

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

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

Confluence Rivers Utility Operating Company, Inc.
500 Northwest Plaza Dr., #500
St. Ann, MO 63074

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.

August 1, 2018
Effective Date Modification Date

Edward B. Galbraith, Director, Division of Environmental Quality

July 31, 2020
Expiration Date

Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

DEMONSTRATION PROJECT—The facility is proposing to add aeration to the single cell lagoon, then install a Triplepoint Water Technologies, LLC NitrOx™ system followed by a clarifier and ultraviolet disinfection to meet the schedule of compliance to achieve compliance with ammonia effluent limits. The facility is replacing their existing chlorine disinfection system with ultraviolet disinfection. The facility will utilize the existing lagoon for flow equalization and reduce the design average flow to 9,999 gpd.

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 publically-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 in accordance with the plans and specifications submitted by 21 Design Group, Inc. on March 16, 2018.
3. The Department must be contacted in writing prior to making any changes to the approved 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(8).

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 St. Louis Regional Office per 10 CSR 20-7.015(9)(E)2.
5. The wastewater treatment facility shall be located at least fifty feet (50') from any dwelling or establishment.
6. The wastewater treatment facility shall be located above the twenty-five (25)-year flood level.
7. Wastewater treatment facility shall not be located within one hundred feet (100'), and preferably three hundred feet (300') of any water well or water supply structure.
8. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of 1 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 dnr.mo.gov/env/wpp/epermit/help.htm. See dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm for more information.
9. A United States (U.S.) Army Corps of Engineers (COE) permit (404) and a Water Quality Certification (401) issued by the Department or permit waiver may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied. If construction activity will disturb any land below the ordinary high water mark of jurisdictional waters of the U.S. then a 404/401 will be required. Since the COE makes determinations on what is jurisdictional, you must contact the COE to determine permitting requirements. You may call the Department's Water Protection Program at 573-751-1300 for more information. See dnr.mo.gov/env/wpp/401/ for more information.
10. Upon completion of construction:
 - A. Confluence Rivers Utility Operating Company, Inc. will become the continuing authority for operation, maintenance, and modernization of these facilities;
 - B. Submit an electronic copy of the as built if the project was not constructed in accordance with previously submitted plans and specifications; and
 - C. Submit the enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N) and request the operating permit modification be issued.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The facility is upgrading its treatment plant to meet ammonia effluent limits. Also as part of the construction, they are removing the chlorine disinfection system and replacing it with an ultraviolet disinfection system.

2. FACILITY DESCRIPTION

The existing facility is a single cell lagoon located at 366 Highway F, High Hill, Montgomery County, Missouri. The facility previously had a design flow of 19,999 gpd with an adjusted design flow of 9,999 gpd and serves a hydraulic equivalent of approximately 200 people. There are currently 60 residences contributing to the facility. Below is a summary of the last five years of discharge monitoring reports. The proposed improvements to the single lagoon cell include the installation of the MBBR, clarifier, and UV disinfection system.

PARAMETER	Unit	Monthly Average Effluent Limit	Average Discharge from Monitoring Reports [§]
Flow	MGD	*	0.003238
BOD ₅	mg/L	45	12.55
TSS	mg/L	70	13.21
pH	SU	>6.5	7.95
Ammonia as N (April 1 – Sept 30)	mg/L	*	5.60
Ammonia as N (Oct 1 – March 31)	mg/L	*	5.76

*Monitoring only

§ Average from Discharge Monitoring Reports, January 1, 2012 to March 23, 2018.

3. COMPLIANCE PARAMETERS

With the proposed upgrades to the treatment facility to meet the final ammonia effluent limits, the facility no longer qualifies for equivalent to secondary limits for BOD and TSS or for pH no to have an upper limit. Below are the effluent limits the facility will have to meet when construction is complete. The ammonia effluent limits were established in 2016 permit renewal with a schedule of compliance to meet final limits by August 1, 2020.

