of DIP with mechanical joints; otherwise they shall be constructed so they will remain watertight and free from changes in alignment or grade. Material used to backfill the trenches shall be stone, coarse aggregate, washed gravel, or other materials that will not readily erode, cause siltation, damage pipe during placement, or corrode the pipe.
	In residential development, when connecting the gravity line to the service line, a 6" x 4" convertor or a Fernco connector may be used. When a Fernco connector is used, the proper bedding should be #57 stone or smaller and should be placed at a minimum of 4" under the pipe.
	No driveways will be constructed over a sewer lateral. Place sewer laterals within the side yard setback or the middle of the property line. It is the responsibility of the owner/developer/contractor to relocate the sewer lateral if a conflict arises.
	Gravity sewer lines are subject to testing per the Departments sewer specifications which are as follows: All sewer lines must be televised by an approved vendor with the capability to provide videotapes, and as-built drawings. At time of acceptance all videotapes, as-built drawings, printouts, and related material of said sewer system should be turned over to the City of Fayetteville Water and Sewer Department. All sewer lines must be air tested. The test requirements are as follows: 5 psi for 5 minutes with a 2 psi drop in the pressure allowed. A representative should be contacted from the Water and Sewer Department for approval of all tests and televising.
	Crossings. Sewers crossing water mains shall be laid to provide a minimum vertical distance of two (2) feet between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. Special structural support for the water and sewer pipes may be required.
	FORCE MAINS:
	At least ten (10) foot horizontal separation between water mains and sanitary sewer mains must be provided. There shall be a two (2) foot vertical separation at crossings. All force mains must be a minimum of four inch 4" in size and must be C900 PVC pipe unless otherwise approved by the City of Fayetteville Water and Sewer Department. At the endpoint of the Force Main where the Gravity Line begins, manhole construction shall consist of cast in lining with the total number of manholes affected and type of lining used, shall be determined and approved by the Water and Sewer Department.
	SIZE OF LINES:
	All gravity sewer lines will be 8" or larger.
	All commercial service lines will be 6" minimum for single service, otherwise 8". Residential service lines may be 4" minimum for single service.
	Size and type of pipe used will be subject to final determination by the Water & Sewer Department.
	APPROVED PIPE:
	PVC SDR 26 pipe and DIP Class 50 pipe.
	PVC SDR 26 pipe has a maximum bury depth of 16' and a minimum of 5'. Anything over 16' or less than 5' requires DIP Class 50 pipe.
	DIP is required for grades greater than 10 percent and concrete collars are required for grades greater than 15 percent.
	Soil conditions will also determine the use of PVC SDR 26 or DIP Class 50 pipe, and/or possibly a higher degree on classification of bedding (e.g., mucky conditions may require deeper excavations and more bedding gravel).
	PVC SDR 26 pipe will be run from manhole to manhole.
	Where DIP Class 50 pipe shall be connected to SDR 26 PVC pipe connection shall be a Fernco coupling or equivalent.
	The approved manufactures of the PVC SDR 26 are: CERTAINTEED, ETI, NAPCO, CAPCO, DIAMOND.

TECHNICAL REQUIREMENTS OF SEWER LINES (CONTINUED)

	MANHOLE CONSTRUCTION:
	Maximum distance between a manhole is 400 feet.
	Manhole inverts will be constructed of solid concrete or precast concrete with rubber boots at influent and effluent openings.
	"RV 30" butyl joint sealant or equal will be used on each manhole section (ring) and these rings (joints) are to be wiped with grouting material for water proofing. All lift holes will be filled with grout.
	6" or more gravel is required under the manhole.
	Drop manhole construction is required when the incoming invert elevation is more than two feet above the outgoing invert. Outside drop to be constructed with DIP. No PVC.
	LIFT STATION CONSTRUCTION:
	All proposed lift stations and existing lift station upgrades shall be submitted to the City of Fayetteville in a proposed certified engineered drawing format and shall be consistent with the Xylem design of the Water and Sewer Department's existing stations.
	Pumps shall be sized to provide a minimum flow velocity of 2.5 feet per second to achieve proper scouring and cleaning of force main.
	The wet well shall be equipped with a transducer with a backup of float switches A "Multitrode" sensor will not be acceptable.
	Check valves shall be of a "ball" type configuration; "swing" check valves will not be acceptable. Check valves must be located in a separate vault or pit.
	The force main must be equipped with a single isolation valve located outside of the check valve vault or pit for proper maintenance and cleaning of check valves.
	SCADA (Supervisory Control and Data Acquisition) All proposed lift stations and existing lift station upgrades shall be equipped with a SCADA system that is compatible with the City of Fayetteville Water and Sewer Department's existing SCADA system
	Upon completion of the lift station construction, the site shall be secured by fencing approved by the City of Fayetteville Water and Sewer Department.
	Lift station site shall be equipped with the proper lighting to provide nocturnal maintenance and safe working conditions and must be approved by the City of Fayetteville Water and Sewer Department.
	A concrete or asphalt drive shall be constructed to the lift station from the roadway with a minimum width of 20'. Provide an approve turn-around for any drives 10. Standby Power (GENERATOR) longer than 50 feet <ul style="list-style-type: none"> a. Standby emergency generator shall be powered by natural gas where available. Generator will be permanently stationed at site. Where natural gas is unavailable, generator will be powered by diesel fuel. Gasoline powered generators will be unacceptable b. Generator shall be capable of handling 150% of the power requirement of the station.