

CHAPTER 6

WASTEWATER INFRASTRUCTURE DESIGN AND CONSTRUCTION

6-1 GENERAL INFORMATION

A. System Design Criteria

The criteria for development of wastewater infrastructure in the City of Peoria shall be in conformance with:

1. The most current edition of the Peoria Wastewater System Master Plan. All new construction shall comply with the Master Plan. Directions for obtaining a PDF copy of the most current edition of the Wastewater System Master Plan is on the website at <http://www.peoriaaz.gov/NewSecondary.aspx?id=1443>
2. The Arizona Department of Environmental Quality (ADEQ) Aquifer Protection Permit and Arizona Pollution Discharge Elimination System regulations.
3. The design engineer is responsible for evaluating site specific design conditions.
4. All other applicable City, State, County and Federal Codes and Guidelines.

B. Requirement to Connect

All developments, including single-family residences, are required to connect to the City's wastewater system per Peoria City Code, Section 25-85. The connection to the City's wastewater system and the extension of the public sanitary sewer are required for all new construction or for modifications to existing disposal systems costing in excess of \$100.00.

Waivers to this requirement may be granted if the public sewer is determined to not be available to the subject property. A public sanitary sewer can be considered "not available" according to the following:

1. The extension of the sanitary sewer is greater than 1320-feet from the City wastewater system.
2. The applicant demonstrates the inability to obtain necessary easements upon reasonable pursuit.
3. There is not adequate capacity or depth in the existing public sanitary sewer.

Requests for a Temporary Revocable Water or Sewer Connection Waiver shall be applied for in writing at the engineering counter. The application is available on the website at <http://www.peoriaaz.gov/NewSecondary.aspx?id=1435>

C. Wastewater System Facilities

Water System Facilities include the: lift stations, forcemains, chlorine flushers, odor control sites, and all other appurtenances required for proper treatment, conveyance, and disposal of wastewater within the system.

It is the responsibility of the design engineer to review the most current edition of the Wastewater Master Plan and determine what additional wastewater infrastructure is necessary to serve the proposed development. The Public Works - Utilities Department will utilize the most current edition of the Wastewater Master Plan and operational knowledge of the system to determine which facilities or upgrades are the requirements of the new development.

Refer to the Appendices, Utility Facilities Design Guidelines for design criteria for Wastewater

System Facilities including: lift stations, forcemains, chlorine flushers, and odor control systems.

D. Exceptions to the Design Guidelines

Any exceptions to Chapter 6 of the Design Guidelines must be approved in writing by the Director of the Public Works - Utilities Department or their designees.

6-2 DESIGN STANDARDS

A. General

1. Materials. Refer to City of Peoria Standard Detail PE-101 for allowable materials. The design engineer must specify the exact pipe material in the construction drawings that are in accordance with the City approved pipe materials. Modifications to the pipe material will require a formal plan revision and must be approved by the design engineer and the City of Peoria.
2. Conveyance. Rights-of-way and easements shall be dedicated prior to any construction or with the Final Plat of the development.
3. Pavement Replacement. Pavement replacement type and compaction type shall be indicated per MAG Standard Details and Specifications on each sheet or as modified in the City of Peoria General Notes.

B. Classification of Sewer Lines

The City's sewer system includes four classifications of wastewater lines, which are determined by use or location within the system, identified below: Wastewater lines shall be sized to accommodate their ultimate service area. Larger mains may be required dependent upon the maximum flows anticipated with full development of the ultimate service area, with additional consideration given to land use. The minimum size line for any public main is 8-inch diameter. Non standard sizes will not be allowed unless approved by the Public Works - Utilities Director.

1. Service Line. The public sewer pipe that extends and connects the customer's private building sewer to the lateral sewer.
2. Lateral Sewer. A sewer pipe that collects flow from one or more services and discharges to another lateral sewer or a trunk sewer.
3. Trunk Sewer. A sewer pipe that receives flow from lateral sewers and connects to an interceptor sewer. Trunk sewers are generally 15" in diameter and larger. Trunk sewers may have some limited connections to services.
4. Interceptor Sewer. A large sewer pipe that receives flows from a number of trunk sewers, and lateral sewers, and conveys such wastewater to a point for treatment or disposal. No service connections are allowed into interceptor sewers.

