

Division 15 Wastewater Facilities

Sec. 6.15.1 Purpose and Intent.

This division sets forth the general requirements for the design of a wastewater system.

Sec. 6.15.2 Decentralized systems.

- A. The decentralized WWTP shall be designed in compliance with FDEP and FDOH requirements and shall be constructed on a dedicated utility site, which will be preserved and protected for the WWTP, until connection to a centralized system is available.
- B. A decentralized WWTP constructed after **the effective date of this Code** shall be taken out of service, deeded, or reclassified under any of the following conditions, which may be appealed to the DRC:
 - (1) The decentralized system owner will be responsible for providing the surveying, design, permitting, and construction of all components necessary to connect the decentralized wastewater system to the centralized system. After connection, all components of the wastewater system will be owned, operated, and maintained by the centralized system owner; or
 - (2) The MCUD Director and a centralized system owner has determined the WWTP is suitable for expansion or inclusion into the centralized system owners Public Service Commission (PSC) territory, the WWTP property and all improvements shall be deeded to the centralized system owner and reclassified as a centralized system; or
 - (3) If the MCUD Director determines that the size, location, or other factors show the decentralized system is not feasible for connection or inclusion into a franchised territory, the system will be reclassified as a centralized system. The reclassified system must be operated and maintained by an FDEP approved service company.
- C. If the decentralized wastewater system is owned, operated, or maintained by an entity that has a PSC franchise and fails to meet the requirements of this section, such entity must, as a condition of such ownership or operation, agree to terminate or modify the franchise. The facility shall not be transferred to a centralized system owner without the project's decentralized water system also being transferred to that owner.

Sec. 6.15.3 Wastewater collection systems.

- A. Design Criteria
 - (1) The County will approve plans for new wastewater systems and extensions only when designed as separate systems in which precipitation, runoff and groundwater are excluded.
 - (2) Sewers systems shall be designed with the following minimum peak factors.

Table 6.15-3 Minimum Peak Factors*

Flow Range	Peak Factor
Flows to 100,000 GPD	4.0
100,000 GPD to 250,000 GPD	3.0
Flow greater than 1,000,000 GPD	2.5

*Peaking factors less than 2.5 may be considered for ADF above 2 MGD, if substantiated by data provided by an engineer.

- (3) ADF shall be calculated by the ERC method as outlined in **Article 7**.
- (4) Pipe shall be located in dedicated rights-of-way or utility easements.
- (5) Pipe located outside of dedicated rights-of-way shall require a minimum 20' easement. If a pipe is located adjacent to a road right-of-way, a minimum 10' easement shall be provided. Additional easement widths shall be provided if the pipe size or depth of cover so dictate.

- (6) Gravity sewer shall be located under pavement unless otherwise authorized by MCUD.
 - (7) Pipe shall not be placed under or within 10' of retention ponds, retention pond berms, or any vertical structures. Sewers shall not be located along side or rear lot lines.
- B. Gravity Sewer
- (1) No gravity sewer main conveying wastewater shall be less than 8" in diameter.
 - (2) The minimum cover over gravity sewers shall be no less than 3' calculated from the finished grade. Exceptions to this requirement may be made for a short length of pipe where structural considerations are incorporated in the design.
 - (3) All sewers shall be designed and constructed to give minimum velocities, when flowing full, of not less than 2 fps, based on Manning's Formula using an "n" value of 0.013. The following minimum slopes shall be provided:

Table 6.15-2 Minimum Slopes

Sewer Size	Minimum Slope in feet per 100 feet
8"	0.40
10"	0.28
12"	0.22
14"	0.17
16"	0.14
18"	0.12
20"	0.11
24" and larger	0.08

- (4) Where design velocities greater than 10 fps (only for peak instantaneous flows) are attained, due to topography or other reasons, special provisions shall be provided for sewer protection subject to **Article 7**.
 - (5) Sewers shall be laid with uniform slope between manholes.
 - (6) Size conversion between manholes shall not be allowed. All sewers shall be laid with straight alignments between manholes.
 - (7) Main drain and back wash systems for pools and spas and storm drain systems shall not connect to the gravity sewer system.
- C. Manholes
- (1) Manholes shall be installed as follows:
 - (a) at the end of each gravity sewer;
 - (b) at all changes in grade, size, or alignment;
 - (c) at all sewer intersections;
 - (d) at distances not greater than 400';
 - (e) a manhole shall be located at the right of way line to separate private sewer systems from the MCUD sewer system; and
 - (f) where sewer extensions for future connections terminate.
 - (2) An outside drop pipe shall be provided for a sewer entering a manhole where the invert elevation is 24" or more above the manhole invert.
 - (3) The manhole invert shall be filleted to prevent solids deposition when the difference in elevation between the incoming sewer invert and the manhole invert is less than 24".

