# 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 St. Robert
194 Eastlawn Avenue, Suite A
St. Robert, MO 65584

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.

December 30, 2020 — Effective Date
October 17, 2022 — Modification Date

December 30, 2024 — Expiration Date

Chris Wieberg

**Chris Wieberg, Director, Water Protection Program**

# CONSTRUCTION PERMIT

## I. CONSTRUCTION DESCRIPTION

The City of St. Robert plans to relocate the existing St. Robert Wastewater Treatment Facility (WWTF) outside the regulatory flood plain due to previous flood events, which resulted in damage and treatment process interruptions at the existing WWTF site. The existing St. Robert WWTF shall be decommissioned following the completion of the proposed construction and successful startup of the new treatment plant. A closure plan will need to be submitted to the Central Field Operations Regional Office for review and approval prior to any closure activites.

This project will include the construction of a new activated sludge wastewater treatment plant with a design average flow of 1.25 million gallons per day (MGD) and a peak flow capacity of 10 MGD. The unit processes included in the treatment system are as follows: an influent pump station with three (3) dry weather pumps and three (3) wet weather pumps, a headworks facility with one (1) perforated drum spiral screen, one (1) manually-raked bar screen, one (1) grit chamber, one (1) grit pump and one (1) grit classifier, influent flow metering, one (1) activated sludge aeration basin, two (2) secondary clarifiers, a return activated sludge (RAS) and waste activated sludge (WAS) pump station with two (2) RAS pumps and one (1) WAS pump, a scum pump station with one (1) scum pump, an ultraviolet (UV) disinfection system with three (3) banks of 36 UV lamps, effluent flow measurement, outfall structure, one (1) aerobic digester, one (1) sludge storage basin, one (1) peak flow clarifier, a laboratory building, and electrical secondary and standby generation equipment.

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 determine Cost Analysis for Compliance because the permit contains no new conditions or requirements that convey a new cost to the facility.

## 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 Archer-Elgin Engineering, Surveying and Architecture 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. The wastewater treatment facility shall be located above the twenty-five (25)-year flood level.

6. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the one hundred- (100-) year flood elevation per 10 CSR 20-8.140(2)(B).The minimum distance between wastewater treatment facilities and all potable water sources shall be at least three hundred feet (300') per 10 CSR 20-8.140(2)(C)1.

7. 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.

8. 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.

9. In accordance with 10 CSR 20-6.010(12), a full closure plan shall be submitted to the Department's Central Field Operations 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-0112925. Closure shall not commence until the submitted closure plan is approved by the Department.

10. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements listed below.

- Leakage tests shall be specified for gravity sewers except polyvinyl chloride (PVC) pipe with a diameter of twenty-seven inches (27") or less. 10 CSR 20-8.120 (3) (C) 2.
    - The leakage exfiltration or infiltration for gravity sewers shall not exceed one hundred (100) gallons per inch of pipe diameter per mile per day for any section between manholes of the system. An exfiltration or infiltration test shall be performed with a minimum positive head of two feet (2'). The exfiltration or infiltration test shall conform to the test procedure described in ASTM C969 – 17 *Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines*, as approved and published April 1, 2017, for precast concrete pipe. 10 CSR 20-8.120 (3) (C) 2. A.
    - The air test for sewers shall, conform to the test procedure described in ASTM C1103 – 14 *Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines*, as approved and published November 1, 2014, for concrete pipe twenty-seven inches (27") or greater in diameter, and ASTM F1417 – 11a(2015) *Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air*, as approved and published August 1, 2015, for plastic, composite, and ductile iron pipe. 10 CSR 20-8.120 (3) (C) 2. B.
- Vacuum testing, if specified for concrete sewer manholes, shall conform to the test procedures in ASTM C1244 – 11(2017) *Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill*, as approved and published April 1, 2017, or the manufacturer's recommendation. 10 CSR 20-8.120 (4) (F) 1.
- Exfiltration testing, if specified for concrete sewer manholes, shall conform to the test procedures in ASTM C969 – 17 *Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines*, as approved and published April 1, 2017. 10 CSR 20-8.120 (4) (F) 2.
- There shall be no physical connections between a public or private potable water supply system and a sewer or appurtenance that would permit the passage of any wastewater or polluted water into the potable supply. 10 CSR 20-8.120 (5) (A)
- Sewers shall be laid at least fifty feet (50') in a horizontal direction from any existing or proposed public water supply well or other water supply sources or structures. Sewers must also comply with 10 CSR 23-3.010. 10 CSR 20-8.120 (5) (B)
- Facilities shall be readily accessible by authorized personnel from a public right-of-way at all times. 10 CSR 20-8.140 (2) (D). 10 CSR 20-8.130 (2) (B)

- 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: 10 CSR 20-8.130 (2) (C)
    - 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 (4') deep. Interconnection between the wet well and dry well ventilation systems is not acceptable; 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 twelve (12) complete air changes per hour. Where continuous ventilation would cause excessive heat loss, provide intermittent ventilation of at least thirty (30) complete air changes per hour when facility personnel enter the area. Base air change demands on one hundred percent (100%) 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 (2) 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)
- The distance between wastewater pumping stations and all potable water sources shall be at least fifty feet (50') in accordance with 10 CSR 23-3.010(1)(B). 10 CSR 20-8.130 (2) (D)
- Dry wells, including their superstructure, shall be completely separated from the wet well with gas tight common walls. 10 CSR 20-8.130 (3) (A) 1.
- Suitable and safe means of access to dry wells and to wet wells shall be provided to persons wearing self-contained breathing apparatuses. 10 CSR 20-8.130 (3) (A) 2.
- Multiple pumps shall be provided except for design average flows of less than fifteen hundred (1,500) gallons per day. 10 CSR 20-8.130 (3) (B) 1.
- Electrical equipment. Electrical equipment shall be provided with the following requirements:
    - 10 CSR 20-8.130 (3) (B) 2. A. Electrical equipment must comply with 10 CSR 20-8.140(7)(B);
    - Utilize corrosive resistant equipment located in the wet well; 10 CSR 20-8.130 (3) (B) 2. B.
    - Provide a watertight seal and separate strain relief for all flexible cable; 10 CSR 20-8.130 (3) (B) 2. C.
    - Install a fused disconnect switch located above ground for the main power feed for all pumping stations. 10 CSR 20-8.130 (3) (B) 2. D.
    - When such equipment is exposed to weather, it shall comply with the requirements of weather proof equipment; enclosure NEMA 4; NEMA 4X where necessary; and *NEMA Standard 250-2014*, published December 15, 2014. 10 CSR 20-8.130 (3) (B) 2. E.
    - Install lightning and surge protection systems; 10 CSR 20-8.130 (3) (B) 2. F.
    - Install a one hundred ten volt (110 V) power receptacle inside the control panel located outdoors to facilitate maintenance; 10 CSR 20-8.130 (3) (B) 2. G.
    - Provide Ground Fault Circuit Interruption (GFCI) protection for all outdoor receptacles. 10 CSR 20-8.130 (3) (B) 2. H.
- Water level controls must be accessible without entering the wet well. 10 CSR 20-8.130 (3) (C)
- Valves shall not be located in the wet well unless integral to a pump or its housing. 10 CSR 20-8.130 (3) (D)

- Covered wet wells shall have provisions for air displacement to the atmosphere, such as an inverted and screened "j" tube or other means. 10 CSR 20-8.130 (3) (E)
- Interconnection between the wet well and dry well ventilation systems is not acceptable. 10 CSR 20-8.130 (3) (F)
- There shall be no physical connection between any potable water supply and a wastewater pumping station, which under any conditions, might cause contamination of the potable water supply. If a potable water supply is brought to the station, it shall comply with conditions stipulated under 10 CSR 20-8.140 (7) (D). 10 CSR 20-8.130 (3) (G)
- Submersible pump stations shall meet the applicable requirements under section (3) of this rule, except as modified in this section. 10 CSR 20-8.130 (5)
    - Pump Removal. Submersible pumps shall be readily removable and replaceable without personnel entering, dewatering, or disconnecting any piping in the wet well. 10 CSR 20-8.130 (5) (A)
    - 10 CSR 20-8.130 (5) (B) Valve Chamber and Valves. Valves required under subsection (3)(D) of this rule shall be located in a separate valve chamber.
    - A minimum access hatch dimensions of twenty-four inches by thirty-six inches (24" x 36") shall be provided. 10 CSR 20-8.130 (5) (B) 1.
    - A portable pump connection on the discharge line with rapid connection capabilities shall be provided. 10 CSR 20-8.130 (5) (B) 2.
- Alarm systems with an uninterrupted power source shall be provided for pumping stations. 10 CSR 20-8.130 (6)
- Where independent substations are used for emergency power, each separate substation and its associated distribution lines shall be capable of starting and operating the pump station at its rated capacity. 10 CSR 20-8.130 (7) (B)
- Force main system shall be designed to withstand all pressures (including water hammer and associated cyclic reversal of stresses), and maintain a velocity of at least two feet (2') per second. 10 CSR 20-8.130 (8) (A)
- Locator wire must be utilized when sewer lines are installed within the public right-of-way in accordance with 319.033, RSMo. 10 CSR 20-8.125 (5) (A) 5.
- 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 one hundred- (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 three hundred feet (300'). 10 CSR 20-8.140 (2) (C) 1.
- 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 twenty-four (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 twenty-four (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)
- 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)
- Grease interceptors shall be provided on kitchen drain lines from institutions, hospitals, hotels, restaurants, schools, bars, cafeterias, clubs, and other establishments from which relatively large amounts of grease may be discharged to a wastewater treatment facility owned by the grease producing entity. Grease interceptors are typically constructed from fiberglass reinforced polyester, high density polyethylene (HDPE), or concrete. For corrugated HDPE grease interceptors, follow ASTM F2649 – 14 *Standard Specification for Corrugated High Density Polyethylene (HDPE) Grease Interceptor Tanks*, as

approved and published September 1, 2014. For precast concrete grease interceptor tanks, follow ASTM C1613 – 17 *Standard Specification for Precast Concrete Grease Interceptor Tanks*, as approved and published September 1, 2017. 10 CSR 20-8.150 (3)

- 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)
- Where two (2) or more mechanically cleaned screens are used, the design shall provide for taking the largest unit out-of-service without sacrificing the capability to handle the average design flow. Where only one mechanically cleaned screen is used, it shall be sized to handle the design peak instantaneous flow. 10 CSR 20-8.150 (4) (B)
- Grit removal facilities are required for wastewater treatment facilities that utilize membrane bioreactors for secondary treatment; utilize anaerobic digestion; receive wastewater from combined sewers; or receive wastewater from collection systems that receive substantial amounts of grit. 10 CSR 20-8.150 (6)
- 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 six inches (6") above the surrounding ground surface and shall provide not less than twelve inches (12") 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)

- Aerobic Solids Digestion High Level Emergency Overflow. An unvalved emergency overflow shall be provided that will convey digester overflow to the treatment plant headworks, the aeration process, or to another liquid sludge storage facility and that has an alarm for high level conditions. 10 CSR 20-8.170 (5)
- For solids pumping systems, audio-visual alarms shall be provided in accordance with 10 CSR 20-8.140(7)(C) for:
    - Pump failure; 10 CSR 20-8.170 (6) (A)
    - Pressure loss; 10 CSR 20-8.170 (6) (B) and
    - High pressure. 10 CSR 20-8.170 (6) (C)
- 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.
- 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.
- 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.