C. Location of Sewer Lines

1. Major arterial streets, Limited Access Parkway - sewer main alignment shall be reviewed individually.
2. Minor arterial streets - sewer mains shall be offset from the street centerline 13-feet south or west.
3. Collector streets - sewer mains shall be offset from the street centerline 6-feet south or west.
4. Local streets - sewer mains shall be offset from the street centerline 6-feet. For curvilinear streets the offset from the street centerline can range from 6 to 9-feet south or west.
5. Generally, the intent is to avoid locating the manhole covers so that wheel line of normal traffic does not track over the casting. The location for the covers and lids should not be closer than 6-feet from the street drainage flow line or gutter line.
6. All sewers shall be parallel to the centerlines or as close to parallel as possible.
7. In cases where public sewers are authorized outside of public right-of-ways, all such sewers shall be centered and parallel to the property lines or as close to parallel as possible.
8. Vertical and horizontal separation from water lines shall be in accordance with MAG Section 610.5 and MAG Standard Detail 404-1. Minimum horizontal separation from the sewer line to other underground utilities shall be 6-feet.
9. No part of any manhole shall be located any closer horizontally than the depth of cover or 6-feet, whichever is greater, from any wall, fence or structure, etc.
10. Public sewer lines will not be permitted within the limits of retention/detention basins and their appurtenances.
11. Sewer service lines shall not be located under driveways or under concrete aprons adjacent to driveways.

D. Easements

1. Sewer easements are to be dedicated for the specific use, maintenance and repair of the sewer line, and any associated appurtenances. Sewer easements are to be dedicated as part of a Final Plat or by separate instrument with written approval from the Engineering Department.
2. Sewer lines shall be located within public rights-of-way or centered within a 20-foot wide easement dedicated for sewer line, or within a 30-foot wide easement (minimum width) dedicated for both water and sewer lines. Larger easement widths with a minimum clear width equal to twice the depth of cover will be required for deeper installations as determined by the Public Works - Utilities or Engineering Department.
3. No other parallel utilities shall be located within the public water or sewer easement.
4. Underground retention and above ground retention basins are not permitted to cross or be within designated public water or public sewer easements.

5. Trees and substantial plantings are not permitted within designated public water or public sewer easements where the easement provides primary access to the utilities. Plantings must typically be at least 5' from the centerline of the pipeline.

E. Cover and Depth

1. Maximum depth for sewer lines and manholes shall be 12-feet, unless detailed loading calculations and materials selection is approved with the written request by the Developer's Design Engineer to the Engineering Department and with written approval by the Public Works - Utilities Department. The proposed design shall be submitted to the Engineering Department for review.
2. When connecting to an existing manhole, verify that there is an existing base and channel to accommodate the new sewer connection. If necessary, construct a new manhole base with channel in the existing manhole.
3. All laterals shall have a minimum of 5-feet of cover measured from finished grade to the invert of the lateral. During construction the depth of cover may be less than 5-feet, such as during preparation of street sub-grade, installation of foundations, culverts or utilities.
4. All trunk sewers and interceptors shall have a sufficient depth to serve the ultimate service area with a minimum cover of 6-feet.

5. Encasement or Casing

Extra protection per MAG 610.5.5 and Standard Details 404-1, 404-2, and 404-3 is required:

- a. Where cover is less than 4-feet (due to topography or potential conflicts with facilities such as canals, washes, or rivers).
- b. Where the bottom of any irrigation, storm drain, sanitary sewer, force main or other gray water pipe is less than 2-feet over the top of the sanitary sewer.
- c. Where a sanitary sewer crosses less than 2-feet above any water line, force main or pressure main.
- d. Where wastewater lines pass under a significant structure greater than 10-feet wide such as box culverts, railroads, highways, canals, etc. The sewer line(s) shall be installed inside a pipe casing as approved by the Engineering Department.
- e. As deemed necessary by the plan reviewer.

