

Pressure Wastewater Code Amendment

13-09-002-0012 Pressure Wastewater Mains and Lift Stations

A. All proposed public wastewater systems shall be gravity flow within the gravity wastewater shed of the Wildcat Hill Wastewater Treatment Plant (see **Figure 13-09-002-02** for a map of the gravity wastewater shed of the Wildcat Hill Wastewater Treatment Plant). Public pressure wastewater systems including piping, lifts, and appurtenances are prohibited within this area.

B. Where pressure systems are allowed, they will transition back to gravity as soon they cross into the gravity wastewater shed as shown in Figure 13-09-002-02.

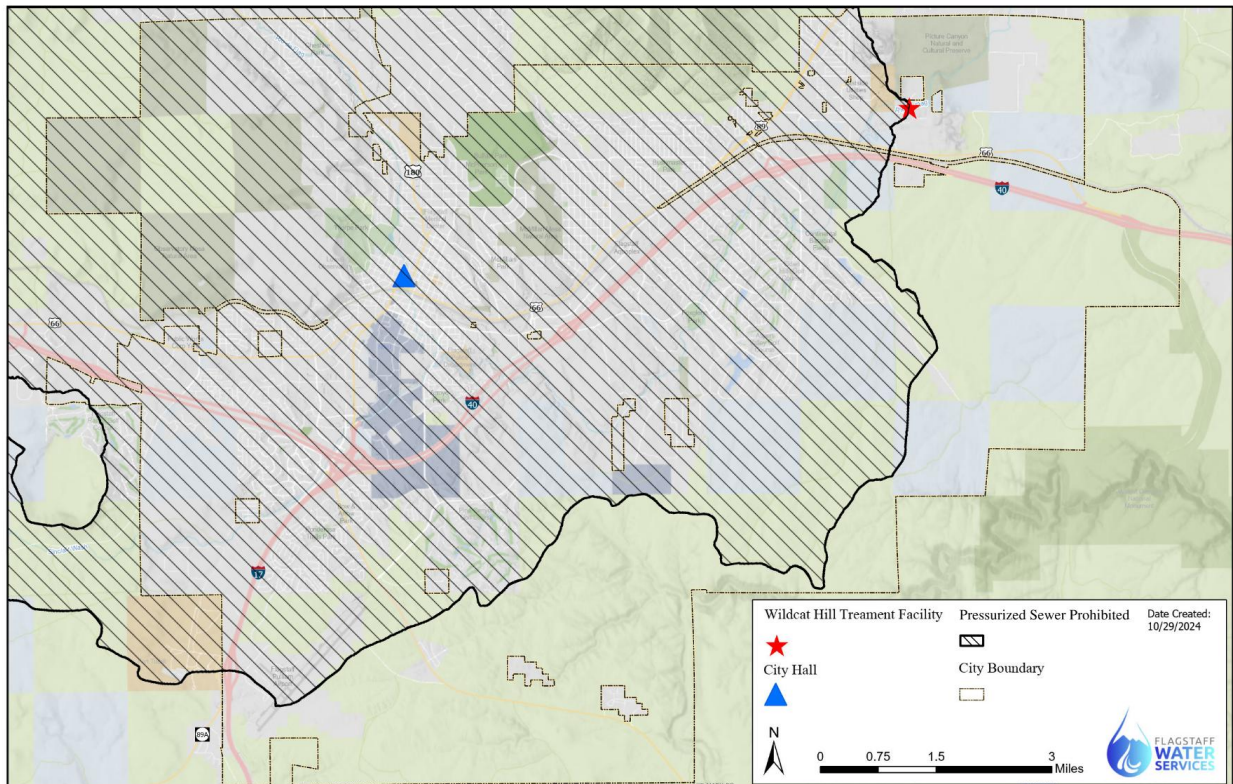


Figure 13-09-002-02 Gravity Wastewater Shed of Wildcat Hill Wastewater Treatment Plant

C. All proposed designs shall meet requirements of Arizona Administrative Code Title 18, Chapter 9.

13-09-02-.1 Lift Stations

A. A development agreement will be required for any new development that requires a lift station.

1. The development agreement shall include a payment of 10 years operation and maintenance which will be included on the Estimate of Probable Cost submitted for the project. The payment will be collected before the issuance of the public improvements permit.

B. The location of the lift station should be chosen so that the entire lift station drainage area can be served by gravity up to the lift station. Lift station sites may not be located in floodways, floodplains or other locations subject to inundation. The lift station must be accessible and free of inundation during the 100 year flood event.

