

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

The Missouri Department of Natural Resources hereby issues a permit to:

City of Potosi
Potosi WWTF #2
State Highway O
Cadet, MO 63630

for the construction of (described facilities):

See attached.

Permit Conditions:

See attached.

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo, and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources (department).

As the department does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.

A representative of the department may inspect the work covered by this permit during construction. Issuance of a permit to operate by the department will be contingent on the work substantially adhering to the approved plans and specifications.

This permit applies only to the construction of water pollution control components; it does not apply to other environmentally regulated areas.

October 3, 2024

Effective Date

January 15, 2027

Expiration Date



John Hoke, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The Potosi WWTF #2 is located at State Highway O, Cadet, in Washington County, Missouri. Construction is to update and make improvements to the Potosi WWTF #2 with either new equipment and/or replacement of existing equipment. Construction will include new fine screens, new influent pumps, new drum screens, conversion of the existing oxidation ditch into flow equalization, construction of a new oxidation ditch, replacement of equipment in existing secondary clarifiers, a new secondary clarifier, new UV disinfection system, and new aerated sludge storage. The design flow will remain the same at 210,000 gallons per day (gpd) or 0.21 million gallons per day (MGD).

A closure plan will need to be submitted to the Southeast Regional Office for review and approval prior to any closure activities. Identified closure activities within the construction permit include the closure of the oxidation ditch and the demolition of the existing drum screens.

This project will also include general site work appropriate to the scope and purpose of the project and all necessary appurtenances to make a complete and usable wastewater treatment facility.

II. COST ANALYSIS FOR COMPLIANCE

Pursuant to Section 644.145, RSMo, when issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or publicly owned treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or [publicly owned] treatment works, the Department of Natural Resources shall make a “finding of affordability” on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control Act. This process is completed through a cost analysis for compliance. Permits that do not include new requirements may be deemed affordable.

The department is not required to complete a cost analysis for compliance because the facility is not a combined or separate sanitary sewer system for a publicly-owned treatment works.

III. CONSTRUCTION PERMIT CONDITIONS

The permittee is authorized to construct subject to the following conditions:

1. This construction permit does not authorize discharge.
2. All construction shall be consistent with plans and specifications signed and sealed by Alissha Feeler, P.E., with Archer-Elgin Engineering & Surveying and as described in this permit.
3. The department must be contacted in writing prior to making any changes to the plans and specifications that would directly or indirectly have an impact on the capacity, flow, system layout, or reliability of the proposed wastewater treatment facilities or any design parameter that is addressed by 10 CSR 20-8, in accordance with 10 CSR 20-8.110(11).
4. State and federal law does not permit bypassing of raw wastewater, therefore steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the department's Southeast Regional Office per 10 CSR 20-7.015(9)(G).
5. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of one acre or more to obtain a Missouri state operating permit to discharge stormwater. The permit requires best management practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the department's ePermitting system available online at <https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem>. See <https://dnr.mo.gov/data-e-services/water/electronic-permitting-epermitting> for more information.
6. A United States Army Corps of Engineers (USACE) Clean Water Act Section 404 Department of the Army permit and a Section 401 Water Quality Certification issued by the department may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied or notification is provided that no Section 404 permit is required by the USACE. You must contact your local USACE district since they determine what waters are jurisdictional and which permitting requirements may apply. You may call the department's Water Protection Program, Operating Permits Section at 573-522-4502 for more information. See <https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality> for more information.
7. In accordance with 10 CSR 20-6.010(12), a full closure plan shall be submitted to the department's Southeast Regional Office for review and approval of any permitted wastewater treatment system being replaced. The closure plan must meet the requirements outlined in Standard Conditions Part III of the Missouri State Operating Permit No. MO- 0099732.

8. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements listed below.
- Flood protection shall apply to new construction and to existing facilities undergoing major modification. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the 100- year flood elevation. 10 CSR 20-8.140 (2) (B)
 - Unless another distance is determined by the Missouri Geological Survey or by the department's Public Drinking Water Branch, the minimum distance between wastewater treatment facilities and all potable water sources shall be at least 300 feet. 10 CSR 20-8.140 (2) (C) 1.
 - Facilities shall be readily accessible by authorized personnel from a public right-of-way at all times. 10 CSR 20-8.140 (2) (D)
 - The outfall shall be so constructed and protected against the effects of flood water, ice, or other hazards as to reasonably ensure its structural stability and freedom from stoppage. 10 CSR 20-8.140 (6) (A)
 - All sampling points shall be designed so that a representative and discrete 24-hour automatic composite sample or grab sample of the effluent discharge can be obtained at a point after the final treatment process and before discharge to or mixing with the receiving waters. 10 CSR 20-8.140 (6) (B)
 - All outfalls shall be posted with a permanent sign indicating the outfall number (i.e., Outfall #001). 10 CSR 20-8.140 (6) (C)
 - All wastewater treatment facilities shall be provided with an alternate source of electric power or pumping capability to allow continuity of operation during power failures. 10 CSR 20-8.140 (7) (A) 1.
 - Disinfection and dechlorination, when used, shall be provided during all power outages. 10 CSR 20-8.140 (7) (A) 2.
 - Electrical systems and components in raw wastewater or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors that are normally present, shall comply with the NFPA 70 *National Electric Code (NEC)* (2017 Edition), as approved and published August 24, 2016, requirements for Class I, Division 1, Group D locations. 10 CSR 20-8.140 (7) (B)
 - An audiovisual alarm or a more advanced alert system, with a self-contained power supply, capable of monitoring the condition of equipment whose failure could result in a violation of the operating permit, shall be provided for all wastewater treatment facilities. 10 CSR 20-8.140 (7) (C)
 - No piping or other connections shall exist in any part of the wastewater treatment facility that might cause the contamination of a potable water supply. 10 CSR 20-8.140 (7) (D) 1.
 - Hot water for any direct connections shall not be taken directly from a boiler used for supplying hot water to a digester heating unit or heat exchanger. 10 CSR 20-8.140 (7) (D) 2.
 - Where a potable water supply is to be used for any purpose in a wastewater treatment facility other than direct connections, a break tank, pressure pump, and pressure tank or a reduced pressure backflow preventer consistent with the department's Public Drinking Water Branch shall be provided. 10 CSR 20-8.140 (7) (D) 3. A.