F. Slopes and Design Flows

1. Pipe slopes are to maintain a minimum mean flow velocity for pipes flowing full of 2.0 feet per second for all diameters except for 8-inch for which the minimum slope is 2.5 feet per second. The maximum mean flow velocity for pipes flowing full is 8 feet per second.
2. The minimum slope for an 8-inch sewer line is 0.50% (0.005 feet per foot).
3. At "end of the line" sewers (the portions of sewer lines between the last two manholes), the slope of sewers serving less than 30 households shall be 0.76%, and that of sewers serving less than 10 households shall be 1.00%.
4. The "n" value of the pipe shall be 0.013 for all new construction.

G. Design Requirements

1. Tie-ins to Existing System. Construction plans shall call for the contractor to tie-in new work to the existing, active system, only after completion of the new work and written approval of the Engineering Inspector to make the tie-in.
2. Force Mains. Force mains shall outfall into a manhole. Non standard sizes will not be allowed unless approved by the Public Works - Utilities Director.
3. Curved Sewers. Curved sewers are prohibited.
4. Private on-site sewer lines shall be constructed of materials and at slopes as specified in the City of Peoria adopted Plumbing Code.
5. Pavement sawcuts shall be in straight lines parallel to the trench, to a depth which exceeds the pavement thickness. Sawcut lines shall be a minimum of 100-feet in length before a jog in the alignment of the sawcut is permitted.

6. Pipe Bedding Requirements

Refer to City of Peoria Standard Detail PE-401. Bedding compaction densities shall be per MAG Specification Table 601-2. Specially designed and alternate beddings may be approved on a case by case basis by the Engineering Department.

7. Trench Backfill Requirements

- a. Minimum trench backfill requirements shall be Type I per MAG Specification 601.4.3, with compaction densities per MAG Specification Table 601-2. Backfill requirements provided by the Developer's Design Engineer shall apply, when such provisions are more restrictive than MAG Specification.
 - b. Within the existing pavement section of public streets, the backfill shall be ½ sack Controlled Low Strength Material (CLSM) per MAG Specification 728.
8. Odor control systems shall be installed at the cost of the developer in sewer systems when required by the Public Works - Utilities or Engineering Department. In some circumstances a flushing valve will be required. Dedication of property at no cost to the City of Peoria may be required for the odor control system.

9. Wash Crossings

All wash crossings will be constructed using restrained joint ductile iron pipe with an approved lining. Bury requirements to place sewer lines under washes or channels shall be based upon the 100-year peak design discharge (Q100) in the channel or wash.

Scour depth will be estimated using Arizona State Standard Attachment (SSA) 5-96, Guideline 2, Level I, as published by the Arizona Department of Water Resources. The engineer will estimate the depth of scour and design the top of pipe to conform to Section 6-1.413 of SSA 5-96. The engineer shall submit the scour analysis with the final plans.

All pipelines located within the scour zone must be protected by installing a cut-off wall, downstream of the pipeline to stabilize the scour depth. Cut-off walls will be structurally designed to the scour conditions calculated.

H. Manholes

1. Materials and Details

- a. All manholes shall be per MAG Standard Details and Specifications except that manhole steps are not allowed.
- b. Lateral pipes shall not enter a manhole at an angle greater than 90 degrees to the sewer trunk line.
- c. Manholes with a through line shall have the invert on a continuous slope or a minimum 0.10-foot drop through the manhole.
- d. Manholes with a line intersecting the through line: the intersecting line invert shall be a minimum of 0.10 foot above the flow line of the through line. The lines shall intersect at not more than a 90-degree angle.
- e. Manholes on boundaries of the subdivision or improvement district shall have stubs with shaped inverts in appropriate directions for future connections.
- f. Manholes which exceed 10 feet in depth shall be 5-foot in diameter, without steps.
- g. Epoxy coating of manhole interior walls and bases, including bench and channel, is required for manholes that have at least one of the following criteria:
 - 10-feet or greater in depth
 - 5-foot in diameter (and larger)
 - located in an Arterial Road
 - located in a non-residential service area
 - force main outfalls
 - as required by the Engineering or Public Works - Utilities department

Epoxy coating systems and installation shall meet current City specifications and the requirements of Peoria Standard Detail PE-101.