- (4) Minimum inside diameter of manholes
 - (a) Sewers 24" in diameter and smaller, the minimum shall be 48".
 - (b) Sewers between 24" and 36", the minimum shall be 60".
 - (c) Sewers larger than 36" in diameter, minimum shall be 72".
 - (5) A minimum access cover diameter of 24" shall be provided for all manholes.
 - (6) The flow channel through manholes shall be made to conform in shape and slope to that of the sewers. Vertical and/or horizontal flow direction changes in excess of 90° shall not be included in sewer alignments without MCUD approval.
 - (7) Manholes, frames, and covers shall be constructed as specified in **Article 7**.
 - (8) A MCUD approved lining shall be required on manholes receiving force mains.
 - (9) Inflow prevention lids shall be provided for manholes not in the crown or center of the roadway or in areas subject to ponding or flooding.
 - (10) Access shall be provided to all manholes located outside of roadways consistent with **Article 7**.
- D. Service Connections
- (1) Service connection shall be through a service lateral.
 - (2) A cleanout shall be provided at the property line.
 - (3) Service laterals and fittings shall be a minimum of 6" in diameter. All service laterals shall be less than 100' in length.
 - (4) Service laterals shall have a minimum slope of one percent.
- E. Wastewater Force Mains
- (1) Only 4", 6", 8", 10", 12", 16", 20", 24", 30", 36", 42", 48", and 54" diameter force mains shall be permitted.
 - (2) At design pumping rates, a cleansing velocity of at least 2.5 fps should be maintained. Maximum velocity at design pumping rates should not exceed 8 fps for ductile iron pipe (DIP) or 5 fps for PVC pipe.
 - (3) Friction losses through force mains shall be based on the Hazen and Williams Formula. In the use of Hazen and Williams Formula, the value for "C" shall be 120 for DIP and 130 for PVC pipe. "C" values greater than 130 shall not be allowed. When initially installed, force mains may have a significantly higher "C" factor. The higher "C" factor should be considered only in calculating maximum power requirements and duty cycle time of the motor.
 - (4) The force main and fittings, including all restrained joint fittings and pipe restraints, shall be designed to withstand pump operating pressures and pressure surges, but not less than 100 psi. The design engineer shall determine the minimum length of pipe to be restrained on each side of the fitting.
 - (5) Force mains shall enter the gravity sewer system at a manhole not more than 1' above the flow line of the receiving manhole and shall have an MCUD approved liner.
 - (6) Valves
 - (a) Valves shall be in a manhole or a valve vault.
 - (b) Valves shall be clearly delineated on the force main profile in the drawings.
 - (c) Valve spacing shall not exceed 2,000'.
 - (d) Valves shall be easily accessible.
 - (e) Valves shall not be subject to flooding.
 - (f) Air release valves, or air/vacuum relief valves, shall be provided as necessary.
 - (g) Plug valves shall be provided at both ends of all crossings so that the section can be isolated for testing or repair.

- (h) Sufficient plug valves shall be provided on force main systems to facilitate effective isolation of the pipe system for repairs and maintenance.
- (7) Aerial and underwater crossings shall be subject to approval by MCUD.
- (8) Material, installation, and testing shall be determined utilizing provisions of Article 7.
- (9) A means for locating and identifying all force mains and valves shall be provided in accordance with the provisions in Article 7.
- (10) Provision for the installation of permanent access points into and egress points out of the piping system for pigging and cleaning purposes shall be incorporated into 8" and larger force mains. Wherever possible, pigging ports shall be located and incorporated within the lift station sites.

Sec. 6.15.4 Wastewater Pump Stations.