- For indirect connections, a sign shall be permanently posted at every hose bib, faucet, hydrant, or sill cock located on the water system beyond the break tank or backflow preventer to indicate that the water is not safe for drinking. 10 CSR 20-8.140 (7) (D) 3. B.
- Where a separate non-potable water supply is to be provided, a break tank will not be necessary, but all system outlets shall be posted with a permanent sign indicating the water is not safe for drinking. 10 CSR 20-8.140 (7) (D) 4.
- A means of flow measurement shall be provided at all wastewater treatment facilities. 10 CSR 20-8.140 (7) (E)
- Effluent 24-hour composite automatic sampling equipment shall be provided at all mechanical wastewater treatment facilities and at other facilities where necessary under provisions of the operating permit. 10 CSR 20-8.140 (7) (F)
- Isolate all wastewater treatment components installed in a building where other equipment or offices are located from the rest of the building by an air-tight partition, provide separate outside entrances, and provide separate and independent fresh air supply. 10 CSR 20-8.140 (7) (G)
- Adequate provisions shall be made to effectively protect facility personnel and visitors from hazards. The following shall be provided to fulfill the particular needs of each wastewater treatment facility:
 - Fencing. Enclose the facility site with a fence designed to discourage the entrance of unauthorized persons and animals; 10 CSR 20-8.140 (8) (A)
 - Gratings over appropriate areas of treatment units where access for maintenance is necessary; 10 CSR 20-8.140 (8) (B)
 - First aid equipment; 10 CSR 20-8.140 (8) (C)
 - Posted “No Smoking” signs in hazardous areas; 10 CSR 20-8.140 (8) (D)
 - Appropriate personal protective equipment (PPE); 10 CSR 20-8.140 (8) (E)
 - Portable blower and hose sufficient to ventilate accessed confined spaces; 10 CSR 20-8.140 (8) (F)
 - 10 CSR 20-8.140 (8) (G) Portable lighting equipment complying with NEC requirements. See subsection (7)(B) of this rule;
 - 10 CSR 20-8.140 (8) (H) Gas detectors listed and labeled for use in NEC Class I, Division 1, Group D locations. See subsection (7)(B) of this rule;
 - Appropriately-placed warning signs for slippery areas, non-potable water fixtures (see subparagraph (7)(D)3.B. of this rule), low head clearance areas, open service manholes, hazardous chemical storage areas, flammable fuel storage areas, high noise areas, etc.; 10 CSR 20-8.140 (8) (I)
 - Ventilation shall include the following:
 - Isolate all pumping stations and wastewater treatment components installed in a building where other equipment or offices are located from the rest of the building by an air-tight partition, provide separate outside entrances, and provide separate and independent fresh air supply; 10 CSR 20-8.140 (8) (J) 1.
 - Force fresh air into enclosed screening device areas or open pits more than four feet deep. 10 CSR 20-8.140 (8) (J) 2.

- Dampers are not to be used on exhaust or fresh air ducts. Avoid the use of fine screens or other obstructions on exhaust or fresh air ducts to prevent clogging; 10 CSR 20-8.140 (8) (J) 3.
- Where continuous ventilation is needed (e.g., housed facilities), provide at least 12 complete air changes per hour. Where continuous ventilation would cause excessive heat loss, provide intermittent ventilation of at least 30 complete air changes per hour when facility personnel enter the area. Base air change demands on 100 percent fresh air; 10 CSR 20-8.140 (8) (J) 4.
- Electrical controls. Mark and conveniently locate switches for operation of ventilation equipment outside of the wet well or building. Interconnect all intermittently operated ventilation equipment with the respective wet well, dry well, or building lighting system. The manual lighting/ventilation switch is expected to override the automatic controls. For a two speed ventilation system with automatic switch over where gas detection equipment is installed, increase the ventilation rate automatically in response to the detection of hazardous concentrations of gases or vapors; 10 CSR 20-8.140 (8) (J) 5.
- Fabricate the fan wheel from non-sparking material. Provide automatic heating and dehumidification equipment in all dry wells and buildings. 10 CSR 20-8.140 (8) (J) 6.
- Explosion-proof electrical equipment, non-sparking tools, gas detectors, and similar devices, in work areas where hazardous conditions may exist, such as digester vaults and other locations where potentially explosive atmospheres of flammable gas or vapor with air may accumulate. 10 CSR 20-8.140 (8) (K)
- Provisions for local lockout/tagout on stop motor controls and other devices; 10 CSR 20-8.140 (8) (L)
- Provisions for an arc flash hazard analysis and determination of the flash protection boundary distance and type of PPE to reduce exposure to major electrical hazards shall be in accordance with NFPA 70E *Standard for Electrical Safety in the Workplace* (2018 Edition), as approved and published August 21, 2017. 10 CSR 20-8.140 (8) (M)
- All wastewater treatment facilities must have a screening device, comminutor, or septic tank for the purpose of removing debris and nuisance materials from the influent wastewater. 10 CSR 20-8.150 (2)
- All screening devices and screening storage areas shall be protected from freezing. 10 CSR 20-8.150 (4) (A) 1.
- Provisions shall be made for isolating or removing screening devices from their location for servicing. 10 CSR 20-8.150 (4) (A) 2.
- Manually cleaned screen channels shall be protected by guard railings and deck gratings with adequate provisions for removal or opening to facilitate raking. 10 CSR 20-8.150 (4) (A) 3. A. (I)
- Mechanically cleaned screen channels shall be protected by guard railings and deck gratings. 10 CSR 20-8.150 (4) (A) 3. A. (II)