- h. All sanitary sewer manholes shall be installed with gasket, joint sealer, or water stop between the base and riser section as approved by the Engineering Department.
- i. In all cases the rim elevation shall be a minimum of 0.10 feet above the flow line of the roadway gutter to prevent stormwater infiltration into the sanitary sewers.
- j. All Private Sewer Manholes lids shall have "Private Sewer" labeling, and shall not be labeled "City of Peoria".
- k. Brick manholes are prohibited.
- l. All manholes located outside of roadways shall have locking lids and have a "Curve-Flex" Utility marker manufactured by Carsonite or approved equal.
- m. Drop manholes will be allowed only if the pipe slopes exceed maximum slope requirements and if approved by the Engineering Department. Construction of drop manholes shall comply with MAG Standard Detail 426.

2. Spacing

- a. Manholes are required at all changes in grade and alignment.

- b. Maximum manhole spacing shall be:
 - 400-feet for 8 inch or 10-inch sewers
 - 500-feet for 12-inch or larger
- c. A manhole shall be placed on the upstream end of all sewer lines. If sewer system is to be phased, a stub shall be provided. The stub shall be capped and plugged.
- d. Clean-outs are prohibited. Existing clean-outs shall be removed and replaced by Developer with a manhole per these guidelines.

I. Sewer Taps

1. Materials and Details

- a. New sewer taps and sewer service piping shall be per MAG Standard Detail 440-1. See the Materials List, City of Peoria Standard Detail PE-101, for allowable materials. Tap location shall be supplemented by a curb stamp per MAG Standard Detail 440-4 (stamped S on top of the curb).
- b. Taps are not allowed into manholes unless approved by the Engineering Department.
- c. A 3-foot minimum separation between service taps is required. A 5-foot minimum separation between a service tap and the outside diameter of a manhole is required.
- d. All taps shall be stationed using the closest downstream manhole as station 0+00.
- e. All taps shall be perpendicular to the lateral.
- f. Taps are not allowed into existing 12-inch or larger sewers.
- g. Provide one single service tap for each residential or commercial building lot. Additional taps are not allowed unless approved by the Engineering Department with written approval by the Public Works - Utilities Department.
- h. A backwater valve shall be provided on service connections to major sewer lines, at manholes where there is potential for the migration of sewer gas into the service line, and at locations where the finish floor is not 12-inches higher than the upstream manhole. Backwater valves shall be located on private property and shall be accessible for maintenance by the property owner.

2. Sizes

- a. Tap sizes for single family residential developments shall be 4-inch minimum. Larger taps shall be sized as determined by the Developer's Design Engineer.
- b. Commercial lots with buildings shall have a minimum 6-inch tap.
- c. Multi-family developments shall have a minimum 6-inch tap.
- d. All 8-inch and larger services shall discharge to a manhole.

3. Location. Proposed tap locations shall be shown on all plans. Any changes in the field must be approved by the Engineering Department.

6-3 PRETREATMENT

A. Commercial Developments

1. Interceptor Requirements

- a. A grease, oil, lint and/or sand interceptor(s) shall be required for laundries, eating establishments, service stations, auto repair shops, car washes and other facilities which the Public Works - Utilities Department determines are necessary for the proper handling of liquid wastes containing grease or oil in excessive amounts or any flammable wastes, sand, or other harmful ingredients. Eating establishments include, but are not limited to restaurants, cafeterias, bars, fast food, schools, nursing homes, clubs, hotels/motels, hospitals, or any other non-private residence food service facility generating grease bearing waste going to sanitary sewer.

Eating establishment fixtures that shall be discharged to a grease trap/interceptor

- Three compartment sink
- Utensil soak sink
- Pre-rinse sink
- Tilt brazing pan to floor trough
- Tilt kettle to floor trough
- Steamer floor sink or trough
- Wash-down hood floor sink or hub drain
- Mop sink or stall adjacent to kitchen area
- Dishwasher machine floor sink
- Can wash station
- Chinese Range/Wok floor sink
- Chef's table sink
- Floor troughs or floor sinks having grease laden waste discharged to them
- Floor drains in the vicinity of any fixtures stated above

Fixtures that are not required to be discharged to grease trap/interceptor

- Hand sinks
- Salad prep sinks
- Ice machine drains

Fixtures that shall not be discharged to grease trap/interceptor

- Toilets
- Urinals
- Other similar sanitary fixtures

- b. Grease and oil interceptors shall be constructed of impervious materials capable of withstanding abrupt and extreme changes in temperature. They shall be of substantial construction, water tight, and equipped with easily removable covers. When bolted covers are required, they shall be gastight and watertight.
- c. Internal interceptors shall be required for those facilities that will have minimal fixtures being discharged and require minimal retention time. The minimum internal interceptor shall be no smaller than a device rated at 50-gallon-per-minute flow with a 100-pound grease capacity (50/100). A flow restriction valve shall be installed upstream of the grease trap and be constructed in such a fashion that it remains

accessible for service is properly vented and must remain in place at all times. Garbage disposals and dishwashers shall not be discharged to an internal grease interceptor.