11. Upon completion of construction:

    A. The City of St. Robert will become the continuing authority for operation and maintenance of these facilities;

    B. Submit an electronic copy of the as builts if the project was not constructed in accordance with previously submitted plans and specifications;

    C. Submit the enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N) with a request for the operating permit modification to be issued.

# IV. REVIEW SUMMARY

## 1. CONSTRUCTION PURPOSE

The existing St. Robert Wastewater Treatment Facility (WWTF) is located near the Gasconade River in Pulaski County, Missouri. Due to the facility's relative proximity to the river, recent storm events in 2015 and 2017 have resulted in flooding at the WWTF. The purpose of this project is to relocate the WWTF to a higher elevation above recent flooding events. Following the successful startup of the new treatment facility, the exsiting St. Robert WWTF will be decommissioned.

## 2. FACILITY DESCRIPTION

The existing St. Robert WWTF is located at 20975 Laramie Road, St. Robert, in Pulaski County, Missouri. The facility has a design average flow of 1.0 million gallons per day (MGD) and serves a hydraulic population equivalent of approximately 10,000 people. The new St. Robert WWTF will be located on a parcel of property owned by the City of St. Robert directly south of the existing WWTF and across Laramie Road. The address of the new facility is 20940 Laramie Road, St. Robert, MO. The facility will have a design average flow of 1.25 MGD and serve a hydraulic population equivalent of approximately 11,495 people. The design maximum daily flow will be 10 MGD. The new treatment system will include a new influent pump station, headworks facility with fine screening and grit removal, activated sludge aeration basin, secondary clarifiers, peak flow fine screening and clarifier, ultraviolet (UV) disinfection, aerobic sludge digester, and sludge storage basin. The new outfall will be located adjacent to the existing outfall for the previous WWTF on the unnamed tributary to the Gasconade River. Sludge will be disposed of via land application in the same manner and on the same sites as sludge from the previous WWTF.

## 3. COMPLIANCE PARAMETERS

The proposed project is required to meet final effluent limits as established in the Antidegradation review dated April 2020.

The limits following the completion of construction will be applicable to the facility:

| Parameter | Units | Monthly average limit |
|---|---|---|
| Biochemical Oxygen Demand$_5$ | mg/L | 13 |
| Total Suspended Solids | mg/L | 13 |
| Ammonia as N- lowest summer | mg/L | 1.5 |
| Ammonia as N- lowest winter | mg/L | 2.6 |
| *Escherichia coli* | #/100mL | 126 |
| Oil & Grease | mg/L | 10 |
| pH | SU | 6.5-9.0 |
| Copper, Total Recoverable | µg/L | 16.2 |

Additional monitoring only requirements included in modified operating permit MO-0112925.

## 4. ANTIDEGRADATION

The Department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated April 2020, due to the increase in the facility's design average flow from 1.0 MGD to 1.25 MGD. See **APPENDIX – ANTIDEGRADATION REVIEW**.

## 5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

**Construction will cover the following items:**

- Components are designed for a Population Equivalent of 11,495 with a hydraulic loading of 1.25 MGD and an organic loading of 1,824 lbs of $BOD_5$ per day to the system. The design maximum daily flow of the treatment plant is 10 MGD.
- Influent Pump Station – Construction of an influent pump station designed to convey the maximum daily flow rate of 10 MGD.
  - Dry weather pumping capacity provided by two (2) duty and one (1) standby submersible pumps each capable of operating at 1,302 gpm at 101.8 feet of TDH. Discharges to the dry weather treatment train shall be limited to 3.75 MGD.
  - Wet weather pumping capacity provided by two (2) duty and one (1) standby submersible pumps each capable of operating at 2,170 gpm at 98.3 feet of TDH. Wet weather pumps shall discharge to the wet weather screening and peak flow clarifier structures for preliminary treatment, primary treatment, and disinfection.
- Flow Measurement – Installation of accurate flow measurement devices will give the treatment facility a means of improved data analysis.
  - Influent – A 12-inch throat influent parshall flume with ultrasonic flow sensor shall measure the raw influent wastewater following grit removal.
  - Effluent – A 12-inch throat effluent parshall flume with ultrasonic flow sensor shall measure the disinfected wastewater prior to discharge at Outfall No. 001.
- Screening – Installation of screening devices removes nuisance inorganic materials from raw wastewater. The dry weather screening devices shall each be capable of treating a peak hourly flow of 3.75 MGD.
  - Spiral screen – One (1) 6 mm perforated drum spiral mechanical screen installed at an angle of 35 degrees from the horizontal. Screen openings of 0.25 inch.
  - Manual Coarse Bar Screen – One (1) standby manual coarse bar screen will have clear bar spacings of 1.5-inch and be positioned at an angle of 60 degrees from the horizontal to allow for manual raking of the screen. The addition of a manually cleaned coarse bar screen provides a means of unit isolation for the mechanical spiral screen.

- Grit Removal – Installation of grit removal facilities removes grit and inert inorganics from raw wastewater. Grit removal prevents downstream abrasion and wear on mechanical components and accumulation at the bottom of basins or channels.
  - Forced Vortex Flow Grit Removal – One (1) circular vortex type grit removal equipment for dry weather flows up to 3.75 MGD. Unit will consist of circular vortex type grit removal equipment, grit classifier with cyclone, grit pump of dry pit submersible type, appurtenant equipment, and grit system control panel.
- Activated Sludge Aeration Basin – Construction of one (1) activated sludge aeration basin for the biological treatment of $BOD_5$ and $NH_3$ in aerobic conditions. The aeration basin shall have a freeboard of 2.0 ft and a volume of 1,057,530 gallons.
  - The hydraulic retention time is 20.3 hours at the design average flow of 1.25 MGD.
  - Process design calculations were provided for a maximum month aeration basin loading of 13.0 lbs $BOD_5$/day/1,000 cubic ft.
  - Aeration is provided by a fine bubble aeration system with retrievable diffusers.
  - The total actual oxygen requirement for $BOD_5$ and $NH_3$ removal is 5,989 lbs $O_2$/day, which converted to standard oxygen requirements for removal is 594 lbs $O_2$/hour at 10°C.
  - The design mean cell residence time is 17.3 days.
- Secondary Clarifiers – Two (2) secondary clarifiers will be constructed with a total surface area of 4,750 sf at the 3.75 MGD peak or 2,375 sf per clarifier. Following the activated sludge aeration basin, a flow splitter will split the flow between each of the two clarifiers.
  - The clarifiers will each have a 55 ft diameter. The minimum sidewater depth will be 14 ft.
  - The surface overflow rate is 789 gpd/sf which meets the requirements of 10 CSR 20-8.160(3)(B)3 of less than 1,000 gpd/sf at peak flow.
  - The solids loading rate is 29.6 lbs/day/sf which meets the requirements of 10 CSR 20-8.160(3)(B)3 of less than 35 lbs/day/sf at peak flow.
  - The weir loading rate is 12,175 gpd which meets the requirements of 10 CSR 20-8.160(3)(C)2. of being less than 30,000 gpd/sf.
- Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms.
  - Open Channel Ultraviolet (UV) – An open channel, gravity flow, low pressure high intensity UV disinfection system capable of treating a peak flow of 10.0 MGD while delivering a minimum UV intensity of 17.5 $mJ/cm^2$ based on T1 and 30,000 $\mu W \cdot s/cm^2$ based on MS-2 phage inactivation with an expected ultraviolet transmissivity of 60% or greater. The open channel UV system consists of three (3) banks, one (1) firm and two (2) standby, with a total of 36 UV lamps.. The disinfected effluent will flow by gravity through flow measurement equipment and to Outfall No. 001.

- Peak Flow Screening – Installation of screening devices removes nuisance inorganic materials from raw wastewater. Wet weather flows in excess of 3.75 MGD will be diverted to peak flow screening and the peak flow clarifier. The screening devices shall be capable of treating a peak hourly flow of 6.25 MGD.
  - Spiral screen – One (1) 6 mm perforated drum spiral mechanical screen installed at an angle of 35 degrees from the horizontal. Screen openings of 0.25 inch.
  - Manual Coarse Bar Screen – One (1) standby manual coarse bar screen will have clear bar spacings of 1.5-inch and be positioned at an angle of 60 degrees from the horizontal to allow for manual raking of the screen. The addition of a manually cleaned coarse bar screen provides a means of unit isolation for the mechanical spiral screen.
- Peak Flow Clarifier – One (1) peak flow clarifier will be constructed with a total surface area of 4,185 sf at the 6.25 MGD peak. Wastewater from the peak flow clarifier will combine with wastewater from the secondary clarifiers prior to UV disinfection and discharge.
  - The clarifier will have a 73 ft diameter. The minimum sidewater depth will be 12 ft.
  - The surface overflow rate is 1,485 gpd/sf which meets the requirements of 10 CSR 20-8.160(3)(B)1. of less than 1,500 gpd/sf at peak flow.
  - The weir loading rate is 29,205 gpd/ft gpd which meets the requirements of 10 CSR 20-8.160(3)(C)2. of being less than 30,000 gpd/sf.
- Relocated Outfall – The new 24 inch effluent pipe location is approximately 46 ft downstream of the current outfall location.
- Emergency Power – An emergency power source will be provided to operate the treatment facility in event of power failure.
  - A 500 kW standby diesel generator and automatic transfer switch will be provided for the influent pump station.
  - A 100 kW standby diesel generator and automatic transfer switch will be provided for the laboratory and maintenance building.
  - A 750 kW standby diesel generator and automatic transfer switch will be provided for the headworks and aeration process area.
  - A 600 kW standby diesel generator and automatic transfer switch will be provided for the clarifiers, sludge pumping, UV disinfection, and sludge process area.
- Aerobic Digester – Construction of one (1) aerobic digester and one (1) sludge storage basin to stabilize and reduce the volume of sludge prior to land application.
  - The aerobic digester will have a diameter of 64 ft, a 14 ft sidewater depth, and a volume of approximately 303,099 gallons. The design basis of the digester is a maximum influent loading of 2,763 lbs $BOD_5$/day (0.5% solids) with a flowrate of 44,158 gpd. Installation of floating aerators will provide aeration and mixing of the sludge to prevent anaerobic conditions.
  - To meet the 503(b) requirements for vector reduction, a 38% VSS reduction is required. Also, the 503(b) regulations require a mean cell residence time of 40 days and 20ºC. At average daily sludge production, the aerobic disgester will have an SRT of 45 days. Assuming a prolonged winter liquid temperature of

-11ºC, there will be an approximately 40% reduction in VSS, which is greater than the 38% required.