- Mechanical screening equipment shall have adequate removal enclosures to protect facility personnel against accidental contact with moving parts and to prevent dripping in multi-level installations. 10 CSR 20-8.150 (4) (A) 3. B. (I)
- A positive means of locking out each mechanical screening device shall be provided. 10 CSR 20-8.150 (4) (A) 3. B. (II)
- An emergency stop button with an automatic reverse function shall be located in close proximity to the mechanical screening device. 10 CSR 20-8.150 (4) (A) 3. B. (III)
- Electrical systems and components in raw wastewater or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors that are normally present, shall comply with the NFPA 70 *National Electric Code (NEC)* (2017 Edition), as approved and published August 24, 2016, requirements for Class I, Division 1, Group D locations. 10 CSR 20-8.140 (7) (B)
- Effective flow splitting devices and control appurtenances (*e.g.* gates and splitter boxes) shall be provided to permit proper proportioning of flow and solids loading to each settling unit, throughout the expected range of flows. 10 CSR 20-8.160 (2) (B)
- Overflow weirs shall be readily adjustable over the life of the structure to correct for differential settlement of the tank. 10 CSR 20-8.160 (3) (C) 1.
- Walls of settling tanks shall extend at least 6 inches above the surrounding ground surface and shall provide not less than 12 inches of freeboard. 10 CSR 20-8.160 (3) (E)
- Safety features shall appropriately include machinery covers, life lines, handrails on all stairways and walkways, and slip resistant surfaces. For additional safety follow the provisions listed in 10 CSR 20-8.140(8). 10 CSR 20-8.160 (5) (A)
- The design shall provide for convenient and safe access to routine maintenance items such as gear boxes, scum removal mechanism, baffles, weirs, inlet stilling baffle areas, and effluent channels. 10 CSR 20-8.160 (5) (B)
- For electrical equipment, fixtures, and controls in enclosed settling basins and scum tanks, where hazardous concentrations of flammable gases or vapors may accumulate, follow the provisions in 10 CSR 20-8.140(7)(B). The fixtures and controls shall be conveniently located and safely accessible for operation and maintenance. 10 CSR 20-8.160 (5) (C)
- Emergency Power. Disinfection and dechlorination processes, when used, shall be provided during all power outages. 10 CSR 20-8.190 (2) (A)
- The UV dosage shall be based on the design peak hourly flow, maximum rate of pumpage, or peak batch flow. 10 CSR 20-8.190 (5) (A) 1.
- If no flow equalization is provided for a batch discharger, the UV dosage shall be based on the peak batch flow. 10 CSR 20-8.190 (5) (A) 2.
- The UV system shall deliver the target dosage based on equipment derating factors and, if needed, have the UV equipment manufacturer verify that the scale up or scale down factor utilized in the design is appropriate for the specific application under consideration. 10 CSR 20-8.190 (5) (A) 3.
- The UV system shall deliver a minimum UV dosage of 30,000 microwatt seconds per centimeters squared ($\mu\text{W} \cdot \text{s}/\text{cm}^2$). 10 CSR 20-8.190 (5) (A) 4.

- Open channel UV systems. The combination of the total number of banks shall be capable of treating the design peak hourly flow, maximum rate of pumpage, or peak batch flow. 10 CSR 20-8.190 (5) (B) 1.
- The UV system must continuously monitor and display at the UV system control panel the following minimum conditions:
 - The relative intensity of each bank or closed vessel system; 10 CSR 20-8.190 (5) (C) 1. A.
 - The operational status and condition of each bank or closed vessel system; 10 CSR 20-8.190 (5) (C) 1. B.
 - The ON/OFF status of each lamp in the system; 10 CSR 20-8.190 (5) (C) 1. C. and
 - The total number of operating hours of each bank or each closed vessel system. 10 CSR 20-8.190 (5) (C) 1. D.
- The UV system shall include an alarm system. Alarm systems shall comply with 10 CSR 20-8.140(7)(C). 10 CSR 20-8.190 (5) (C) 2.

9. Upon completion of construction:

- A. The City of Potosi will become the continuing authority for operation and maintenance of these facilities;
- B. Submit an electronic copy of the as built; and
- C. Submit the Statement of Work Completed form to the department in accordance with 10 CSR 20-6.010(5)(N) (<https://dnr.mo.gov/document-search/wastewater-construction-statement-work-completed-mo-780-2155>). The operating permit renewal issued in 2024 includes the updated facility description, as there was no change in effluent limits or receiving stream with the construction permit. No operating permit modification fee required.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

Construction is to update and make improvements to the Potosi WWTF #2 with either new equipment or replacement of existing equipment. This is to help ensure the facility will remain in compliance with existing effluent limits and to prepare for future changes to water quality standards and growth within Potosi. The design flow will remain the same at 210,000 gpd (0.21 MGD).