C. Design should accommodate for expansion of lift station capacity with development while meeting wet well retention and pump cycling/capacity criteria. Capacities of lines are to be determined for an entire drainage

area, developed or undeveloped, which may be reasonably serviced by the proposed system or by future extensions of the system. Densities will be estimated from the land use plan of the current Regional Plan. Use Table 13-09-002-01, to determine number of persons per unit for different dwelling types. All lift stations and force mains must be designed for peak flow in accordance with Table 13-09-002-01 and Figure 13-09-002-01.

E. Minimum design considerations by the Water Services Division for lift station facilities are as follows:

1. A communications link will be provided by fiber optic cable to the nearest City facility if the facility is within one mile of the lift station. If the facility is greater than one mile away from the site, then a microwave tower may be constructed instead of the fiber optic cable. A SCADA communications plan must be submitted for plan approval.

- a. All components of the SCADA system shall be included in the communications plan including at a minimum monitoring instruments, programmable logic controllers (PLCs), remote terminal unit (RTUs) and variable frequency drives (VFDs). These components shall be compatible with the existing COF SCADA system.

2. An outflow meter will be provided at the lift station. Meters will be submitted and approved by the Water Services Division. The outflow meter shall be an ultrasonic flow meter that is compatible with COF SCADA systems. The flow meter shall be sized to meet both low and high flow ranges per manufacturer recommendations. The location of the flow meter shall be easily accessible and visible within the site. The flow meter shall have a pressure rating greater or equal to the pipeline it is connected to, and shall be rated for wastewater.

3. An alarm with an automated callout system will be required. The system will be submitted and approved by the Water Services Department. The alarm and automated callout system shall be functional before acceptance of the wastewater system. An override button shall be provided at the lift station site to allow for maintenance to be completed without triggering alarms.

4. The lift station shall be equipped with a standby power system. This system shall include at a minimum, an automatic transfer switch, a diesel generator, and a fuel tank of sufficient capacity to allow continuous operation under full load for 24-hours.

5. Design shall allow for continuity of pumping operation during service and cleaning through the incorporation of divided wet wells or other design as approved by the City Engineer and Water Services Director.

- a. A cleanout pipe will be provided that allows for a vacuum truck to connect and clean the lift station.
6. All pumps must be submitted and approved by COF Water Services Division. Minimum design requirements for pumps are as follows:
 - a. Nonclog wastewater pumps shall be used for the lift station.
 - b. The pump will require at least one back up for redundancy. The pump system shall be set up so that both pumps are regularly operated using a duplex system or similar system that balances the wear on the pumps.
 - c. Pumps shall be designed with a rail system to allow for the pumps to be easily lifted and lowered into the wet well for pump replacements.
7. All lift interior lift stations components shall be coated with a corrosion resistant epoxy coating rated for wastewater.
8. Check valves, air release valves, and plug valves shall be located in a separate vault within the lift station.
 - a. Check valves shall be full-port solids handling ball check valves. Check valves shall be provided on pump discharges 8" and smaller. Check valves shall be rated for wastewater and feature a corrosion resistant epoxy coating. Check valves shall have a pressure rating equal to or greater than the pipeline they are connected to.
 - b. Air release valves shall be combination type and rated for wastewater. Air release valves shall be Cla-Val or approved equal.
 - c. Eccentric plug valves shall be provided on the discharge of all pumps. Install the plug valves horizontally so the plug rotates up 90° to open and the plug seat is facing downstream when closed. The plug valves shall be located downstream of the check valves. All valve materials shall be rated for wastewater and shall have a minimum of 40 mils of ceramic epoxy lining.
9. Fall protection shall be provided at the wet well entry hatch.
10. An odor control system shall be required. The odor control system must be submitted and approved by the Water Services Division.

11. A minimum eight (8) foot tall CMU masonry wall around the perimeter with a locked entrance gate.

a. The wall shall be compatible with the surrounding environment, including landscaping.

12. The facility entrance shall have a twelve (12) foot wide double drive access gate with at least twelve (12) feet clear space.

13. The station shall have a paved access road at least twelve (12) feet wide with a maximum slope not to exceed ten percent (10%)

a. A forty-five (45) foot radius or hammerhead turnaround shall be provided if the access road exceeds fifty (50) feet in length.

14. The interior of the compound shall be surfaced with four (4) inches of asphaltic cement pavement.

15. Service vehicle access to major station components shall be incorporated in the station design.

16. Down cast facility lighting, both wall mounts and pole mounts shall be provided with at least one (1) photocell operated light.

a. The light switch shall be located next to the access gate in the interior of the compound.

b. Lights shall be dark sky compliant.