- d. External interceptors shall be required for those facilities that will have numerous fixtures being discharged and require extended retention time. The minimum external interceptor shall be no smaller than a two compartment container rated at 500-gallon capacity and no larger than a three compartment container rated at 2500-gallon capacity. All external interceptors shall be installed according to City of Peoria Standard Detail PE-450 and must include a sample vault. Each interceptor shall be properly vented and shall have a clean-out on the discharge pipeline.
- e. Interceptors and sample vaults installed in high traffic areas must be backfilled with ½ sac slurry to the top of the interceptor/sample vault tank. All concrete rings, risers, and manhole covers shall be traffic rated and installed to manufacturer's specifications.
- f. Interceptors must be sized using the fixture unit equivalent to gallons per minute table. Final calculations must be verified using the International Plumbing Code, latest adopted edition. For ease of calculations and verification, Fixture Units, Section 709 shall be used. Interceptors having flow-through ratings, which fall between interceptor sizes, must be rounded up to the next larger size.

Fixture Outlet or Trap Size (inches)	Drainage Fixture Unit Value	GPM Equivalent
1 ¼	1	7.5
1 ½	2	15.0
2	3	22.0
2 ½	4	30.0
3	5	37.5
4	6	45.0
Floor Drains – all	2	15
Dishwashers	2X Trap Arm Size	

Sizing Example

The following is an example of a facility having one 3-compartment sink discharging indirectly into a 2 ½ inch floor drain, one mop sink that has a 3-inch drain, two 2-inch floor sinks, and four floor drains.

Type of Fixture	Fixture Count	Size	Fixture-Unit Value	Total
3-comp. sink	1	2 ½"	4	4
Mop sink	1	3"	5	5
Floor sink	2	2"	3	6
Floor drain	4	N/A	2	8
Total Fixture-Units				23
Multiply by 3 GPM Flow Rate				X3
Total GPM Flow Rate				69
Multiply by either 12 or 17 – without or with garbage disposal unit				X12
Size of interceptor calculated				828
Round up to next available size				1050

Non Food Related Interceptor requirements and sizing criteria

<u>Type of Business</u>	<u>Pretreatment Device</u>	<u>Minimum Size</u>
Commercial Laundry		
Up to 30 machines	Lint or Sand & Oil	500 gal
+30 machines	Lint or Sand & Oil	750 gal
Industrial Shop		
1-3 Fixtures	Sand & Oil	500 gal
4 or more	Sand & Oil	750 gal
Car/Truck/Equipment Wash		
Single Stall Auto	Sand & Oil	500 gal
Multiple Stall Car/Pickup	Sand & Oil	750 gal
Single Drain Truck Wash	Sand & Oil	750 gal
Automatic Commercial Car	Sand & Oil	1500 gal
Multiple Truck/Heavy Equipment	Sand & Oil	1500 gal
Auto/Truck/Airplane Repair		
1-3 Fixtures	Sand & Oil	500 gal
4 or more fixtures	Sand & Oil	750 gal
Automotive or Airplane Center		
Multiple Shops Sharing Common Interceptor	Sand & Oil	1500 gal
Barber/Beauty Salon		
Shampoo Sink	Hair Trap or Solids	JR Smith 8750 or Equiv.
Veterinary		
Cage wash-down drain or Grooming Wash Tub	Hair Trap or Solids	JR Smith 8750 or Equiv.

School

Science Lab Sink	Acid Neutralization	500 gal
Art Room Sink	Plaster Trap or Solids	JR Smith 8710 or Equiv.