2. FACILITY DESCRIPTION

The Potosi WWTF #2 is located at State Highway O, Cadet, in Washington County, Missouri. The existing system has influent screening, flow splitters, 2 oxidation ditches, 2 secondary clarifiers, Parshall flume, UV disinfection. Construction will include replacement/modification work in the fine screen, influent pump station, drum screen, flow equalization, oxidation ditch, new flow splitters, secondary clarifiers, RAS/WAS pump station, effluent flow metering structure, the disinfection system, and construction of a new sludge storage basin. Bid alternates covered in the project include construction of a new channel grinder, a 3rd secondary clarifier, and a 4th sludge storage basin.

The facility has a design average flow of 210,000 gpd and serves a hydraulic population equivalent of approximately 2,100 people.

3. COMPLIANCE PARAMETERS

The facility will retain their existing permit effluent limits after completion of construction, MO-009732. The facility is in compliance with the existing limits.

4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

Existing major components that will remain in use include the following:

- Manual Coarse Bar Screen – The existing manual coarse bar will serve as back-up if the fine screen is offline for maintenance. The coarse bar screen will be immediately upstream of the fine screen.
- Existing concrete flow splitter between the drum screen and the oxidation ditch will remain.
- RAS/WAS pump station and the 8-inch lines will continue to be used.
- Sludge storage basin #1 with 6,845 cubic ft of storage (51,200 gallons).
 - Dimensions are 20 ft by 76 ft with a sidewater depth of 4.5 ft and a SRT of 27 days.
- Sludge storage basin #2 with 8,476 cubic ft of storage (63,400 gallons)
 - Dimensions are 30 ft diameter with 12 ft sidewater depth and an SRT of 34 days.

Construction will cover the following items:

- Screening – Installation of screening devices removes nuisance inorganic materials from raw wastewater.
 - Channel Grinder (Bid Alternate) – The channel grinder will grind waste in the influent stream to help prevent clogging of downstream piping.
 - The channel grinder will be able to handle a peak flow of 0.75 MGD.
 - From the channel grinder it will go through the existing Manhole MH1 and the 12-inch pipe to the fine screen.

- Mechanical Fine Screen – One mechanically cleaned fine screen with a maximum perforated plate spacing of 6 mm located within the fine screen building for outdoor protection.
 - The screening devices shall be capable of treating a design average flow of 210,000 gpd (0.21 MGD) and a peak flow of 0.75 MGD.
 - Mechanical screen channel will be 2 ft by 11.16 ft, with a channel velocity downstream of the screen of 2.07 fps.
 - The addition of a washer/compactor and screenings conveyor will mitigate the increased volume of screenings captured by washing, dewatering, and compacting the screenings prior to disposal.
 - For maintenance activities, the existing manual bar screen located immediately upstream of the proposed fine screen will be used.
 - The screening structure is followed by the influent pump station through a 12-inch pipe.

- Influent Pump Station – Pumps within the existing influent duplex pump station will be replaced to help facility gravity flow through the plant to facilitate that the discharge is above the 100-year flood elevation. Each submersible, non-clog centrifugal pump is capable of operating at 521 gpm (0.75 MGD) at 22.4 ft TDH.
 - 1 pump will be duty and 1 will be standby.
 - The pumps will discharge to the 8-inch forcemain to the drum screen.
 - Return activated sludge will enter in the influent pump station.

- Drum screen - The purpose of the drum screen is for additional removal of inorganic solids not removed by the fine screen. Construction will replace the existing 2 drum screens with a new drum screens (1 firm+1 standby). Each drum screens shall be capable of treating a design average flow of 210,000 gpd (0.21 MGD) and a peak flow of 0.75 MGD, with a screen clear opening size of 1 mm.
 - The removal of the existing drum screen and its building must be covered in the closure plan submitted to SERO.
 - Within the drum screen building there will be a combination louver/damper intake. The damper will be open when the exhaust fan is on.
 - The exhaust fan will provide 852 cfm, providing approximately 14 air exchanges per hour.
 - Following the drum screen, flows will be split between the existing oxidation ditch and the new oxidation ditch.

- Existing oxidation ditch - The existing oxidation ditch will be converted to a flow equalization basin, and will have the rotors removed, following completion of construction of the new oxidation ditch.
 - The ditch has a sidewater depth of 5 ft, a channel width of 6 ft and a racetrack length of 275 ft, providing approximately 130,000 gallons with the 2 channels.
 - Flow equalization volume will be approximately 14.8 hours of storage time at design average flow of 0.21 MGD.
 - There will be a line returning flow from the equalization basin back to the flow splitter area for treatment in the new oxidation ditch.