- The sludge holding basin will have a diameter of 80 ft, a 16 ft sidewater depth, and a volume of approximately 601,571 gallons. The design solids retention time of the sludge holding basing is 75 days.

## 6. OPERATING PERMIT

Operating permit MO-0112925 will require a modification to reflect the construction activities. The modified St. Robert WWTF, MO-0112925 was successfully public noticed from October 23, 2020 to November 23 2020 with no comments received. Upon completion of construction, submit the 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.

## 7. CONSTRUCTION PERMIT MODIFICATION

This construction permit is being modified upon the request of the facility owner to extend the construction permit schedule. The construction permit will now expire on December 30, 2024.

## 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

Ellen Modglin, EI
Engineering Section

Cindy LePage, P.E.
Engineering Section
Cindy.LePage@dnr.mo.gov

**APPENDIX- Antidegradation Review**

# Water Quality and Antidegradation Review

*For the Protection of Water Quality*
*and Determination of Effluent Limits for Discharge to*
***Tributary to the Gasconade River***

***By***

## *St. Robert Wastewater Treatment Facility*

April, 2020

*1. Facility Information*

FACILITY NAME: St. Robert Wastewater Treatment Facility (WWTF) NPDES #: MO-0112925

**FACILITY TYPE/DESCRIPTION:**
FACILITY TYPE: POTW– Municipal Wastewater Treatment Facility – SIC #4952
FACILITY DESCRIPTION: The St. Robert Wastewater Treatment Facility (WWTF) is a municipal WWTF, which serves the City of St. Robert in Pulaski County. The existing treatment system consists of a bar screen / two (2) influent screw pumps / grit chamber / peak flow clarifier / two (2) aerations basins / two (2) final clarifiers / UV disinfection / aerobic sludge digester / sludge storage basin / biosolids are land applied / blending occurs when effluent from peak flow clarifier is combined with effluent from final clarifiers prior to disinfection. The current permitted design flow is 1.0 MGD. Actual flow is approximately 0.646 MGD. The facility is currently located within the 100-year floodplain and recent storm events in December 2015 and April 2017 resulted in damage to the treatment system. The City is proposing to relocate the WWTF and build a new treatment system located above the 100-year floodplain. The proposed treatment system will consist of preliminary treatment, an aeration basin with retrievable diffusers for secondary treatment, clarification, and disinfection. The proposed design flow will be 1.25 MGD, with a maximum hydraulic capacity of 10 MGD. During wet weather events, flows in excess of 3.75 MGD will be routed through peak flow clarification and combined with the dry weather treatment train prior to disinfection. It is anticipated that the existing outfall location will remain unchanged

| | | | |
|---|---|---|---|
| COUNTY: | Pulaski | UTM COORDINATES: | X= 573327 / Y=4190523 |
| 12- DIGIT HUC: | 10290201-0701 | LEGAL DESCRIPTION: | Sec. 08, T36N, R11W |
| EDU*: | Ozark / Gasconade | ECOREGION: | Ozark Highlands |

* - Ecological Drainage Unit

*2. Water Quality Information*

In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(3)] and federal antidegradation policy at Title 40 Code of Federal Regulation (CFR) Section 131.12 (a), the Missouri Department of Natural Resources (Department) developed a statewide antidegradation policy and corresponding procedures to implement the policy. A proposed discharge to a water body will be required to undergo a level of Antidegradation Review which documents that the use of a water body's available assimilative capacity is justified. Effective August 30, 2008, and revised July 13, 2016, a facility is required to use *Missouri's Antidegradation Implementation Procedure (AIP)* for new and expanded wastewater discharges.

***2.1.** Water Quality History:*

The discharge monitoring data over the last five years indicated the facility generally performs below the permitted effluent limits. The average values over the sampling period from January 2015 to December 2019 were as follows: NH3 – 0.69 mg/L, $BOD_5$ – 6.87 mg/L, TSS – 6.37 mg/L. The facility exceeded its effluent limits for $BOD_5$, TSS, and NH3 in January 2016 and February 2016. The facility exceeded its effluent limits for Copper in September 2019.

The proposed project will affect the following waterbodies:

| OUTFALL | DESIGN FLOW (CFS) | TREATMENT LEVEL | RECEIVING WATERBODY | DISTANCE TO CLASSIFIED SEGMENT (MI) |
|---|---|---|---|---|
| 001 | 1.93 | Secondary | 100K Extent-Remaining Streams | 0.0 |
| | | | Gasconade River | 0.59 |

The Gasconade River is included on the 2018 303(d) List of Impaired Waters for mercury in fish tissue due to atmospheric deposition. The facility is not expected to contribute to the impairment. A TMDL has not been developed

*3. Receiving Waterbody Information*

| WATERBODY NAME | CLASS | WBID | LOW-FLOW VALUES (CFS) | | | DESIGNATED USES** |
|---|---|---|---|---|---|---|
| | | | 1Q10 | 7Q10 | 30Q10 | |
| Tributary to Gasconade River (100K Extent-Remaining Streams) | C | 3960 | 0 | 0 | 0 | AQL, WBC(B), SCR, HHP, IRR, LWW |
| Gasconade River | P | 1455 | 131 | 143 | 164 | AQL, CLF, WBC(A), SCR, HHP, IRR, LWW, DWS |

** Irrigation (IRR), Livestock & Wildlife Protection (LWW), Protection of Warm Water Aquatic Life (AQL), Human Health Protection (HHP), Cool Water Fishery (CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation – Category A (WBC-A), Whole Body Contact Recreation – Category B (WBC-B), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND), Groundwater (GRW).

RECEIVING WATER BODY SEGMENT #1: 100K Extent-Remaining Streams
Upper end segment* UTM coordinates: X= 573327 / Y= 4190523 (Outfall)
Lower end segment* UTM coordinates: X= 573910/ Y= 4190996 (Meets Gasconade River)
*Segment is the portion of the stream where discharge occurs. Segment is used to track changes in assimilative capacity and is bound at a minimum by existing sources and confluences with other significant water bodies.

*4. General Comments*

HDR, prepared, on behalf of the City of St. Robert, the *St. Robert WWTF Antidegradation Review Report* dated April 2, 2020.

Applicant elected to determine that discharge of all pollutants of concern (POC) except for Ammonia and Copper are non-degrading or insignificant to the receiving stream. This analysis was conducted to fulfill the requirements of the AIP. Information that was provided by the applicant in the submitted report and summary forms in Appendix B was used to develop this review document.

A Geohydrological Evaluation was submitted for this facility upgrade. The stream is gaining for discharge purposes (Appendix D).

A Missouri Department of Conservation Natural Heritage Review Report was obtained by the applicant; MDC found several records of wildlife preserves, critical habitats, or state or federal endangered-list species records within one mile of the site. As a condition of the grant award and site selection process, the City has already been addressing these and other environmental issues in coordination with the Meramec Regional Planning Commission and relevant public agencies. The Department anticipates that the City will continue these coordination efforts throughout the project, as needed (Appendix E).

*5. Antidegradation Review Information*

The following is a review of the *St. Robert WWTF Antidegradation Review Report* dated April 2, 2020.

### *5.1.* TIER DETERMINATION

Below is a list of pollutants of concern reasonably expected to be in the discharge (see Appendix B). Pollutants of concern (POC) are defined as those pollutants "proposed for discharge that affects beneficial use(s) in waters of the state. POCs include pollutants that create conditions unfavorable to beneficial uses in the water body receiving the discharge or proposed to receive the discharge." (AIP, Page 7). Tier 1 was determined for Ammonia and Copper. Tier 2 was assumed for all other POCs; however, tier determinations were not necessary with maintenance of mass loading determinations (see Appendix B).

Table 1. Pollutants of Concern and Tier Determination

| POLLUTANTS OF CONCERN | TIER | DEGRADATION | COMMENT |
|---|---|---|---|
| Biochemical Oxygen Demand$_5$ ($BOD_{5)}$ / Dissolved Oxygen (DO) | * | Insignificant | |
| Total Suspended Solids (TSS) | * | Insignificant | |
| Ammonia as N | 1 | Significant | |
| Copper, Total Recoverable | 1 | Significant | |
| pH | ** | Insignificant | Permit limits applied |
| Oil & Grease | * | Insignificant | Permit limits applied |
| *Escherichia coli* (*E. coli*) | * | Insignificant | Permit limits applied |

*Tier determination not possible with the demonstration of mass loading maintenance. ** Standards for these parameters are ranges.

The following Antidegradation Review Summary attachments in Appendix B were used by the applicant:
For pollutants of concern, the attachments are:\

- Path A: Tier 2—Non-Degradation Mass Balance
- Path D: Tier 1 Preliminary Review Request

### *5.2.* EXISTING WATER QUALITY

The receiving waterbody, Tributary to Gasconade River (100k Extent-Remaining Streams), is classified as a C stream with a 7Q10 low flow of 0.0 cfs. There are no other permitted point source discharges into the receiving waterbody. No existing water quality data was submitted; however, the definition of Existing Water Quality (EWQ) in the AIP states, "For waters receiving pollutants from an existing source (where full design capacity has not been reached), the EWQ shall include the levels of pollutants already permitted to be discharged at maximum design flow." As the St. Robert WWTF is an existing facility with effluent limits for Ammonia and Copper that are water-quality based, the Tributary to Gasconade River is already permitted to contain these POCs "at or near" WQS levels, which by definition classifies the receiving water as Tier 1 for these two pollutants.

According to the AIP, "Tier 1 reviews allow pollutants to be discharged in accordance with the WQS without performing the alternatives analysis, reviewing the implementation of nonpoint source controls, or determining social and economic importance." The facility will be required to meet Water Quality Standards Limits for both Copper and Ammonia to ensure the Water Quality Criterion for these pollutants will not be exceeded in the receiving stream.

### *5.3.* NO DISCHARGE EVALUATION

According to 10 CSR 20-6.010 (4)(D), reports for the purpose of constructing a wastewater treatment facility shall consider the feasibility of constructing and operating a no discharge facility. Missouri's antidegradation implementation procedures specify that if the proposed activity does not result in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are not required. For this reason, the no discharge evaluation should be completed during the submittal of engineering report or facility plan for the purpose of obtaining a construction permit.

Regionalization is not appropriate as this is a major municipal WWTF, and there is not an existing treatment facility within a 5 mile radius with the capacity to accept the wastewater flows from the City of St. Robert.

### *5.4.* LOSING STREAM ALTERATIVE DISCHARGE LOCATION

Under 10 CSR 20-7.015(4) (A), *discharges to losing stream shall be permitted only after other alternatives including land application, discharge to gaining stream and connection to a regional facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons*. The facility does not discharge to a losing stream segment or will not discharge within 2 miles of a losing stream segment.