Hospital, Doctor, Dentist, Lab

Cast Room Sink	Plaster Trap or Solids	JR Smith 8710 or Equiv.
Dental Lab Sink	Plaster Trap or Solids	JR Smith 8710 or Equiv.
Laboratory Sink	Acid Neutralization Tank	Site Specific

Silk Screen Printing

1-3 Fixtures	Sand & Oil	500 gal
4 or more fixtures	Sand & Oil	750 gal

Optical Manufacturing

Lens Machine & Lab Sink	Solids	JR Smith 8715 or Equiv.
-------------------------	--------	-------------------------

Photo Developing

Silver Recovery Unit

- g. All interceptors shall be of a type and capacity approved by the Public Works - Utilities Department Wastewater Environmental Division, and shall be located as to be readily and easily accessible for cleaning and inspection. Where installed, all grease, oil, lint and sand interceptors, or any other pretreatment devices shall be maintained by and at the expense of the owner in continuously efficient operation at all times.

2. Common Interceptor

A letter requesting a variance must be submitted to the Environmental Quality Assurance Officer from both the property management company and the project engineer for approval. The engineer's letter must include their stamped seal. The Environmental Quality Assurance Officer will respond by letter stating if the request for variance had been approved.

The variance letter must address the following:

- The property management company assuming responsibility and liability for the maintenance and service of the interceptor(s). Service and cleaning schedules will be determined and enforced by the Wastewater Environmental Division. Any costs incurred by the City of Peoria as a direct result of improper maintenance of the pretreatment devices will be assessed to the property manager/owner, including monetary penalties accrued as the result of enforcement actions.
- Construction plumbing plans must be submitted with City of Peoria Construction Detail PE-450 and showing interceptor size, sizing calculations, location, and must be installed accordingly. For ease of calculations and verification, Fixture Units Section 709 shall be used for grease interceptor sizing criteria.
- If single or multiple tenants should exceed the interceptor capacity, an additional interceptor will be required and installed at the property owner's expense. A new set of construction plans must be submitted to the department regarding the required improvements for the specified tenant(s). Submitted plans must address and show the grease interceptor size, sizing calculations, location, and City of Peoria Detail PE-450 as stated above.

B. Industrial Developments

1. Pretreatment Facilities

Where necessary, as determined by the Public Works - Utilities or Engineering Department, any non-residential user of the sewer system shall provide at their expense, such pretreatment as necessary to reduce objectionable characteristics or pollutants below the Local Limits established by City Code Chapter 25 Section 25-139, or any national pretreatment standards established by the Code of Federal Regulations Title 40 Part 403 and in accordance with City Code Chapter 25 Sections 25-134 through 25-186.

2. Industrial Wastewater Permit Application

An Industrial Wastewater Permit Application must be completed for all developments which can potentially be classified as a Significant Industrial User by the following qualifying factors:

- a. Any facility that falls under any Categorical Industrial Users Category as found in the Code of Federal Regulations Title 40 Parts 405 through 471.
- b. Discharges 25,000-gallons-per-day or more of process water.
- c. Contribute a process waste stream which makes up five (5) percent or more of the annual average daily dry weather hydraulic capacity of a treatment plant.
- d. Any facility that has a reasonable potential, in the opinion of the control or approval authority, to adversely affect the Publicly Owned Treatment Works through interference with the treatment process, pass-through of pollutants, sludge contamination, exceedance of federal or state Pretreatment Standards, or endangerment of persons employed or otherwise working at the Publicly Owned Treatment Works.

3. Flow Metering and Sample Vaults

- a. A sample vault and flow meter vault shall be installed at the owner's expense on the building sewer to facilitate observation, measurement, and sampling of wastes. The vaults shall be located as to be readily and easily accessible and be constructed of impervious materials capable of withstanding abrupt and extreme changes in temperature. Vaults shall be of substantial construction, water tight, and equipped with easily removable covers. When bolted covers are required, they shall be gastight and watertight. The sample vault shall be large enough to allow room for sampling and monitoring equipment and include enough working space for City personnel.
- b. A permanent flow measuring device, such as Palmer Bowlus Flume will be required for commercial and industrial facilities as listed below:
 1. Flume size should be based upon minimum and maximum flow rates and velocities to ensure free-flow conditions. Maximum flow shall be 70-100% of maximum capacity of selected flume size. A minimum flow depth of 0.5 inches should exist at the minimum actual flow.
 2. Flume floor elevation should be high enough, relative to the downstream conditions, to prevent submerged flow (50% submergence is acceptable at maximum flow). Install the flume level with the floor longitudinally and transversely in the converging section.