- The existing 2nd oxidation ditch will be removed from service, as the new oxidation ditch will be within the footprint of the existing 2nd oxidation ditch. A closure plan must be submitted to the SERO for its closure.
- Oxidation Ditch –The new oxidation ditch is approximately 93.75 ft long by 20.38 ft channel width with a sidewater depth of 10 ft and 1 ft of freeboard.
 - The oxidation ditch will have 2 rotors. The volume of the basin is approximately 260,500 gallons, which provides a hydraulic retention time of 30 hours.
 - The F/M ratio is 0.09
 - The design SRT is 23.8 days with a design MLSS of 3,500 mg/L.
 - Total oxygen required is 1,559 lb/day (65 lbs/hr), with a standard oxygen transfer rate design of 107 lb O₂ / hr. Aeration supplied to the basin is approximately 2,568 lbs O₂ / day.
 - From the oxidation ditch, flows will go to the flow splitter to be split between the two existing secondary clarifiers and the new clarifier.
- Secondary Clarifier – Potosi WWTF #2 has two existing peripheral feed secondary clarifiers. Construction will include replacement of existing equipment within those clarifiers and as a bid alternate, the construction of a third peripheral feed clarifier.
 - The existing secondary clarifiers have a diameter of 24 ft with a sidewater depth of 12 ft, and a surface area of 452 ft² per clarifier (904 ft² for both clarifiers).
 - Each clarifier has an approximate volume of 40,606 gallons, which will provide 4.6 hours of hydraulic retention time at design average flow of 0.21 MGD and 1.3 hours at peak flow of 0.75 MGD.
 - Both clarifiers operating together would provide a volume of 81,212 gallons, which provides 9.3 hours at design average flow of 0.21 MGD and 2.6 hours at peak flow of 0.75 MGD.
 - Weir length of 69 ft per clarifier.
 - Total weir length is 138 ft between the 2 clarifiers.
 - The proposed third clarifier is a bid alternate and will have a diameter of 24 ft with a sidewater depth of 12 ft, providing a surface area of 452 ft² and an approximate volume of 40,606 gallons. With all three clarifiers, the total surface area is 1,356 ft².
 - Hydraulic retention time in the 3rd clarifier, will provide 4.6 hours of hydraulic retention time at design average flow of 0.21 MGD and 1.3 hours at peak flow of 0.75 MGD.
 - With all three clarifiers operating together, it would provide a volume of approximately 121,818 gallons.
 - Hydraulic retention time at design average flow of 0.21 MGD with all 3 clarifiers operating is 13.9 hrs.
 - Hydraulic retention time at peak flow of 0.75 MGD with all 3 clarifiers operating is 3.9 hrs.
 - The surface overflow rate is:
 - At design average flow of 0.21 MGD:

- 464.6 gpd/ft² for 1 clarifier
 - 232.3 gpd/ft² for 2 clarifiers
 - 154.9 gpd/ft² for 3 clarifiers
 - At peak flow of 0.75 MGD (31,250 gph):
 - 1,659.3 gpd/ft² for 1 clarifier
 - 829.6 gpd/ft² for 2 clarifiers
 - 553.1 gpd/ft² for 3 clarifiers
 - The surface overflow rate of 829.6 gpd/ft² for 2 clarifiers or 553.1 gpd/ft² for 3 clarifiers are less than the maximum surface overflow rate of 1,200 gpd/ft² required for activated sludge system per 10 CSR 20-8.160(3)(B)3.
 - Weir length of 69 ft per clarifier.
 - Total weir length between the 3 clarifiers is 207 ft.
 - The weir loading rate is:
 - At design average flow of 0.21 MGD:
 - 3,043 gpd/ft for 1 clarifier
 - 1,521 gpd/ft for 2 clarifiers
 - 1,014 gpd/ft for 3 clarifiers
 - At peak flow of 0.75 MGD:
 - 10,869 gpd/ft for 1 clarifier
 - 5,435 gpd/ft for 2 clarifiers
 - 3,623 gpd/ft for 3 clarifiers
 - With 1, 2, or 3 clarifiers in operation, the weir loading rate is less than the maximum loading rate requirement of 20,000 gpd/ft in 10 CSR 20-8.160(3)(C)2.
 - The solids loading rate:
 - At design average flow of 0.21 MGD and a solids loading of 15,325 lbs:
 - 33.9 lbs/day/ft² for 1 clarifier
 - 17 lbs/day/ft² for 2 clarifiers
 - 11.3 lbs/day/ft² for 3 clarifiers
 - At peak flow of 0.75 MGD and a solids loading of 31,087 lbs/day:
 - 68.8 lbs/day/ft² for 1 clarifier
 - 34.4 lbs/day/ft² for 2 clarifiers
 - 22.9 lbs/day/ft² for 3 clarifiers
 - The solids loading rate of 34.4 lbs/day/ft² with 2 clarifiers or the 22.9 lbs/day/ft² meets the requirements of 10 CSR 20-8.160(3)(B)3 of less than 35 lbs/day/ft² at peak flow.
 - Flows go from the secondary clarifiers to the RAS/WAS pumps.
- Return Activated Sludge (RAS)/Waste Activated Sludge (WAS) Pump Station – This is existing pump station. Construction will include replacement of check and plug valves. No changes to the pumps or pipe sizing.
 - RAS is returned to the influent pump station/drum screen building via 8-inch line.
 - WAS is sent to the sludge basins via 8-inch line.