### *5.5.* DEMONSTRATION OF INSIGNIFICANCE

In Section II.A of *Missouri's Antidegradation Rule and Implementation Procedure,* a demonstration of insignificance of the discharge requires the applicant to show a reduction, or maintenance of loading, i.e., no change in ambient water quality concentrations in the receiving waters. As demonstrated in the *St. Robert WWTF Antidegradation Review Report* dated April 2, 2020, Table 2 below summarizes the results of current loading based on the current permit concentrations and proposed loadings based on the proposed permit concentrations.

Table 2A. Net Change in Loadings Based upon Current and Proposed Permit Limits.

| POLLUTANTS OF CONCERN | CURRENT MONTHLY AVERAGE LIMIT (MG/L) | PROPOSED MONTHLY AVERAGE LIMIT (MG/L) | CURRENT LOADING (LBS/DAY) | PROPOSED LOADING (LBS/DAY) | NET CHANGE (LBS/DAY) |
|---|---|---|---|---|---|
| $BOD_5$ | 30 | 13 | 250 | 136 | -114 |
| TSS | 30 | 13 | 250 | 136 | -114 |
| pH** | 6.5-9.0 SI units | 6.5-9.0 SI units | Not applicable | Not applicable | Not applicable |
| *E. coli*** | Regulatory limits apply | Regulatory limits apply | Not applicable | Not applicable | Not applicable |
| Oil & Grease** | 10 | 10 | Not applicable | Not applicable | Not applicable |

Table 2B. Net Change in Loadings Based upon Current and Proposed Permit Limits.

| POLLUTANTS OF CONCERN | CURRENT WEEKLY AVERAGE OR MAXIMUM DAILY LIMIT (MG/L) | PROPOSED MAXIMUM DAILY LIMIT (MG/L) | CURRENT LOADING (LBS/DAY) | PROPOSED LOADING (LBS/DAY) | NET CHANGE (LBS/DAY) |
|---|---|---|---|---|---|
| $BOD_5$ | 45 (AWL) | 20 (AWL) | 375 | 209 | -166 |
| TSS | 45 (AWL) | 20 (AWL) | 375 | 209 | -166 |
| pH** | 6.5-9.0 SI units | 6.5-9.0 SI units | Not applicable | Not applicable | Not applicable |
| *E. coli*** | Regulatory limits apply | Regulatory limits apply | Not applicable | Not applicable | Not applicable |
| Oil & Grease** | 15 | 15 | Not applicable | Not applicable | Not applicable |

AWL = average weekly limit.
*WQBEL=water quality based effluent limit.
**See Derivation and Discussion of Limits, Section 10.
.

Current design flow (Qd) = 1.0 MGD
Mass conversion -- 1 mg/L = 8.34 lbs/million gallons
Wasteload Allocation (WLA) = maximum daily or weekly average

Existing Load (lbs/day) = Mass conversion * WLA * Qd
**Example**: 8.34 (lbs/MG)/(mg/L) * 30 mg/L * 1.0 MGD = 250 lbs/day

### 5.6. DEMONSTRATION OF NECESSITY AND SOCIAL AND ECONOMIC IMPORTANCE

Missouri's antidegradation implementation procedures specify that if the proposed activity does not result in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are not required. Thus, the Tier 2 Review is not required.

## *6. General Assumptions of the Water Quality and Antidegradation Review*

1. A Water Quality and Antidegradation Review (WQAR) assumes that [10 CSR 20-6.010(3) Continuing Authorities and 10 CSR 20-6.010(4) (D), consideration for no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
2. A WQAR does not indicate approval or disapproval of alternative analysis as per [10 CSR 20-7.015(4) Losing Streams], and/or any section of the effluent regulations.
3. Changes to Federal and State Regulations made after the drafting of this WQAR may alter Water Quality Based Effluent Limits (WQBEL).
4. Effluent limitations derived from Federal or Missouri State Regulations (FSR) may be WQBEL or Effluent Limit Guidelines (ELG).
5. WQBEL supersede ELG only when they are more stringent. Mass limits derived from technology based limits are still appropriate.
6. A WQAR does not allow discharges to waters of the state, and shall not be construed as a National Pollution Discharge Elimination System or Missouri State Operating Permit to discharge or a permit to construct, modify, or upgrade.
7. Limitations and other requirements in a WQAR may change as Water Quality Standards, Methodology, and Implementation procedures change.
8. Nothing in this WQAR removes any obligations to comply with county or other local ordinances or restrictions.

9. If the proposed treatment technology is not covered in 10 CSR 20-8 Design Guides, the treatment process may be considered a new technology. As a new technology, the permittee will need to work with the review engineer to ensure equipment is sized properly. The operating permit may contain additional requirements to evaluate the effectiveness of the technology once the facility is in operation. This Antidegradation Review is based on the information provided by the facility and is not a comprehensive review of the proposed treatment technology. If the review engineer determines the proposed technology will not consistently meet proposed effluent limits, the permittee will be required to revise their Antidegradation Report.

*7. Mixing Considerations*

**Mixing Zone (MZ):** Not Allowed [10 CSR 20-7.031(5)(A)4.B.(I)(a)].

**Zone of Initial Dilution (ZID):** Not Allowed [10 CSR 20-7.031(5)(A)4.B.(I)(b)].

*8. Permit Limits and Monitoring Information*

| Wasteload Allocation Study Conducted (Y or N): | N | Use Attainability Analysis Conducted (Y or N): | N | Whole Body Contact Use Retained (Y or N): | Y |
|---|---|---|---|---|---|

Table 3. Effluent Limits for Outfall #001

| Parameter | Units | Daily Maximum | Weekly Average | Monthly Average | Basis for Limit (note 2) | Monitoring Frequency |
|---|---|---|---|---|---|---|
| Flow | MGD | * | | * | FSR | Once/day |
| $BOD_5$*** | mg/L | | 20 | 13 | NDEL | Twice/month |
| TSS | mg/L | | 20 | 13 | NDEL | Twice/Month |
| pH | SU | 6.5 – 9.0 | | 6.5 – 9.0 | FSR | Once/Month |
| Ammonia as N | | | | | | |
| (January) | mg/L | 12.1 | | 3.1 | | Once/Month |
| (February) | mg/L | 12.1 | | 2.7 | | Once/Month |
| (March) | mg/L | 10.1 | | 3.1 | | Once/Month |
| (April) | mg/L | 12.1 | | 2.7 | | Once/Month |
| (May) | mg/L | 12.1 | | 2.2 | | Once/Month |
| (June) | mg/L | 12.1 | | 1.7 | WQBEL | Once/Month |
| (July) | mg/L | 12.1 | | 1.5 | | Once/Month |
| (August) | mg/L | 12.1 | | 1.5 | | Once/Month |
| (September) | mg/L | 12.1 | | 1.8 | | Once/Month |
| (October) | mg/L | 12.1 | | 2.6 | | Once/Month |
| (November) | mg/L | 12.1 | | 3.1 | | Once/Month |
| (December) | mg/L | 12.1 | | 3.1 | | Once/Month |
| Oil & Grease | mg/L | 15 | | 10 | FSR | Once/month |
| *Escherichia coliform* (*E. coli*) | Note 1 | | 630** | 126** | FSR | Once/Week |
| Acute Wet Testing | $TU_A$ | * | | * | FSR | Once/ Year |
| Chronic WET testing | $TU_C$ | * | | * | | Once/Permit Cycle |
| Copper, Total Recoverable | µg/L | 32.4 | | 16.2 | WQBEL | Once/Month |
| Total Kjeldahl Nitrogen | mg/L | * | | * | FSR | Once/Month |
| Nitrate + Nitrite | mg/L | * | | * | FSR | Once/Month |
| Total Phosphorus | mg/L | * | | * | FSR | Once/Month |

Note 1 – Colonies/100 mL
Note 2– Water Quality-based Effluent Limitation – WQBEL; or Minimally Degrading Effluent Limit – MDEL; or Preferred Alternative Effluent Limit – PEL; or Technology-based Effluent Limit – TBEL; or No Degradation effluent Limit – NDEL; or Federal/State Regulation – FSR; or Not Applicable – N/A. Also, please see the **General Assumptions of the WQAR #4 & #5.**

* Monitoring requirements only.
** The Monthly and Weekly Average for *E. coli* shall be reported as a Geometric Mean. The Weekly Average for *E. coli* will be expressed as a geometric mean if more than one (1) sample is collected during a calendar week (Sunday through Saturday).
*** This facility is required to meet a removal efficiency of 85% or more for $BOD_5$ and TSS. Influent $BOD_5$ and TSS data should be reported to ensure removal efficiency requirements are met.

*9. Influent Monitoring Requirements*

**Permitted Feature INF**

| PARAMETER(S) | SAMPLING FREQUENCY | SAMPLE TYPE | LOCATION |
|---|---|---|---|
| $BOD_5$ | Once/month | Composite | Treatment Facility Headworks |
| TSS | Once/month | Composite | |
| Ammonia as N | Once/month | Composite | |
| Total Kjeldahl Nitrogen | Once/month | Composite | |
| Nitrite + Nitrate | Once/month | Composite | |
| Total Phosphorus | Once/month | Composite | |

*10. Derivation and Discussion of Limits*

Wasteload allocations and limits were calculated using two methods:

1) Water quality-based – Using water quality criteria or water quality model results and the dilution equation below:

$$C = \frac{(Cs \times Qs) + (Ce \times Qe)}{(Qe + Qs)}$$ (EPA/505/2-90-001, Section 4.5.5)

Where: C = downstream concentration
Cs = upstream concentration
Qs = upstream flow
Ce = effluent concentration
Qe = effluent flow

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ). Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow at the edge of the zone of initial dilution (ZID).

Water quality-based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

Chronic wasteload allocations (WLAc) were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and upstream stream flow without mixing considerations. Acute wasteload allocations are only determined in the absence of applicable chronic criteria.

### *10.1.* OUTFALL #001 – **MAIN FACILITY OUTFALL**

10.2. LIMIT DERIVATION

- **Flow**. In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the Department, which may require the submittal of an operating permit modification.

- **Biochemical Oxygen Demand ($BOD_5$).** $BOD_5$ limits of 13 mg/L monthly average, 20 mg/L average weekly. The technology-based secondary limitations at 10 CSR 20-7.015 (8) of 30 mg/L monthly and 45 mg/L average weekly are less protective of water quality standards than the no degradation expansion limitations in the table below. The table below shows that the expanded loading will be reduced as compared to the current permitted loading. This demonstration of insignificance satisfies the requirements of the AIP. These limitations are non-degrading and protective of existing water quality.

| | Current | | | Proposed | | | % Change in Loading |
|---|---|---|---|---|---|---|---|
| | Flow (MGD) | limit (mg/L) | loading (lb/day) | Flow (MGD) | limit (mg/L) | loading (lb/day) | |
| Average Weekly | 1.0 | 45 | 375 | 1.25 | 20 | 209 | -44.3% |
| Average Monthly | 1.0 | 30 | 250 | 1.25 | 13 | 136 | -45.6% |

Using the weekly expansion limitation stated above, Streeter Phelps modeling provided by the applicant in Appendix C demonstrated that $BOD_5$ effluent is protective of water quality standards for DO.