F. An operation and maintenance plan for the lift station and its components must be provided and approved by COF Water Services Division. The operation and maintenance plan shall be provided for all equipment and systems, valves, instruments and control devices, and electric gear. The operation and maintenance plans shall include at a minimum:

a. Contact information for the Contractor, Engineer, and Supplier

b. Engineer approved submittals

c. Disassembly drawings

d. Operating instructions

e. Test data

f. Maintenance recommendations and schedule

g. Troubleshooting procedures

h. Recommended spare parts

i. Warranty terms and duration

G. An Engineer's Design Report must be prepared and submitted. The report shall be prepared, signed and sealed by an Arizona Registered Engineer. It shall be submitted to the City for review and approval and will include, at a minimum, the following:

a. Description of design criteria to be utilized other than this document,

b. Flow computations, including a complete analysis of the downstream gravity system's capacity to convey such flows in addition to other design flows and if mitigation measures such as gravity wastewater up-size, flow equalization basins or other measures are warranted.

c. Wet well volume calculations,

d. Retention and pump cycling calculations,

e. Hydraulic analysis including friction and minor head loss calculations,

f. Calculated system curves with overlaid pump curves,

g. Surge protection recommendations

h. Structural component description and calculations

i. Electrical, instrumentation, and process description, control description, and calculations,

j. Analysis and design solutions to control corrosion, odor, and noise in the lift station, force-main and downstream gravity wastewater system

k. Define site, right-of-way, and easement requirements,

- I. Listing of permit requirements,
- m. Geotechnical investigation,
- n. Cost estimate based on unit costs for major elements of work following this design criteria.

13-09-002-0012.2 Wastewater Force Mains

A. Velocities in force mains shall be determined for design capacities using the Hazen Williams formula. Flow capacities shall also be determined using the Hazen Williams formula.

B. Design velocities for wastewater force mains shall comply with ARS R18-9-E301 with a minimum of 3 and maximum of 7 feet per second.

C. New public wastewater force mains may be constructed using the following minimum material specification and subject to engineering analysis based on the specific design additional material specifications may apply:

1. Class 200 (polyvinyl chloride) PVC conforming to the appropriate MAG section.

2. Class 200 ductile iron pipe (DIP) conforming to the appropriate MAG section. DIP may be used for wastewater force mains, four (4) inches through twelve (12) inches in diameter. All ductile iron pipelines shall be polyethylene encased in accordance with MAG Specifications. When DIP is used, it shall be lined with Protecto 401 ceramic epoxy. Special design considerations may require a higher class rating of DIP.

3. DR 11 High density polyethylene (HDPE) wastewater pipe conforming to MAG Section 738 and AWWA C906.

D. Depth requirements for force mains shall conform to COF standards for water mains.

E. Separation requirements shall meet requirements defined in COF Engineering Standards section 13-09-001-0004 and the current MAG standards whichever is greater.

F. Force mains 6 inches and larger shall provide two-way cleanouts every 1,300 feet or 1-way cleanouts every 650 feet. Single cleanouts must be provided at all horizontal bends oriented in line with the downstream pipe. Lines 4 inches and smaller shall provide two-way cleanouts every 600 feet or 1-way cleanouts every 300 feet.

G. Joint restraint will be required everywhere where there are horizontal or vertical bends and in areas where the pipe is above ground.

H. Air release valves will be required at all high points.

13-09-002-0012.3 Force Main Discharge Manholes

A. Force main discharge manholes should conform to City of Scottsdale Standard Detail 2402 or approved equal.

B. Discharge manholes shall at a minimum be coated with a corrosion resistant epoxy coating approved by COF Water Services.

13-09-03-0012.4 Private Pressure Wastewater Systems

A. Private pressure wastewater systems, including individual pressure wastewater services are not allowed unless approved by the Utilities Division and the City Engineer. Off-site extensions of the public system in order to provide gravity service may be required. Should a private system be allowed, the following criteria shall be addressed prior to plan approval:

1. A provision for continued operation by the appropriate Class or Grade Operator as required in AAC R18-05-114.
2. A provision for scheduled routine operation and maintenance by qualified personnel and an operation and maintenance manual approved by ADEQ.
3. An emergency spill prevention and response plan shall be kept at the site and include provisions for twenty-four (24) hour response and mitigation by qualified personnel.
4. In accordance with AAC R18-9-E301, wastewater collection, force mains, and lift stations having the design flow of ten thousand (10,000) gpd or more shall maintain and revise, when needed, an operation and maintenance plan at the operator's control center (office) and the appropriate field person's vehicle.

5. Private pressure systems may not be placed within public Right-of-Way or public utility easement. Separate private utility easements may be required.

6. When a lift station is installed as an interim condition until the future extension of a gravity main, the developer shall pay to the City Utilities Division the estimated cost of decommissioning and removing the lift station and connecting to the gravity main.