- Flow Measurement -The existing Parshall flume between the RAS/WAS pump station and the UV disinfection system will be replaced.
- Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms. The facility has an existing UV disinfection system that will be replaced.
 - Open Channel Ultraviolet (UV) – An open channel, gravity flow, low pressure high intensity UV disinfection system capable of treating a peak flow of 750,000 gpd while delivering a minimum UV intensity of 35 mJ/cm² with an expected ultraviolet transmissivity of 60 percent or greater.
 - The single open channel UV system consists of 2 banks in series with 2 modules per bank and 4 lamps per module, for a total of 16 lamps.
 - The channel will be 3 ft deep by 20.3 ft long (not including weir) with a width of 0.67 ft.
 - The UV disinfection system will be Trojan UV3000Plus or equivalent.
 - The disinfected effluent will flow by gravity through 12-inch pipe to Outfall No. 001.
- Sludge Holding Basin – The facility has 2 existing aerated sludge holding basins. Construction will include the rehabilitation of 1 of the existing basins, plus construction of 1 or 2 new basins. The 4th basin is a bid alternate.
 - The sludge will be received from the secondary clarifiers.
 - WAS% solids is 0.5 percent, with it increasing to 2 percent solids after decant
 - Max month sludge production is 539 lbs/day (3,202 gpd), with average day sludge production at 319 lbs/day (1,892 gpd)
 - Rehab of the existing sludge storage basin #1 will include cleanout of the basin, replace existing decant valves with gate valves.
 - Construction of the new sludge storage basins. Each basin will have a 40 ft inside diameter, a 12 ft sidewater depth, and a volume of 15,080 cubic ft (112,800 gallons) with a SRT of 60 days.
 - Installation of floating aerators will provide aeration and mixing of the sludge to prevent anaerobic conditions.
 - With an operating DO of 2 mg/L, a minimum of 14.2 lbs O₂/hr is required in the winter and 13.4 lbs O₂/hr is required in the summer.
 - An ultrasonic level sensor will measure the volume of sludge present.
 - Decant from the sludge storage basins will be returned to the manhole prior to the new fine screen via 8-inch lines.
 - Sludge loading will be via 6-inch lines.

5. OPERATING PERMIT

Operating permit MO-0099732 will require a modification to reflect the construction activities and updated facility description. The modified Potosi #2 permit was incorporated into the 2024 renewal as all that changed was an updated facility description. Submit the Statement of Work Completed to the department in accordance with 10 CSR 20-6.010(5)(N), with as-builts.

V. NOTICE OF RIGHT TO APPEAL

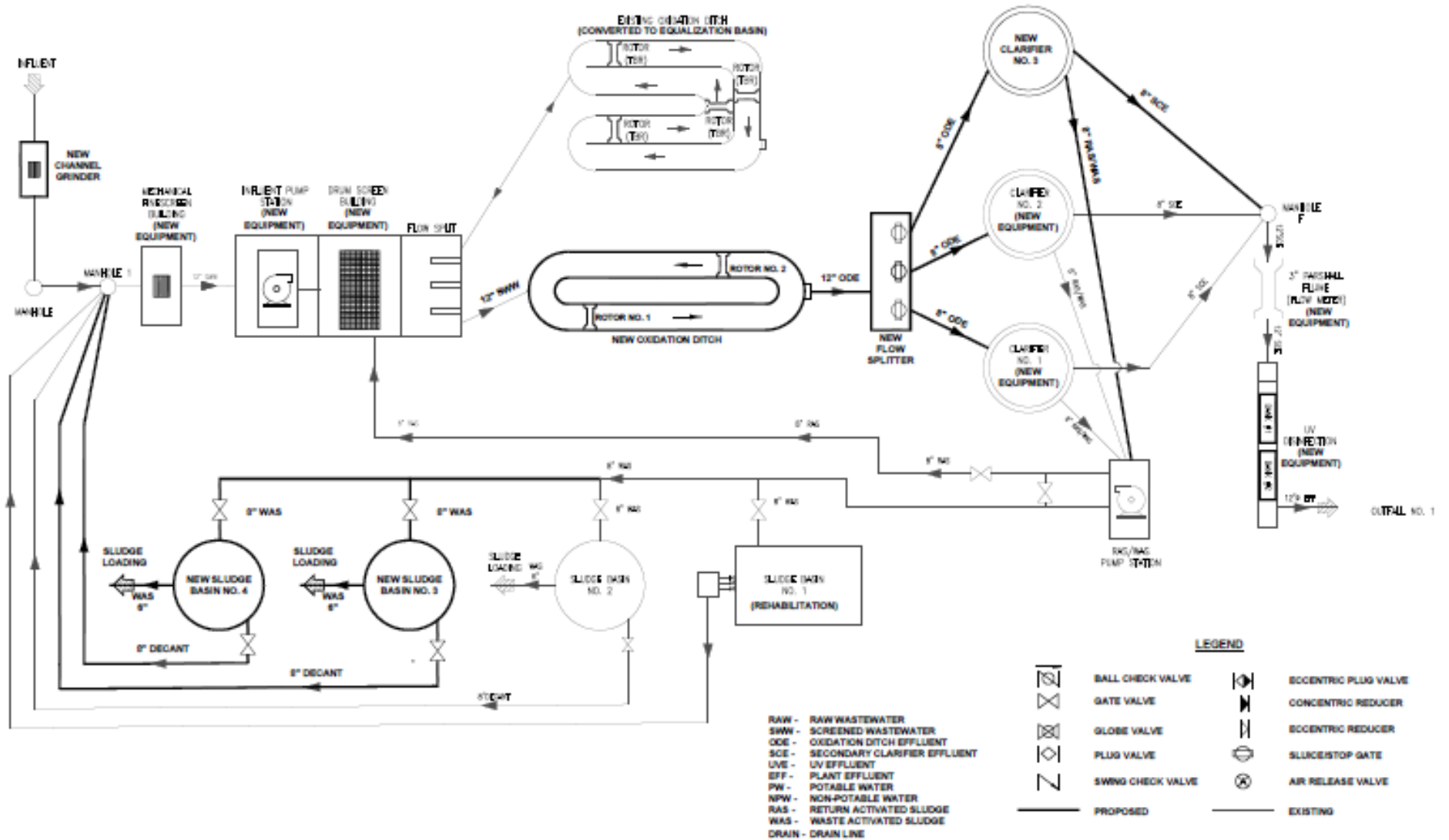
If you were adversely affected by this decision, you may be entitled to an appeal before the Administrative Hearing Commission (AHC) pursuant to Section 621.250 RSMo. To appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Any appeal should be directed to:

Administrative Hearing Commission
U.S. Post Office Building, Third Floor
131 West High Street, P.O. Box 1557
Jefferson City, MO 65102-1557
Phone: 573-751-2422
Fax: 573-751-5018
Website: <https://ahc.mo.gov>

Leasue Meyers, EI
Engineering Section
leasue.meyers@dnr.mo.gov

Chia-Wei Young, P.E.
Engineering Section
Chia-wei.young@dnr.mo.gov

APPENDIX A- PROCESS FLOW DIAGRAM WITH BID ALTERNATES



Received 7/16/24



MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
**APPLICATION FOR CONSTRUCTION PERMIT –
WASTEWATER TREATMENT FACILITY**

FOR DEPARTMENT USE ONLY	
APP NO.	CP NO.
FEE RECEIVED	CHECK NO.
DATE RECEIVED	

APPLICATION OVERVIEW

The Application for Construction Permit – Wastewater Treatment Facility form has been developed in a modular format and consists of Part A and B. **All applicants must complete Part A.** Part B should be completed for applicants who currently land-apply wastewater or propose land application for wastewater treatment. **Please read the accompanying instructions before completing this form. Submittal of an incomplete application may result in the application being returned.**

PART A – BASIC INFORMATION

1.0 APPLICATION INFORMATION (Note – If any of the questions in this section are answered NO, this application may be considered incomplete and returned.)

- 1.1 Is this a Federal/State funded project? YES N/A Funding Agency: DNR ARPA Project #: 36E1B394A921
- 1.2 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?
 YES Date of Approval: _____ N/A
- 1.3 Has the department approved the proposed project's facility plan*?
 YES Date of Approval: 2/6/23 NO (If No, complete No. 1.4.)
- 1.4 [Complete only if answered No on No. 1.3.] Is a copy of the facility plan* for wastewater treatment facilities included with this application?
 YES NO Exempt because _____
- 1.5 Is a copy of the appropriate plans* and specifications* included with this application?
 YES Denote which form is submitted: Hard copy Electronic copy (See instructions.) NO
- 1.6 Is a summary of design* included with this application? YES NO
- 1.7 Has the appropriate operating permit application (A, B, or B2) been submitted to the department?
 YES Date of submittal: _____
 Enclosed is the appropriate operating permit application and fee submittal. Denote which form: A B B2
 N/A: However, In the event the department believes that my operating permit requires revision to permit limitation such as changing equivalent to secondary limits to secondary limits or adding total residual chlorine limits, please share a draft copy prior to public notice? YES NO
- 1.8 Is the facility currently under enforcement with the department or the Environmental Protection Agency? YES NO
- 1.9 Is the appropriate fee or JetPay confirmation included with this application? YES NO
See Section 7.0

* Must be affixed with a Missouri registered professional engineer's seal, signature and date.

2.0 PROJECT INFORMATION

2.1 NAME OF PROJECT Potosi Wastewater Treatment Facility No. 2	2.2 ESTIMATED PROJECT CONSTRUCTION COST \$ 6,000,000
2.3 PROJECT DESCRIPTION See attached	
2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION Wastesludge is pumped to sludge basins for stabilization and storage. Biosolids are land applied.	
2.5 DESIGN INFORMATION A. Current population: <u>900</u> ; Design population: <u>1400</u> B. Actual Flow: <u>0.135</u> gpd; Design Average Flow: <u>0.21</u> gpd; Actual Peak Daily Flow: <u>0.409</u> gpd; Design Maximum Daily Flow: <u>0.75</u> gpd; Design Wet Weather Event: <u>0.75</u>	
2.6 ADDITIONAL INFORMATION A. Is a topographic map attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO B. Is a process flow diagram attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	

3.0 WASTEWATER TREATMENT FACILITY

NAME Potosi WWTF #2		TELEPHONE NUMBER WITH AREA CODE 573-438-2767	E-MAIL ADDRESS 573-438-2767	
ADDRESS (PHYSICAL) State Highway O	CITY Cadet	STATE MO	ZIP CODE 63630	COUNTY Washington

Wastewater Treatment Facility: Mo- 0099732 (Outfall 1 Of 1)

3.1 Legal Description: _____ ¼, _____ ¼, _____ ¼, Sec. _____, T _____, R _____
(Use additional pages if construction of more than one outfall is proposed.)3.2 UTM Coordinates Easting (X): 699386 Northing (Y): 4201362
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)3.3 Name of receiving streams: West Branch Mill Creek**4.0 PROJECT OWNER**

NAME City of Potosi		TELEPHONE NUMBER WITH AREA CODE 573-438-2767	E-MAIL ADDRESS jblount@potosicityhall.org	
ADDRESS 121 E High St	CITY Potosi	STATE MO	ZIP CODE 63664	

5.0 CONTINUING AUTHORITY: A continuing authority is a company, business, entity or person(s) that will be operating the facility and/or ensuring compliance with the permit requirements.