PARAMETER	Unit	Daily Maximum	Weekly Average	Monthly Average
Flow	MGD	*		*
BOD ₅	mg/L		45	30
TSS	mg/L		45	30
pH	SU	6.5-9.0		6.5-9.0
Ammonia as N (April 1 – Sept 30)	mg/L	3.6		1.4
Ammonia as N (Oct 1 – March 31)	mg/L	7.5		2.9
Escherichia coli	***	1030		206

4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

The current design guides, 10 CSR 20-8, do not contain design parameters for the innovative moving bed biological reactor (MBBR). As a **DEMONSTRATION** project, the data gathered with the operating permit will be used to help develop design criteria for future projects.

The facility proposes to reduce the design average flow based on the discharge monitoring reports for the last five years, drinking water reports of 6,400 gpd, the lack of new connections and growth, and with the lagoon providing flow equalization, the upgrades to the treatment facility reduce the design average flow to 9,999 gpd. In Appendix A is the facility flow diagram with the upgrades in place.

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

- Lagoon Cell No. 1 –Lagoon Cell No. 1 has a surface area of 1.20 acres and a wastewater volume of 900,000 gallons. This cell has 3 ft of operating depth and a clay liner. This provides approximately 94 days of retention at the proposed design flow.
- Sludge will be retained in the lagoon cell.

Construction will cover the following items:

- Aeration will be added to the lagoon cell as part of the construction. The facility is proposing to use Triplepoint MARS aeration system with fine bubble diffusion to increase mixing.
- Triplepoint Water Technologies, LLC NitrOx™ – The lagoon treated effluent will flow by gravity to the NitrOx™ system. The NitrOx™ system is capable of treating a design average flow of 10,000 gpd.
 - The system is composed of one tank with approximately 8 ft diameter and a depth of 9 ft. Total volume of the tank is 3367 gallons.
 - The average flow hydraulic retention time is 7.45 hours and the peak flow hydraulic retention time is 1.8 hours.

- A floating insulating cover shall be installed on the tank. An immersion tank heater will be installed to maintain a minimum wastewater temperature of 39°F.
- The tank shall be filled approximately 65% with high surface area HDPE media. Aeration by means of two tri-lobe positive displacement blowers each capable of supplying 34.7 scfm with 1.5 HP motors.
- The effluent from the NitrOx™ will flow by gravity to the clarifier for polishing prior to disinfection and discharge.
- Hopper Style Clarifier- The hopper type clarifier will have a surface area of 50.27 square feet. The volume of the clarifier is 12,990 gallons with an average overflow rate of 198.92 gpd/square foot.
 - The hydraulic retention time is 5.18 hours at design average flow which meets the minimum requirements of 10 CSR 20-8.020(13)(B)7 or 1.3 hours at a peak flow of 42,206 gpd.
 - The clarifier has the dimensions of 8 feet wide by 4 feet long with a sidewater depth of 10.06 feet.
 - The detention capacity of the hopper, using only the top third (by height) per 10 CSR 20-8.020(13)(B)7.C is 654.4 gallons.
- Disinfection – A closed vessel, gravity flow Sanitron Model S2400C or equivalent UV disinfection system capable of treating a peak flow of 57,600 gpd while delivering a minimum UV intensity of 30 mJ/cm² with an expected ultraviolet transmissivity of 85% or greater. The closed vessel UV system consists of 1 lamp per reactor. The disinfected effluent will flow by gravity through flow measurement equipment and to Outfall No. 001.

5. OPERATING PERMIT

Operating permit MO-0087211 will require a modification to reflect the construction activities. The modified Roy-L Utilities, MO-0087211, was successfully public noticed from May 18 to June 18, 2018 with no comments received. Submit the Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(D) and request the operating permit modification be issued.

6. CONSTRUCTION PERMIT MODIFICATION

On May 29, 2019, Confluence Rivers Utility Operating Company, Inc. submitted an ownership transfer. The construction permit has been updated to reflect the new owner and continuing authority. Permit condition #10 was updated to reflect the new continuing authority. The construction permit modification is issued to Confluence Rivers Utility Operating Company, Inc.

Appendix A: Process Diagram