- A. Private Pump Stations shall be:
 - (1) Designed by an engineer and approved by FDEP;
 - (2) Not located directly adjacent to public thoroughfares; and
 - (3) Pump stations shall be located on fee simple tracts of land adjacent to rights-of-way, with the exception of private pump stations serving single owner properties.
- B. Private Pump Stations with flow to a MCUD system shall be:
 - (1) Designed by an engineer and approved by FDEP and MCUD per Article 7;
 - (2) Not located directly adjacent to public thoroughfares; and
 - (3) Pump stations shall be located on fee simple tracts of land adjacent to rights-of-way, with the exception of private pump stations serving single owner properties.
- C. Marion County pump stations shall be designed by an engineer, approved by FDEP, and conform to the following:
 - (1) Design
 - (a) Pump stations to be dedicated to and operated by MCUD shall be designed to MCUD specifications based on the size of the pump station.
 - (b) Pump stations shall have wet wells designed and constructed to serve the lowest developable point on all adjacent vacant tracts of land surrounding a project by means of gravity flow only. The appropriate sized utilities easement(s) shall be provided by the developer so the gravity wastewater mains from all surrounding tracts of land can easily be connected to the wet well of the pump station.
 - (c) The engineer shall submit the design and calculations for all wastewater pump stations to MCUD for review and approval. Calculations shall include:
 - 1. High head and low head condition system curves plotted on the manufacturer's pump curve;
 - 2. Hydraulic analysis of force main system including all friction and minor losses;
 - 3. Operating cycles with wet well sizing; and
 - 4. Buoyancy calculations.
 - (d) The design basis for all calculations shall provide for 60 percent of all receiving system pumps to be operating at the time that the proposed pump station is to be operating.
 - (e) System curves shall verify that the pumps are operating at peak efficiency in accordance with the manufacturer's specifications and are suitable for the design flow application.
 - (f) Pump and motor selection shall be designed on the hydraulic grade line at the point of connection as based on the MCUD master plan model for the utility service area affected by the proposed development.
 - (g) Each component of the pump station shall be designed to accommodate the development's design flow at the prevailing system conditions at the time of build out.

- (h) Pump station structures, electrical equipment, and mechanical equipment shall be designed to be protected from physical damage by a 100-year 24-hour storm event. The bottom of all station control and electrical boxes shall be no lower than the one percent (100-year) flood plain flood elevation.
 - (i) Wastewater pump stations shall remain fully operational and accessible during a 100-year 24-hour storm event. The top elevation of the wet well shall be no lower than the one percent (100-year) flood plain flood elevation. On a case-by-case basis, the top elevation of the wet well may be lower if it can be shown that no drainage runoff from the surrounding areas will flow to the pump station site at any time.
 - (j) The top elevation of the control panel shall not exceed maximum distance from the pump station's concrete pad that is allowed by Code.
 - (k) The pump station site design shall insure positive stormwater drainage radiates outward from the center of the wet well to the boundaries of the site and away from the pump station site. Access driveways and roadways shall be designed to prevent stormwater conveyance onto the pump station site.
 - (l) The pump station shall be readily accessible by maintenance vehicles during all weather conditions including a 100-year 24-hour storm event. The pump station driveway shall be concrete. A temporary 12' wide paved asphalt access road (1.5" thick FDOT SP-9.5 Asphaltic Concrete, 6" thick LBR 40 Limerock Base, and 6" thick FBV 75 Sub-Base) shall be provided by the developer and utilized by MCUD until the temporary access is replaced with a platted roadway.
 - (m) A complete system for the control of odors shall be provided as required and specified by MCUD.
 - (n) A supervisory control and data acquisition capable control panel shall be provided and of type to match pump station configuration.
- (2) Site and Location
- (a) Pump stations shall be located on fee simple tracts of land adjacent to rights-of-way.
 - (b) No part of a pump station, regardless of ownership, shall be located in a roadway median, in the middle of a cul-de-sac, within any portion of a public or private right-of-way, directly in front or behind of an occupied structure on the same side of the roadway, or less than 50' perpendicularly from the intersection of two or more rights-of-way.
 - (c) Permanent and temporary vehicular access to a pump station shall freely accommodate the turning movements of a 40' long and 9' wide single unit truck vehicle with a 28' wheelbase as specified by the Institute of Transportation Engineers. Vehicular backup distance shall not exceed 60'.
 - (d) Driveways to pump stations on residential roadways shall not be less than 30' in length from the pump station's gates to the adjacent roadway's edge of pavement or back of curb so as not to totally block both lanes of travel. The driveway length along all other roadways shall not be less than 45'.
 - (e) Pump station sites shall be sized as delineated in the standard drawings for duplex and triplex stations per the pump station site plans.
 - (f) The developer shall dedicate the pump station site and driveway by plat or separate instrument to MCUD. Dedicated easements shall be shown as specified on the pump station site plans in the standard drawings.
 - (g) A minimum 20' wide utilities easement that provides for ingress and egress to the pump station.
- (3) Pump stations shall be completely enclosed to maintain and control access consistent with Article 7.
- (4) Emergency generators shall be provided for pump stations as required by MCUD. Generator specification and installation shall comply with Article 7.