NAME City of Potosi		TELEPHONE NUMBER WITH AREA CODE 573-438-2767	E-MAIL ADDRESS jblount@potosicityhall.org	
ADDRESS 121 E High St	CITY Potosi	STATE MO	ZIP CODE 63664	

5.1 A letter from the continuing authority, if different than the owner, is included with this application. YES NO N/A

5.2 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHORITY IS A MISSOURI PUBLIC SERVICE COMMISSION REGULATED ENTITY.

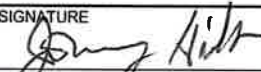
A. Is a copy of the certificate of convenience and necessity included with this application? YES NO

5.3 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHORITY IS A PROPERTY OWNERS ASSOCIATION.

A. Is a copy of the as-filed restrictions and covenants included with this application? YES NOB. Is a copy of the as-filed warranty deed, quitclaim deed or other legal instrument which transfers ownership of the land for the wastewater treatment facility to the association included with this application? YES NOC. Is a copy of the as-filed legal instrument (typically the plat) that provides the association with valid easements for all sewers included with this application? YES NOD. Is a copy of the Missouri Secretary of State's nonprofit corporation certificate included with this application? YES NO**6.0 ENGINEER**

ENGINEER NAME / COMPANY NAME Alissha Feeler/ Archer-Elgin Engineering & Surveying		TELEPHONE NUMBER WITH AREA CODE 573-364-6362	E-MAIL ADDRESS afeeler@cmarcher.com	
ADDRESS 310 E. 6th St.	CITY Rolla	STATE MO	ZIP CODE 65401	

7.0 APPLICATION FEE CHECK NUMBER JETPAY CONFIRMATION NUMBER**8.0 PROJECT OWNER:** I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

PROJECT OWNER SIGNATURE 		
PRINTED NAME Johnny Hicks	DATE 7-11-24	
TITLE OR CORPORATE POSITION Superintendent	TELEPHONE NUMBER WITH AREA CODE 573 854 7197	E-MAIL ADDRESS

Mail completed copy to: MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
P.O. BOX 176
JEFFERSON CITY, MO 65102-0176**END OF PART A.****REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHETHER PART B NEEDS TO BE COMPLETE.**

PART B – LAND APPLICATION ONLY

(Submit only if the proposed construction project includes land application of wastewater.)

8.0 FACILITY INFORMATION

8.1 Type of wastewater to be irrigated: Domestic State/National Park Seasonal business
 Municipal Municipal with a pretreatment program or significant industrial users
 Other (explain) _____

8.2 Months when the business or enterprise will operate or generate wastewater:
 12 months per year Part of the year (list months): _____

8.3 This system is designed for:
 No-discharge.
 Partial irrigation when feasible and discharge rest of time.
 Irrigation during recreational season, April – October, and discharge during November – March.
 Other (explain) _____.

9.0 STORAGE BASINS

9.1 Number of storage basins: 2 (Use additional pages if greater than three basins.)

9.2 Type of basins: Steel Concrete Fiberglass Earthen Earthen with membrane liner

9.3 Storage basin dimensions at inside top of berm (feet). Report freeboard as feet from top of berm to emergency spillway or overflow pipe.
Basin #1: Length _____ Width _____ Depth _____ Freeboard _____ Depth _____ Safety _____ % Slope _____
Basin #2: Length _____ Width _____ Depth _____ Freeboard _____ Depth _____ Safety _____ % Slope _____
Basin #3: Length _____ Width _____ Depth _____ Freeboard _____ Depth _____ Safety _____ % Slope _____

9.4 Storage Basin operating levels (report as feet below emergency overflow level).
Basin #1: Maximum operating water level _____ ft Minimum operating water level _____ ft
Basin #2: Maximum operating water level _____ ft Minimum operating water level _____ ft
Basin #3: Maximum operating water level _____ ft Minimum operating water level _____ ft

9.5 Design depth of sludge in storage basins.
Basin #1: _____ ft Basin #2: _____ ft Basin #3: _____ ft

9.6 Existing sludge depth, if the basins are currently in operation.
Basin #1: _____ ft Basin #2: _____ ft Basin #3: _____ ft

9.7 Total design sludge storage: _____ dry tons and _____ cubic feet

10.0 LAND APPLICATION SYSTEM

10.1 Number of irrigation sites _____ Total Acres _____ Maximum % field slopes _____
Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
(Use additional pages if greater than three irrigation sites.)

10.2 Type of vegetation: Grass hay Pasture Timber Row crops
 Other (describe) _____

10.3 Wastewater flow (dry weather) gallons per day: Average annual _____ Seasonal _____ Off-season _____

10.4 Land application rate (design flow including 1-in-10 year storm water flows):
Design: _____ inches/year _____ inches/hour _____ inches/day _____ inches/week
Actual: _____ inches/year _____ inches/hour _____ inches/day _____ inches/week

10.5 Total irrigation per year (gallons): Design: _____ gal Actual: _____ gal

10.6 Actual months used for irrigation (check all that apply):
 Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

10.7 Land application rate is based on:
 Hydraulic Loading Other (describe) _____
 Nutrient Management Plan (N&P) If N&P is selected, is the plan included? YES NO