- **Total Suspended Solids (TSS).** 13 mg/L monthly average, 20 mg/L average weekly limit. The technology-based secondary limitations at 10 CSR 20-7.015 (8) of 30 mg/L monthly and 45 mg/L average weekly are less protective of water quality standards than the no degradation expansion limitations in the table below. Therefore, the no degradation limitations must be applied.

| | Current | | | Proposed | | | % Change in Loading |
|---|---|---|---|---|---|---|---|
| | Flow (MGD) | limit (mg/L) | loading (lb/day) | Flow (MGD) | limit (mg/L) | loading (lb/day) | |
| Average Weekly | 1.0 | 45 | 375 | 1.25 | 20 | 209 | -44.3% |
| Average Monthly | 1.0 | 30 | 250 | 1.25 | 13 | 136 | -45.6% |

- **Biochemical Oxygen Demand ($BOD_5$) Percent Removal**. In accordance with 40 CFR Part 133, removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to $BOD_5$ and TSS for Publicly Owned Treatment Works (POTWs)/municipals. This facility is required to meet 85% removal efficiency for $BOD_5$.

- **Total Suspended Solids (TSS) Percent Removal**. In accordance with 40 CFR Part 133, removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to $BOD_5$ and TSS for Publicly Owned Treatment Works (POTWs)/municipals. This facility is required to meet 85% removal efficiency for TSS.

- **Total Ammonia Nitrogen**. Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(5)(B)7.C. & Table B3]. Background total ammonia nitrogen = 0.01 mg/L. No mixing considerations allowed; therefore, WLA = appropriate criterion.

  The Department previously followed the 2007 Ammonia Guidance method for derivation of ammonia limits. However, the EPA's Technical Support Document for Water Quality-based Toxic Controls (TSD) establishes other alternatives to limit derivation. The Department has determined that the approach established in Section 5.4.2 of the TSD, which allows for direct application of both the acute and chronic wasteload allocations (WLA) as permit limits for toxic pollutants, is more appropriate limit derivation approach. Using this method for a discharge to a waterbody where mixing is not allowed, the criterion continuous concentration (CCC) and the criterion maximum concentration (CMC) will equal the chronic and acute WLA respectively. The WLAs are then applied as effluent limits, per Section 5.4.2 of the TSD, where the CMC is the Daily Maximum and the CCC is the Monthly Average. The direct application of both acute and chronic criteria as WLA is also applicable for facilities that discharge into receiving waterbodies with mixing considerations. The CCC and CMC will need to be calculated into WLA with mixing considerations using the mass-balance equation:

$$Ce = \frac{(Qe + Qs)C - (Qs \times Cs)}{(Qe)}$$

  Where C = downstream concentration Ce = effluent concentration
  Cs = upstream concentration Qe = effluent flow
  Qs = upstream flow

  In the event that mixing considerations derive an AML less stringent than the MDL, the AML and MDL will be equal and based on the MDL.

| Month | Temp (°C) | pH (SU) | Total Ammonia Nitrogen CCC (mg/L) | Total Ammonia Nitrogen CMC (mg/L) |
|---|---|---|---|---|
| January | 8.3 | 7.8 | 3.1 | 12.1 |
| February | 9.2 | 7.9 | 2.7 | 10.1 |
| March | 12.9 | 7.8 | 3.1 | 12.1 |
| April | 16.6 | 7.8 | 2.7 | 12.1 |
| May | 20.0 | 7.8 | 2.2 | 12.1 |
| June | 23.8 | 7.8 | 1.7 | 12.1 |
| July | 26.0 | 7.8 | 1.5 | 12.1 |
| August | 26.0 | 7.8 | 1.5 | 12.1 |
| September | 23.0 | 7.8 | 1.8 | 12.1 |
| October | 17.2 | 7.8 | 2.6 | 12.1 |
| November | 14.0 | 7.8 | 3.1 | 12.1 |
| December | 10.4 | 7.8 | 3.1 | 12.1 |

| | | |
|---|---|---|
| **January**<br>AML = WLAc = 3.1 mg/L<br>MDL = WLAa = 12.1 mg/L | **May**<br>AML = WLAc = 2.2 mg/L<br>MDL = WLAa = 12.1 mg/L | **September**<br>AML = WLAc = 1.8 mg/L<br>MDL = WLAa = 12.1 mg/L |
| **February**<br>AML = WLAc = 2.7 mg/L<br>MDL = WLAa = 10.1 mg/L | **June**<br>AML = WLAc = 1.7 mg/L<br>MDL = WLAa = 12.1 mg/L | **October**<br>AML = WLAc = 2.6 mg/L<br>MDL = WLAa = 12.1 mg/L |

| | | |
|---|---|---|
| **March**<br>AML = WLAc = 3.1 mg/L<br>MDL = WLAa = 12.1 mg/L | **July**<br>AML = WLAc = 1.5 mg/L<br>MDL = WLAa = 12.1 mg/L | **November**<br>AML = WLAc = 3.1 mg/L<br>MDL = WLAa = 12.1 mg/L |
| **April**<br>AML = WLAc = 2.7 mg/L<br>MDL = WLAa = 12.1 mg/L | **August**<br>AML = WLAc = 1.5 mg/L<br>MDL = WLAa = 12.1 mg/L | **December**<br>AML = WLAc = 3.1 mg/L<br>MDL = WLAa = 12.1 mg/L |

- ***Escherichia coli (E. coli)***. Monthly average of 126 per 100 mL as a geometric mean and Weekly Average of 630 per 100 m: as a geometric mean during the recreational season (April 1 – October 31), to protect Whole Body Contact Recreation (A) designated use of the receiving stream, as per 10 CSR 20-7.031(5)(C). An effluent limit for both monthly average and daily maximum is required by 40 CFR 122.45(d). The Geometric Mean is calculated by multiplying all of the data points and then taking the nth root of this product, where n = # of samples collected. For example: Five *E. coli* samples were collected with results of 1, 4, 6, 10, and 5 (#/100mL). Geometric Mean = $5^{th}$ root of (1)(4)(6)(10)(5) = $5^{th}$ root of 1,200 = 4.1 #/100mL.

- **pH**. – 6.5-9.0 SU. Technology based effluent limitations of 6.0-9.0 SU [10 CSR 20-7.015] are not protective of the Water Quality Standard, which states that water contaminants shall not cause pH to be outside the range of 6.5-9.0 SU. No mixing zone is allowed due to the classification of the receiving stream, therefore the water quality standard must be met at the outfall.

- **Oil & Grease**. Conventional pollutant, [10 CSR 20-7.031, Table A]. Effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.

- **Total Phosphorus and Total Nitrogen (Speciated)**. Effluent monitoring for Total Phosphorus, Total Kjeldahl Nitrogen, and Nitrite + Nitrate are required per 10 CSR 20-7.015(9)(D)8.

**Metals**

Effluent water hardness of 244 mg/L is used in the calculation below. This value represents the $50^{th}$ percentile (median) for all sample data submitted to the Department by the facility in compliance with the final effluent monitoring requirements of the operating permit.

Due to the absence of contemporaneous effluent and instream data for total recoverable metals, dissolved metals, hardness, and total suspended solids with which to calculate metals translators, partitioning between the dissolved and absorbed phases was assumed to be minimal (Section 5.7.3, EPA/505/2-90-001). Freshwater criteria conversion factors for dissolved metals were used as the metals translator is recommended in guidance (Section 1.3, 1.5.3, and Table 1, EPA 823-B-96-007). If concurrent site-specific data for total recoverable metals, dissolved metals, hardness, and total suspended solids are provided to the Department, partitioning evaluations may be considered and site-specific translators developed.

| METAL | CONVERSION FACTORS | |
|---|---|---|
| | ACUTE | CHRONIC |
| Copper | 0.960 | 0.960 |

Conversion factors for Cu are hardness dependent. Values calculated using equation found in Section 1.3 of EPA 823-B-96-007 and hardness = 244 mg/L.

- **Copper, Total Recoverable**. Protection of Aquatic Life Acute Criteria = 31.13 µg/L, Chronic Criteria = 19.19 µg/L. The hardness value of **244 mg/L** represents the $50^{th}$ percentile (median) for 100K Extent-Remaining Streams (C) (3960).

Acute AQL: e^(0.9422 * ln244 – 1.700300) * (0.960) = 31.134 µg/L [at hardness 244]
Chronic AQL: e^(0.78545 * ln244 – 1.702) * (0.960) = 19.192 µg/L [at hardness 244]

TR Conversion: AQL/Translator = 31.134 / 0.96 = 32.432 [at hardness 244]
TR Conversion: AQL/Translator = 19.192 / 0.96 = 19.992 [at hardness 244]

Acute WLA: Ce = ((1.934 cfsDF + 0 cfsZID) * 32.432 – (0 cfsZID * 0 background)) / 1.934 cfsDF = 32.432
Chronic WLA: Ce = ((1.934 cfsDF + 0 cfsMZ) * 19.992 – (0 cfsMZ * 0 background)) / 1.934 cfsDF = 19.992

LTAa: WLAa * LTAa multiplier = 32.432 * 0.321 = 10.413 [CV: 0.6, 99th %ile]
LTAc: WLAc * LTAc multiplier = 19.992 * 0.527 = 10.544 [CV: 0.6, 99th %ile]
use most protective LTA: 10.413

Daily Maximum: MDL = LTA * MDL multiplier = 10.413 * 3.114 = **32.4 µg/L** [CV: 0.6, 99th %ile]
Monthly Average: AML = LTA * AML multiplier = 10.413 * 1.552 = **16.2 µg/L** [CV: 0.6, 95th %ile, n=4]

**Whole Effluent Toxicity**

- **Acute Whole Effluent Toxicity**. Monitoring requirement only. Monitoring is required to determine if reasonable potential exists for this facility's discharge to exceed water quality standards. Where no mixing is allowed, the acute criterion must be met at the end of the pipe. However, when using an LC50 as the test endpoint, the acute toxicity test has an upper sensitivity level of 100% effluent, or 1.0 TUa. If less than 50% of the test organisms die at 100% effluent, the true LC50 value for the effluent cannot be measured, effectively acting as a detection limit. Therefore, when the allowable effluent concentration is 100% a limit of 1.0 TUa will apply. If more than 50% of the organisms survive at 100% effluent, the permittee should report TUa <1.

  ✓ Acute Allowable Effluent Concentrations (AECs) for facilities that discharge to Class C are 100%, 50%, 25%, 12.5%, & 6.25%.

- **Chronic Whole Effluent Toxicity**. Monitoring requirement only. Monitoring is required to determine if reasonable potential exists for this facility's discharge to exceed water quality standards. A chronic toxic unit limit of 1.6 applies.