3. Upstream flow should be wave free, non-turbulent, symmetrical and have a uniform velocity (1 fps minimum to 3 fps maximum) at least 10 times flume throat in length in the approach channel. Bends in the outlet or inlet pipe will not be permitted for a distance of 25 pipe diameters up and down stream.
 4. It shall be the owner's responsibility to properly maintain the flume in accordance with the manufacturer's recommendations to ensure the accuracy of the measurement.
 5. When installed, the Flume size shall be based upon the minimum and maximum flow rates and velocities to ensure free-flow conditions. The flume floor elevation should be high enough, relative to downstream conditions, to prevent submerged flow. The flume shall be self-supporting and require no external supporting structure. Flume size, construction, and location must be approved by the Wastewater Environmental Division prior to installation.
- c. Industries included in, but not necessarily limited to, the following list shall install a sample vault and permanent flow meter in the building sewer:

Adhesive Manufacturing	Carbon Black Manufacturing
Aluminum Forming	Coil Coating
Asbestos Manufacturing	Copper Forming
Battery Manufacturing	Electrical and Electronic Component Manufacturing
Electroplating	Feedlots
Ferroalloy Manufacturing	Fertilizer Manufacturing
Foundries (metal molding and casting)	Glass manufacturing
Grain Mills	Ink Formulating
Inorganic Chemicals Manufacturing	Iron and Steel Manufacturing
Laundries	Leather Tanning and Finishing
Mechanical Products Manufacturing	Metal Finishing
Metal molding and casting (foundries)	Nonferrous Metals Manufacturing
Paint Formulating	Pesticides Chemical Manufacturing
Petroleum Refining	Pharmaceutical Manufacturing
Porcelain Enameling	Printing and Publishing
Pulp, Paper and Paperboard Manufacturing	Rubber Manufacturing
Soap and Detergent Manufacturing	Steam Electric Power Generating
Sugar Processing	Tars and Asphalt Paving and Roofing
Textile Mills	Materials Manufacturing
Rubber Manufacturing	Timber Products Processing

6-4 CONSTRUCTION

A. General

All construction shall be per the latest MAG Uniform Standard Details and Specifications for Public Works Construction, and subject to City of Peoria modifications, latest edition.

B. Tie-ins to Existing System

Construction plans shall indicate that any tie-ins to the existing, active system shall be made only after completion of all new work and written approval of the City Engineering Inspector.

C. Testing and Inspection

1. Manhole Testing

All new sanitary sewer manholes installed shall be tested for integrity either by an exfiltration test or by a negative air pressure (vacuum) test.

- a. Exfiltration testing shall be performed in accordance with MAG Section 615.11(B) and Arizona Department of Environmental Quality (ADEQ) Engineering Bulletin No. 11, Chapter 4, Section B. When using the exfiltration test method, water loss shall not exceed 0.1 gallons per vertical foot of manhole in a 24-hour period.
- b. Negative air pressure (vacuum) testing shall be performed in accordance with ASTM C 1244. Testing shall be performed at the top of the manhole cone for manholes located in paved areas. Manholes outside paved areas shall be vacuum tested at the ring and cover. Apply a negative air pressure of ten (10) inches of mercury (136 inches water) on the manhole and measure the time in seconds for the vacuum to drop to nine (9) inches of mercury (122 inches water). The manhole will pass this test if the time for the vacuum to drop the specified amount meets or exceeds the following values:

TEST DURATION (SECONDS)

<u>MANHOLE DEPTH</u>	<u>48" DIAMETER</u>	<u>60" DIAMETER</u>
10 feet or less	60	75
Greater than 10 feet to 15 feet	Not Applicable	90
Greater than 15 feet	Not Applicable	105

If manhole joint compound is pulled out during the vacuum test, the manhole shall be disassembled and the joint repaired or replaced as necessary. The vacuum testing shall then be repeated until the manhole passes.