Sec. 6.15.5 Water Reclamation Facilities.

The design of water reclamation facilities shall be designed according to FDEP BMPs, current compliance standards, and MCUD requirements.

Division 16 Reuse Facilities

Sec. 6.16.1 Purpose and Intent.

This division sets forth the general requirements for the design of a reclaimed water system.

Sec. 6.16.2 Applicability.

- A. New projects required to connect to central water and/or sewer shall complete a [Water Reuse Feasibility Assessment Form](#) provided by the County.
- B. The completed [Water Reuse Feasibility Assessment Form](#) shall be submitted to the County along with any application required for special use permit and/or with any site improvement plan, master plan or other applicable document submitted for development review.
- C. MCUD shall evaluate the information provided by the applicant and make a determination if incorporation into MCUD's reclaimed water system represents a beneficial use of the reclaimed water resource. The developer may appeal the determination of the MCUD to the DRC.

Sec. 6.16.3 An executed Developer's agreement for reuse distribution (irrigation) systems shall be required prior to receipt of potable water and wastewater service, if project is required to connect to MCUD reclaimed water system.

Sec. 6.16.4 Design standards.

- A. Approved and prohibited uses of reclaimed water shall comply with FAC 62-610, Reuse of Reclaimed Water and Land Application, Part III.
- B. The water reuse potential of a project shall be based on the anticipated irrigation demand at an annual average irrigation rate calculated consistent with water management district guidelines.
- C. Reclaimed water systems shall be designed to promote efficient reclaimed water usage and for the estimated ultimate irrigation demand, based on planned development build-out. The developer is responsible for sizing the mains within the development property limits (on-site). Individual single-family homes are exempt from providing design calculations for irrigation systems with one inch or smaller meters.
- D. Reclaimed water mains outside the development limits (off-site) shall be sized using the flow calculations and peak hourly factor below:
 - (1) The weekly reclaimed water flow shall be based on a minimum of 1" per week over the irrigable area of the property.
 - (2) Peak hourly factor:
 - (a) For commercial developments, the peak reclaimed water flow shall be calculated by dividing the weekly flow by the allowed days of irrigation per week and multiplying the result by a peak hourly factor of six. Irrigation zones shall be provided to uniformly distribute flows so that the maximum peak hourly factor is not exceeded. Alternate irrigation system designs will be evaluated on a case-by-case basis.
 - (b) For single family residential developments, the peak reclaimed water flow shall be calculated by dividing the weekly flow by the allowed days of irrigation per week and multiplying the result by a peak hourly factor of six.

E. Design Calculations

- (1) Project Engineer or Landscape Architect shall submit signed, sealed and dated hydraulic calculations with the master plan and the plans for all reclaimed water distribution projects. Calculations shall show sufficient hydraulic capacity to transport peak flows. All head losses and minor losses shall be included in the calculations.
- (2) An engineering submittal for proposed on-site storage ponds shall be submitted to MCUD for review and approval. The submittal shall include two copies of construction plans and an engineering report supporting the pond design. The submittal must meet the requirements of MCUD, as well as FAC 62-610.