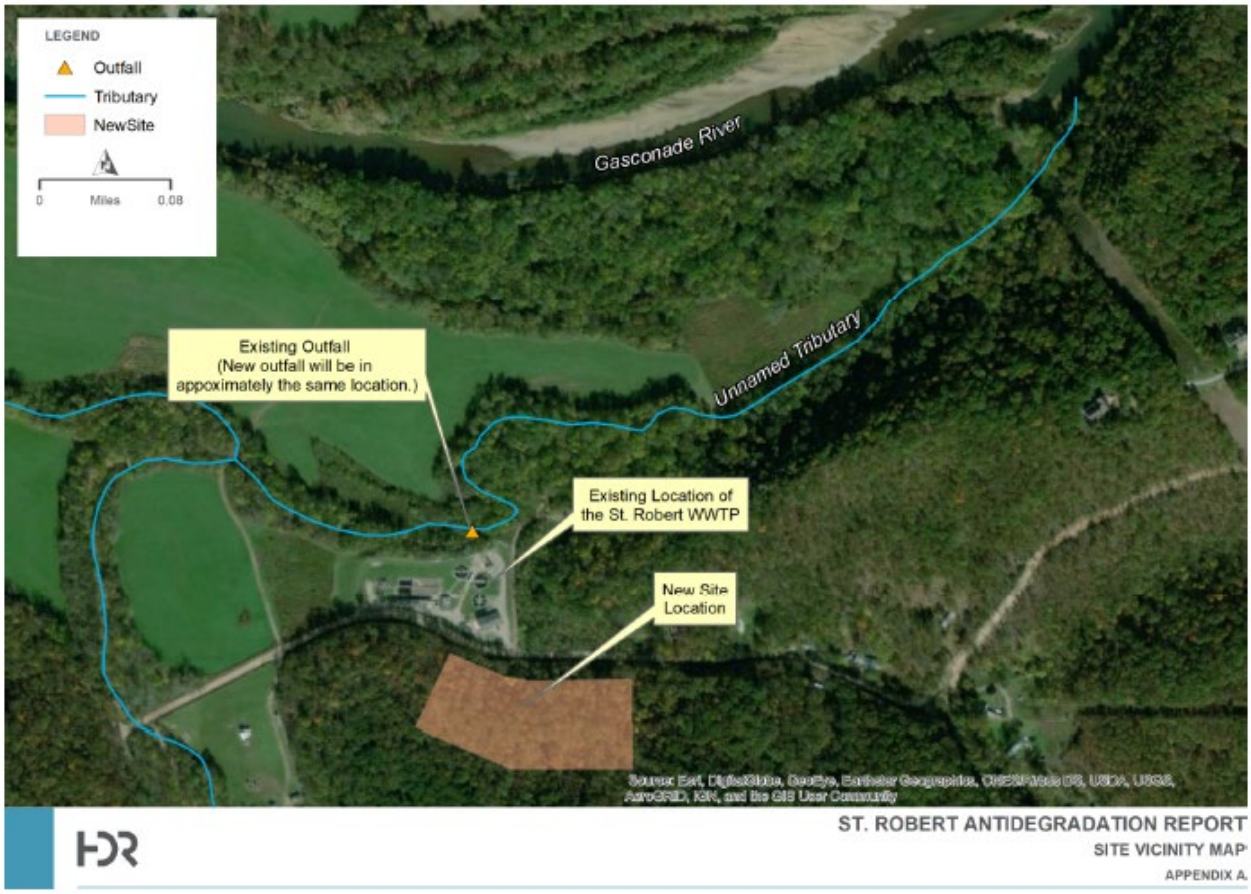
  - Chronic Allowable Effluent Concentrations (AECs) for facilities that discharge to Class C are 100%, 50%, 25%, 12.5%, & 6.25%.

## 11. ANTIDEGRADATION REVIEW PRELIMINARY DETERMINATION

The proposed facility discharge will result in no degradation of the segment identified in the Tributary to the Gasconade River for all pollutants with the exception of Copper and Ammonia. For Copper and Ammonia water-quality based effluent limits are being established. Per the requirements of the AIP, the effluent limits in this review were developed to be protective of beneficial uses and to retain the remaining assimilative capacity. The Department has determined that the submitted review is sufficient and meets the requirements of the AIP. No further analysis is needed for this discharge.

Reviewer: Ellen Modglin, E.I.
Date: April 2020
Unit Chief: John Rustige, P.E.

Appendix A: Map of Discharge Location Outfall and Map of the St. Robert WWTF Location.



Appendix B: Antidegradation Review Summary Forms

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH
**ANTIDEGRADATION REVIEW SUMMARY / REQUEST**

| FOR DEPARTMENT USE ONLY | |
|---|---|
| APP NO. | |
| FEE RECEIVED | CHECK NO. |
| DATE RECEIVED | |

**1. FACILITY**

| NAME | | | COUNTY |
|---|---|---|---|
| St. Robert Wastewater Treatment Plant | | | Pulaski |
| ADDRESS (PHYSICAL) | CITY | STATE | ZIP CODE |
| 20975 Laramie Road | St. Robert | MO | 65584 |
| PERMIT NUMBER | PROPOSED DESIGN FLOW | SIC / NAICS CODE | |
| MO-0112925 | 1.25 | 4952 | |

**2. OWNER**

| NAME | | | |
|---|---|---|---|
| Steve Long, City of St. Robert | | | |
| ADDRESS | CITY | STATE | ZIP CODE |
| 194 Eastlawn Avenue, Suite A | St. Robert | MO | 65584 |
| EMAIL ADDRESS | | TELEPHONE NUMBER WITH AREA CODE | |
| slong@saintrobert.com | | (573) 451-3315 | |

**3. CONTINUING AUTHORITY** The regulatory requirement regarding continuing authority is found in 10 CSR 20-6.010(2).

| NAME | SECRETARY OF STATE CHARTER NUMBER | | |
|---|---|---|---|
| Steve Long, City of St. Robert | N/A | | |
| ADDRESS | CITY | STATE | ZIP CODE |
| 194 Eastlawn Avenue, Suite A | St. Robert | MO | 65584 |
| EMAIL ADDRESS | | TELEPHONE NUMBER WITH AREA CODE | |
| slong@saintrobert.com | | (573) 451-3315 | |

**4. CONSULTANT**

| PREPARER NAME | COMPANY NAME | | |
|---|---|---|---|
| David Carani | HDR | | |
| ADDRESS | CITY | STATE | ZIP CODE |
| 401 South 18th Street, Suite 300 | St. Louis | MO | 63103 |
| EMAIL ADDRESS | | TELEPHONE NUMBER WITH AREA CODE | |
| David.Carani@hdrinc.com | | 314-425-8339 | |

**5. RECEIVING WATER BODY SEGMENT #1**

NAME: Tributary to Gasconade River

5.1 Upper end of segment – Location of discharge
UTM: X= 573327, Y= 4190523 OR Lat _____, Long _____

5.2 Lower end of segment –
UTM: X= 573912, Y= 4190998 OR Lat _____, Long _____

Per the Missouri Antidegradation Implementation Procedure (AIP), the definition of a segment, "a segment is a section of water that is bound, at a minimum, by significant existing sources and confluences with other significant water bodies."

**6. WATER BODY SEGMENT #2 (IF APPLICABLE, Use another form if a third segment is needed)**

NAME: Gasconade River (WBID 1455)

6.1 Upper end of segment – End of Segment #1
UTM: X= 573912, Y= 4190998 OR Lat _____, Long _____

6.2 Lower end of segment –
UTM: X= 626335, Y= 4281804 OR Lat _____, Long _____

**7. DECHLORINATION**

If chlorination and dechlorination is the existing or proposed method of disinfection treatment, will the effluent discharged be equal to or less than the Water Quality Standards for Total Residual Chlorine stated in Table A1 of 10 CSR 20-7.031?

☐ Yes ☑ No – What is the proposed method of disinfection? UV disinfection

Based on the disinfection treatment system being designed for total removal of Total Residual Chlorine, minimal degradation for Total Residual Chlorine is assumed and the facility will be required to meet the water quality based effluent limits. These compliance limits for Total Residual Chlorine are much less than the method detection limit of 0.13 mg/L.

## 8. SUMMARIZE THE FEASIBILITY OF CONSTRUCTING A NO-DISCHARGE TREATMENT WASTEWATER FACILITY

According to the Antidegradation Implementation Procedure Sections I.B. and II.B.1., the feasibility of no-discharge alternatives must be considered. No-discharge alternatives may include connection to a regional treatment facility, surface land application, subsurface land application, and recycle or reuse.

I.B. and II.B.1 only applies to significantly degrading discharges. The proposed expansion is insignificant. Therefore, the feasibility of no-discharge alternatives do not need to be evaluated.

## 9. ADDITIONAL REQUIREMENTS

**Complete and submit the following with this submittal:**

- ☑ Copy of the Geohydrologic Evaluation – Submit request through the Missouri Geological Survey website
- ☑ Copy of the Missouri Natural Heritage from the Missouri Department of Conservation website
- ☑ Attach your Antidegradation Review Report and all supporting documentation as these forms are only a summary.
- ☐ If applicable, submit a copy of any Existing Water Quality data used in this process, Include the date range of the data, source(s) of the data, and location of data collection relative to the outfall. If using your own collected water quality data, submit a copy of the Quality Assurance Project Plan (QAPP) approved by the department's Watershed Protection Section. For more detailed information, see the Missouri Antidegradation Implementation Procedure (AIP), Section II.A.1.

## 10. PATH / TIER REVIEW ATTACHMENTS ENCLOSED

| | | |
|---|---|---|
| **Path A: Tier 2 – Non-Degradation Mass Balance** | ☑ **Yes** | ☐ **No** |
| **Path B: Tier 2 – Minimal Degradation** | ☐ **Yes** | ☐ **No** |
| **Path C: Tier 2 – Significant Degradation** | ☐ **Yes** | ☐ **No** |
| **Path D: Tier 1 – Preliminary Review Request** | ☑ **Yes** | ☐ **No** |
| **Path E: Temporary Degradation** | ☐ **Yes** | ☐ **No** |

## 11. APPLICANT PROPOSED ANTIDEGRADATION REVIEW EFFLUENT LIMITS

Preliminary effluent limits for the proposed project are dependent upon the path selected:

| Applicable Pollutants of Concern | Concentration* | | Path / Tier Review Attachment Used for POC Evaluation | Average Monthly Limit | Daily Maximum Limit or Average Weekly Limit |
|---|---|---|---|---|---|
| | mg/L | µg/L | | | |
| $BOD_5$ | X | | Path A | 13 | 20 |
| TSS | X | | Path A | 13 | 20 |
| Ammonia (Summer) | X | | Path D | 1.5-3.2 | 12.1 |
| Ammonia (Winter) | X | | Path D | monitor only | monitor only |
| Total Phosphorus | X | | NA | NA | NA |
| Copper | | X | Path D | 16 | 31 |
| | | | | | |
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* Place an X in appropriate box for the concentration units for each Pollutant of Concern.