- 2. Closed Circuit TV (CCTV) Inspection. Perform CCTV inspections in accordance with NASSCO's Pipeline Assessment Certification Program. CCTV inspections shall be provided in digital (DVD) format utilizing a measuring device ahead of the camera to identify deflections in the line. Measuring device shall be able to measure water depth from 0-2 inches in ¼ inch increments.
- 3. Epoxy Coating Systems. Perform inspections and testing according to City specifications. Administer adhesion testing for the underlayment and the finished coating system. Perform spark testing for all surfaces of the complete installation in accordance with ASTM D-4787.

D. Protection of Monuments

The Developer is responsible for protecting and restoring if damaged, construction survey stakes and property corner monuments used by the City to locate the service lines.

E. Existing Wastewater System Requirements

1. Sewer Service Installations. Requirements for lowering, extending and relocating sewer service lines are as follows:
 - a. A construction permit is required for any work on the City system regardless of the location of the facility. Construction permits can be obtained through the Engineering Department.
 - b. The Contractor's representative shall be responsible for customer notification.
2. All building sewers and service line installations shall be completed by a qualified licensed contractor and comply with current City of Peoria Standard Details, latest edition of the International Plumbing Code Chapter 10, and City of Peoria Code Chapter 25. A final inspection will be required by a member of the Industrial Users/Building Safety Division prior to the issuance of a Certificate of Occupancy.
3. Switch-overs and Abandonments. Work will be done by contractor after written authorization by the City Public Works - Utilities Department. Follow City of Peoria "Abandonment of Facilities in the City's ROW" Policy.

6-5 FINAL DOCUMENT SUBMITTALS

A. Plan Approvals

1. Plans shall be prepared per Chapter 1 of the Infrastructure Design Guidelines.
2. Utility Reports (Refer to the Planning Department process guide):

Preliminary Water and Sewer Analysis Report - This is used to determine the potential impact that the development would have to the existing water and sewer infrastructure. This report will also be used to verify that the proposed density and water use of the proposed development is consistent with the City's general plan and the City's water allocation for the proposed parcel. Refer to the report template at <http://www.peoriaaz.gov/NewSecondary.aspx?ID=1435>

Final Sewer Report-2009- Required for all sites in which public sewer is extended. The calculations in this report will be used to verify that the proposed public sewer design provides adequate cover, slope, and design velocities. Refer to the report template at <http://www.peoriaaz.gov/NewSecondary.aspx?ID=1435>

Master Water and Master Sewer Reports- When required this report should show the infrastructure required for the utilities in the development to function per City of Peoria standards. Individual Final Water and Final Sewer Reports will be required for each parcel at the time of submittal. Individual phased reports should be consistent with the data, calculations, and assumptions shown in the Master Reports. Refer to Chapter 6 for additional information regarding Sewer Reports. Refer to the guidance memo at <http://www.peoriaaz.gov/NewSecondary.aspx?ID=1435>

3. The completed Approval to Construct (ATC) application with signatures should be submitted during plan review. The *Sewage Collection System Name* is "City of Peoria". The *Sewage Treatment Facility Name* is one of three current City of Peoria facilities: *Butler WWTP*, *Beardsley WWTP*, and *Jomax WWTP*. Refer to the Wastewater Master Plan to look up which service area the project is within. The "*Sewer Capacity Letter*" will

be issued by the *Public Works - Utilities Department* after the ATC application has been submitted and will not be provided until the utility plans are substantially approved.

4. A copy of the Approval to Construct (ATC) issued by Maricopa County Environmental Services Department (MCESD) and the cover sheet signed by MCESD must be submitted to Engineering prior to receiving final plan approval from the City.

B. Wastewater Infrastructure Acceptance

Copies of the following documents must be submitted to the Engineering Department prior to acceptance of the wastewater line(s) by the City. Refer to Chapter 7 of this document for as-built requirements. Final Letter of Acceptance (FLOA) will be released by the City of Peoria Engineering Department after all other items have been completed.

1. A copy of the "Certificate of Approval of Construction" (AOC) issued by MCESD.
2. A copy of the "Engineer's Certification of Completion".
3. Pressure and Vacuum Testing documentation.
4. Deflection Testing documentation.
5. Video CCTV. Inspection Records on DVD.
6. Copy of interceptor inspection documentation.