F. Location

- (1) Reclaimed mains shall maintain a consistent alignment with respect to the centerline of the road when installed in rights-of-way.
- (2) Reclaimed mains located outside of dedicated rights-of-way shall require a minimum 20' easement shall be provided if it is not adjacent to the road right-of-way.
- (3) Reclaimed mains located adjacent to a road right-of-way shall have a minimum of a 15' easement.
- (4) Additional easement widths shall be determined by MCUD, when necessary.
- (5) Reclaimed mains shall not be placed under or within 10' of the high water line of retention ponds, retention pond berms, or any vertical structures.
- (6) Reclaimed mains shall not be located along side or rear lot lines, except when approved by MCUD.
- (7) Proposed commercial and residential development offsite mains shall be extended a minimum of 10' beyond the furthest entrance to the development.

Sec. 6.16.5 Service connections and metering

A. Service connections

- (1) Connections shall conform to the applicable provisions of the **Article 7**.
- (2) Only 1", 2", 4", 6", and 8" services will be permitted. All services greater than 8" will be evaluated on a case-by-case basis, as determined by MCUD.
- (3) 1" and 2" services shall be polyethylene tubing. Services 4" and larger shall be DIP from the point of connection to the existing main to the meter assembly, if the existing main is on the same side of the street as the property. If the main is on the opposite side of the street, as a minimum, the segment of pipe immediately upstream from the meter assembly shall be DIP.
- (4) MCUD will install up to 2" services on existing reclaimed water mains, after payment of applicable fees. Services and connections 4" or larger to new or existing reclaimed water systems shall be installed by the developer.

B. Reclaimed water metering

- (1) All reclaimed water service connections shall be metered.
- (2) A master metering system is required when reclaimed water flow dictates installation of a 4" or larger meter. However, the engineer must obtain approval before finalizing the metering system design.
- (3) Meter boxes shall not be installed in sidewalks, driveways or areas subject to vehicular traffic unless specifically approved by MCUD. Meters subject to vehicular traffic shall be installed in a traffic rated meter box.
- (4) All commercial, industrial, institutional, shopping centers, apartments, and condominium projects shall require installation of one meter to service the entire development.
- (5) Meters larger than 2" shall be installed by the developer. Installation of meters 2" and smaller will be performed by MCUD. Meters 1" or smaller in size will be installed underground in an approved meter box. Meters that are 1.5" and larger shall be installed above ground, within a utility easement adjacent to the public right of way.

- (6) Size of all meters shall be determined in accordance with current AWWA Standards.

Sec. 6.16.6 Non-residential Irrigation wells.

- A. Existing or proposed wells may be utilized as a back-up supply of irrigation water in the case of an interruption of service from the reclaimed water system.
- B. Existing or proposed wells shall be protected from reclaimed water entering the well by a reduced pressure backflow preventer.

Sec. 6.16.7 On-site storage.

- A. On-site storage may be required when the supply pipe requirement is 2" or greater. The volume of the on-site storage ponds or tanks shall be equal to or greater than the annual average daily demand during a 24-hour period.
- B. On-site storage ponds shall be lined, operated and maintained by the pond owner.
- C. The pond shall include a level control device to avoid overflow.
- D. The pond reclaimed water meter assembly shall include a pressure sustaining valve to protect the system pressure.
- E. No monitoring wells shall be approved.

Sec. 6.16.8 Backflow prevention.

- (1) Backflow prevention for all new development shall follow all rules, regulations, and procedures as set forth in the AWWA Manual 14, Practice for Backflow Prevention and Cross-Connection Control.
- (2) An approved backflow prevention device shall be required to protect the reclaimed water system from contamination due to cross-connection with a private system utilizing a chemical injection and/or stormwater augmentation systems.
- (3) An approved double check valve assembly shall be required for developments that use reclaimed water with chemical injection and/or stormwater augmentation systems that add potential contaminants such as fertilizer, pesticides, and algaecides.
- (4) An approved RPZ shall be required for projects with a higher degree of hazard, as determined by MCUD.
- (5) All backflow prevention devices shall be located directly downstream of the reclaimed water meter serving the owner's property. Backflow prevention devices shall be installed per **Article 7**. It shall be the owner's responsibility to pay for, install, and maintain all backflow prevention devices.