**12. PROPOSED PROJECT SUMMARY**

The City of St, Robert (City) is pursuing the relocation and expansion of the St, Robert Wastewater Treatment Plant (WWTP) to address flooding concerns. The St. Robert WWTP relocation project will consist of the construction of a new wastewater treatment plant adjacent to the existing structure. The City is proposing to increase the design average flow (DAF) of the treatment plant from 1.0 to 1.25 million gallons per day (MGD). Dry weather treatment will consist of preliminary treatment (vortex grit removal and fine mechanical screening), biological treatment, final clarification, and disinfection. Wet weather treatment will consist of coarse bar screening, clarification, and disinfection. During wet weather, flows up to 3.75 MGD will be routed through the dry weather treatment process. Flows in excess of 3.75 MGD up to 10 MGD will be routed through the wet weather process and then combined with the dry weather train prior to disinfection and discharge. The outfall location on the unnamed tributary to the Gasconade River will remain the same.

Applicants choosing to use a new wastewater technology that are considered an "unproven technology" in Missouri must comply with the requirements set forth in the *New Technology Definitions and Requirements fact sheet*.

**13. CONTINUING AUTHORITY WAIVER (For New Discharges)**

In accordance with 10 CSR 20-6.010(2)(C), applicants proposing use of a lower preference continuing authority, when the higher level authority is available, must submit a waiver from the existing higher authority one or other documentation for the department's review, provided it does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or by the Missouri Clean Water Commission. Is the waiver necessary? ☐ Yes ☐ No
If yes, provide a copy.

**14. APPLICATION FEE**

☐ CHECK NUMBER ☑ JETPAY CONFIRMATION NUMBER 20015773

**15. SIGNATURE**

I am authorized and hereby certify that I am familiar with the information contained in this document and to the best of my knowledge and belief such information is true, complete and accurate.

| SIGNATURE | DATE |
|---|---|
| | 4/9/2020 |
| PRINT NAME | TITLE |
| David Carani | Project Manager |

**PLEASE IDENTIFY YOUR STATUS FOR THIS PROJECT:** ☐ **OWNER** ☐ **CONTINUING AUTHORITY** ☑ **CONSULTANT**

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH

# ANTIDEGRADATION REVIEW SUMMARY
# PATH D: TIER 1 PRELIMINARY REVIEW REQUEST

## 1. FACILITY AND CONTACT INFORMATION

| FACILITY NAME | | | COUNTY |
|---|---|---|---|
| St. Robert Wastewater Treatment Plant | | | Pulaski |
| **ADDRESS (PHYSICAL)** | **CITY** | **STATE** | **ZIP CODE** |
| 20975 Laramie Road | St. Robert | MO | 65584 |
| **CONTACT NAME** | | | |
| Steve Long | | | |
| **ADDRESS** | **CITY** | **STATE** | **ZIP CODE** |
| 194 Eastlawn Avenue, Suite A | St. Robert | MO | 65584 |
| **EMAIL ADDRESS** | | | **TELEPHONE NUMBER WITH AREA CODE** |
| slong@saintrobert.com | | | (573) 451-3315 |

## 2. EXISTING WATER QUALITY DATA OR MODEL SUMMARY

The proposed project will be reviewed by the Watershed Protection Section to determine whether or not the discharge will cause or contribute to the impairment. Once this determination has been completed, the applicant may proceed by paying the review fee and submitting the request forms for the entire project.

Provide all the relevant data and reports for approval by the Watershed Protection Section.

Name of Receiving Stream: Tributary to Gasconade River

Does the receiving stream have a Total Maximum Daily Load (TMDL)? ☐ Yes ☑ No

If known, what is the source(s) of the impairment?
Not applicable because the stream is not impaired. However, it is Tier 1 based on the levels of pollutants permitted.

List the pollutants for which the stream is impaired:
Not applicable because it is not impaired. However, it is Tier 1 for ammonia and copper.

What is the design flow of the proposed facility?

**Comments/Discussion:**
The City is proposing to increase the design flow from 1.0 to 1.25 MGD. Because the facility discharges to an effluent dominated stream (7Q10 = 0), existing water quality is driven by effluent from the St. Robert WWTF. Per the AIP, existing water quality "shall include the levels of pollutants already permitted to be discharged at maximum design flow." The AIP also states that pollutants of concern "at or near" the water quality standard (WQS) qualify as Tier 1. The permitted levels of ammonia and copper are water quality-based; therefore, by definition are Tier 1 (i.e., at or near the WQS).

**Tier Determination:** Identify all Tier 1 pollutants below.

| Tier 1 Pollutant of Concern | Concentration* | | Water Quality Standard | Proposed Effluent Concentration |
|---|---|---|---|---|
| | mg/L | µg/L | | |
| Ammonia-N | X | | 1.5/12.1 (CCC/CMC, July) | 1.5/12.1 (July AML/MDL) |
| Copper | | X | 19/31 (CCC/CMC, hard=244) | 16/31 (AML/MDL) (CV=0.6) |
| | | | | |

* Place an X in appropriate box for the concentration units for each Pollutant of Concern

## 3. PROPOSED PROJECT SUMMARY

The City of St. Robert (City) is pursuing the relocation and expansion of the St. Robert Wastewater Treatment Plant (WWTP) to address flooding concerns. The St. Robert WWTP relocation project will consist of the construction of a new wastewater treatment plant adjacent to the existing structure. The City is proposing to increase the design average flow (DAF) of the treatment plant from 1.0 to 1.25 million gallons per day (MGD). Dry weather treatment will consist of preliminary treatment (vortex grit removal and fine mechanical screening), biological treatment, final clarification, and disinfection. Wet weather treatment will consist of coarse bar screening, clarification, and disinfection. During wet weather, flows up to 3.75 MGD will be routed through the dry weather treatment process. Flows in excess of 3.75 MGD up to 10 MGD will be routed through the wet weather process and then combined with the dry weather train prior to disinfection and discharge. The outfall location on the unnamed tributary to the Gasconade River will remain the same.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH

# ANTIDEGRADATION REVIEW SUMMARY
# PATH A: TIER 2 – NON-DEGRADATION MASS BALANCE

## 1. FACILITY

| NAME | COUNTY |
|---|---|
| St. Robert Wastewater Treatment Plant (MO-0112925) | Pulaski |

## 2. EXISTING LOAD SUMMARY – NET CHANGE

| Pollutant of Concern | Type of Limit | Current Permit Limit* | Current Design Flow | Current Load | New Load | New Expanded Design Flow | No-Degradation Expansion Concentration |
|---|---|---|---|---|---|---|---|
| | | mg/L | MGD | lbs/day | lbs/day | MGD | mg/L |
| Biochemical Oxygen Demand ($BOD_5$) | AWL | 45 | 1.0 | 375 | 209 | 1.25 | 20 |
| | AML | 30 | | 250 | 136 | | 13 |
| Total Suspended Solids (TSS) | AWL | 45 | | 375 | 209 | | 20 |
| | AML | 30 | | 250 | 136 | | 13 |
| Ammonia (Summer) | MDL | NA | | NA | NA | | NA |
| | AML | NA | | NA | NA | | NA |
| Ammonia (Winter) | MDL | NA | | NA | NA | | NA |
| | AML | NA | | NA | NA | | NA |
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* If current facility discharges the pollutant of concern and does not have a current permit limit for this pollutant of concern, the water quality standard should be used in the calculation.

AWL – Average Weekly Limit MDL – Maximum Daily Limit AML – Average Monthly Limit

Equation: Load = Limit (mg/L)* Conversion Factor (8.34 (LBS/MG)/(mg/L))*Design Flow (MGD). Note: New Load must be less than or equal to the Current Load.

Is mass balance non-degradation proposed for all pollutants of concern? ☐ Yes ☑ No
If no, the appropriate additional forms must be used for those pollutants which are degrading.

## 3. PROPOSED PROJECT SUMMARY

The City of St, Robert (City) is pursuing the relocation and expansion of the St, Robert Wastewater Treatment Plant (WWTP) to address flooding concerns. The St. Robert WWTP relocation project will consist of the construction of a new wastewater treatment plant adjacent to the existing structure. The City is proposing to increase the design average flow (DAF) of the treatment plant from 1.0 to 1.25 million gallons per day (MGD). Dry weather treatment will consist of preliminary treatment (vortex grit removal and fine mechanical screening), biological treatment, final clarification, and disinfection. Wet weather treatment will consist of coarse bar screening, clarification, and disinfection. During wet weather, flows up to 3.75 MGD will be routed through the dry weather treatment process. Flows in excess of 3.75 MGD up to 10 MGD will be routed through the wet weather process and then combined with the dry weather train prior to disinfection and discharge. The outfall location on the unnamed tributary to the Gasconade River will remain the same.

Appendix C: Dissolved Oxygen Modeling

## *Draft Spreadsheet Prepared for Missouri Dept of Natural Resources*

## *Modified Streeter-Phelps Dissolved Oxygen Model*

### Part 1: Analysis Documentation

| | | | |
|---|---|---|---|
| Permit Applicant: | St. Robert WWTP | | |
| Analysis Date: | 12/31/2019 | Permit Number: | MO-0112925 |
| Analysis Performed By: | HDR Engineering, Inc. | | |

### Part 2: Facility Discharge Information

County: Pulaska  Latitude:  Longtitude:

**Effluent Characteristics**

| Variable | Unit | Value | Suggested Value & Comments |
|---|---|---|---|
| Flow | MGD | 1.25 | *Facility Design Average Flow* |
| $CBOD_5$ | [mg/L] | 15 | *Adjust to meet D.O. criteria* |
| $NH_3$-N | [mg/L] | 1.3 | *Equal to or less than toxicity-based ammonia WLA. Adjust to meet D.O.* |
| TSS | [mg/L] | 20 | *Adjust to meet D.O. criteria* |
| D.O. | [mg/L] | 6 | *Adjust to meet D.O. criteria* |
| pH | S.U. | 7.8 | *Use median from DMR data if available, otherwise assume 7.8 S.U.* |
| Temperature | °C | 26 | *Default - 26°C for summer allocations, 6°C winter allocations* |

### Part 3: Receiving Stream Information

| | | | | | |
|---|---|---|---|---|---|
| Name: | Trib to Gasconade | Class: | C | Watershed Area ($mi^2$): | 9.6 |
| WBID: | 3960 | Type: | Riffle-Pool | Aquatic Life Use Designation: | GWWF |

**Upstream Conditions**

| Variable | Unit | Value | Default Value |
|---|---|---|---|
| Streamflow | $ft^3\ sec^{-1}$ | 0.00 | ----- |
| $CBOD_5$ | [mg/L] | 1 | 1 |
| $NH_3$-N | [mg/L] | 0.05 | 0.05 |
| VSS | [mg/L] | 2 | 2 |
| D.O. | [mg/L] | 5 | 5 |
| pH | S.U. | 7.8 | 7.8 |
| Temperature | °C | 26 | 26°C |

**Upstream Facilities**

| Permit ID | Design Flow Units | Value |
|---|---|---|
| | MGD | |
| | MGD | |
| | MGD | |
| | MGD | |
| | MGD | |
| | MGD | |

**Water Quality Criteria of Receiving Stream**

| Criteria | Unit | Value | Type |
|---|---|---|---|
| D.O. | [mg/L] | 5.0 | Chronic |
| $NH_3$-N | [mg/L] | 1.5 | Chronic - ELP |
| $NH_3$-N | [mg/L] | 12.1 | Acute |

**Hydrogeometry & Transport**

| Variable | Unit | Value |
|---|---|---|
| Slope | ft/ft | 0.0032 |
| Elevation | ft ASL | 740 |
| Velocity | *ft. sec $^{-1}$* | 0.157 |
| *Velocity Default* | *ft. sec $^{-1}$* | 0.157 |
| Width | ft. | 8.6 |
| *Width Default* | *ft.* | 8.6 |
| Depth | ft. | 1.4 |
| *Depth Default* | *ft.* | 1.4 |

**Mixing Zone and Critical Flows**

| Flow | Unit | Value | Default Value |
|---|---|---|---|
| 7Q10 | $ft^3\ sec^{-1}$ | 0 | 0.00 |
| D.O. Mxg Zone | $ft^3\ sec^{-1}$ | *0.00* | *25% Upstream Flow* |

## Part 4: Model Parameters and Rate Constants

**Stoichiometry of Organic Matter**

| | | |
|---|---|---|
| Carbon | 40 | gC |
| Nitrogen | 7.2 | gN |
| Dry Weight -OM | 100 | gD |

**Model Output Control**

| | |
|---|---|
| Model Length (mi): | 0.6 |
| Output Resolution (mi): | 0.025 |

**Global Rates**

| Rate | Unit | Value at 20°C | Value at Simulated Temperature | Theta | Uncalibrated Value | Comments |
|---|---|---|---|---|---|---|
| $CBODU:CBOD_5$ | mgU:mg5-day | 2.8 | ----- | ----- | 2.8 | *Varies between 1.5 to 4.* |
| Effluent VSS:TSS | mgVSS:mgTSS | 0.85 | ----- | ----- | 0.85 | *Generally greater than 70%* |
| CBOD Oxidation | $day^{-1}$ | 0.62 | 0.82 | 1.05 | 0.64 | *Varies between 0.1 to 4* |
| NBOD Oxidation | $day^{-1}$ | 0.3 | 0.48 | 1.08 | 0.3 | |
| SOD | $gO_2\ m^{-3}\ day^{-1}$ | 4.2 | 6.1 | 1.07 | 4.1 | *Varies between 0.2 and 9* |
| SOD Coverage | % | 25% | ----- | ----- | 25% | *Varies between 0% to 100%* |
| Reaeration Rate | $day^{-1}$ | 10.5 | 12.1 | 1.02 | 10.5 | *See Melching and Flores (1999)* |

**Mass Balance at Point of Mixing**

| Variable | Unit | Value |
|---|---|---|
| Streamflow | $ft^3\ sec^{-1}$ | 1.94 |
| $CBOD_5$ | [mg/L] | 15.0 |
| CBODU | [mg/L] | 42.0 |
| $NH_3$-N | [mg/L] | 1.3 |
| VSS (Detritus) | [mg/L] | 17.0 |
| D.O. | [mg/L] | 6.0 |
| D.O. Saturation | [mg/L] | 7.90 |
| D.O. Deficit | [mg/L] | 1.90 |
| pH | S.U. | 7.8 |
| Temperature | °C | 26.0 |

**RUN Streeter-Phelps**

**Minimum D.O. [mg/L]:** 5.0

Appendix D: Geohydrologic Evaluation

**Missouri Department Of Natural Resources**
Missouri Geological Survey
Geological Survey Program
Environmental Geology Section

Project ID Number
**LWE20064**
County
**Pulaski**

**Request Details**

Project: St. Robert WWTF

Legal Description: 08 T36N R11W
Quadrangle: WAYNESVILLE
Latitude: 37 51 27.61
Longitude: -92 9 59.48

**Organization Official**
Name: Alissha Feeler
Address: 310 E. 6th St.
City: Rolla
State: MO Zip: 65401
Phone: 573-364-6362
Email: afeeler@cmarcher.com

**Preparer**
Name: Alissha Feeler
Address: 310 E. 6th St.
City: Rolla
State: MO Zip: 65401
Phone: 573-364-6362
Email: afeeler@cmarcher.com

**Project Details**

**Report Date:** 04/01/2020
**Date of Field Visit:** 03/17/2020

**Previous Reports:** LWL99169
LWE20052

**Facility Type**
- [X] Mechanical treatment plant
- [ ] Recirculating filter bed
- [ ] Land application
- [ ] Lagoon or storage basin
- [ ] Subsurface soil absorption system
- [ ] Lagoon or storage basin W/Land App
- [ ] Lagoon or storage basin W/SSAS
- [ ] Other type of facility

**Type of Waste**
- [ ] Animal
- [X] Human
- [ ] Process or industrial
- [ ] Leachate
- [ ] Other waste type

**Funding Source**
- [X] IWT
- [ ] WWL-SRF

**Additional Information**
- [ ] Plans were submitted
- [ ] Site was investigated by NRCS
- [ ] Soil or geotechnical data were submitted

**Geologic Stream Classification:** [X] Gaining [ ] Losing [ ] No discharge

**Overall Geologic Limitations**
- [ ] Slight
- [X] Moderate
- [ ] Severe

**Collapse Potential**
- [X] Not applicable
- [ ] Slight
- [ ] Moderate
- [ ] Severe

**Topography**
- [X] <4%
- [X] 4% to 8%
- [X] 8% to 15%
- [X] >15%

**Landscape Position**
- [ ] Broad uplands
- [X] Floodplain
- [ ] Ridgetop
- [X] Alluvial plain
- [X] Hillslope
- [ ] Terrace
- [ ] Narrow ravine
- [ ] Sinkhole

**Bedrock:** Approximately 70 feet of moderately permeable Ordovician-age Gasconade Dolomite

**Surficial Materials:** Approximately 10 feet of moderately permeable silt loam with approximately 10 percent pebble to gravel sized clasts

**Missouri Department Of Natural Resources**
Missouri Geological Survey
Geological Survey Program
Environmental Geology Section

Project ID Number
**LWE20064**
County
**Pulaski**

| Recommended Construction Procedures for Earthen Facility | Determine Overburden Properties | Determine Hydrologic Conditions |
|---|---|---|
| ☐ Installation of clay pad and Compaction | ☐ Particle size analysis | ☐ Groundwater elevation |
| ☐ Diversion of subsurface flow | ☐ Atterberg limits | ☐ Direction of groundwater flow |
| ☐ Artificial sealing | ☐ 95% Max. dry density test method | ☐ 25-Year flood level |
| ☐ Rock excavation | ☐ Overburden thickness | ☐ 100-Year flood level |
| ☐ Limit excavation depth | ☐ Permeability coefficient-undisturbed | |
| | ☐ Permeability coefficient-remolded | |

**Remarks:**

On March 17, 2020, a geologist from the Missouri Geological Survey (MGS) conducted a geohydrologic evaluation for a proposed discharging mechanical treatment plant (MTP) in Pulaski County, Missouri. Upon further review of previous projects and reports, the following addendum is added to LWE20052.

There are two aquifers at the site, the alluvial aquifer and the underlying Ordovician bedrock aquifer. The Ordovician aquifer is comprised of highly weathered, highly permeable Roubidoux and Gasconade Formations in the upper and lower slopes, respectively. The alluvial/colluvial material caps the bedrock aquifer within the floodplain at lower elevations. The existing discharge location is to an unnamed tributary of the Gasconade River, which converges with the Gasconade River in approximately 0.5 mile. Any loss within the unnamed tributary or the Gasconade River is likely shallow, therefore, the MGS considers these stream segments gaining for discharging purposes.

The change in stream classification necessitates an update to the overall geological limitations rating. Due to the gaining receiving streams, karst landscape, and alluvial setting the site receives a moderate overall geological limitation rating. In the event of wastewater treatment failure, the surface waters of the unnamed tributary and the Gasconade River may be adversely impacted, however, the bedrock aquifer would likely be unaffected. Yet, during flooding events the flow direction can be reversed, and the bedrock aquifer may be adversely impacted.

Appendix E: Natural Heritage Review

## Missouri Department of Conservation

Missouri Department of Conservation's Mission is to protect and manage the forest, fish, and wildlife resources of the state and to facilitate and provide opportunities for all citizens to use, enjoy and learn about these resources.

**Natural Heritage Review Level Three Report: Species Listed Under the Federal Endangered Species Act**

There are records for species listed under the Federal Endangered Species Act, and possibly also records for species listed Endangered by the state, or Missouri Species and/or Natural Communities of Conservation Concern within or near the the defined Project Area. Please contact the U.S. Fish and Wildlife Service and the Missouri Department of Conservation for further coordination.

**Foreword:** Thank you for accessing the Missouri Natural Heritage Review Website developed by the Missouri Department of Conservation with assistance from the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, Missouri Department of Transportation and NatureServe. The purpose of this website is to provide information to federal, state and local agencies, organizations, municipalities, corporations and consultants regarding sensitive fish, wildlife, plants, natural communities and habitats to assist in planning, designing and permitting stages of projects.

**PROJECT INFORMATION**

**Project Name and ID Number:** St. Robert WWTP Improvements #6710
**Project Description:** The City of St. Robert is expanding the existing St. Robert WWTP. The WWTP discharges to an unnamed tributary of the Gasconade River (X=573327/Y=4190523) in Pulaski County.
**Project Type:** Waste Transfer, Treatment, and Disposal, Liquid waste/Effluent, Effluent Discharge, Effluent discharge - renewal or modification of discharge to stream
**Contact Person:** John Christiansen
**Contact Information:** john.christiansen2@hdrinc.com or 573-886-8932

**Disclaimer:** The NATURAL HERITAGE REVIEW REPORT produced by this website identifies if a species tracked by the Natural Heritage Program is known to occur within or near the area submitted for your project, and shares suggested recommendations on ways to avoid or minimize project impacts to sensitive species or special habitats. If an occurrence record is present, or the proposed project might affect federally listed species, the user must contact the Department of Conservation or U.S. Fish and Wildlife Service for more information. The Natural Heritage Program tracks occurrences of sensitive species and natural communities where the species or natural community has been found. Lack of an occurrence record does not mean that a sensitive plant, animal or natural community is not present on or near the project area. Depending on the project, current habitat conditions, and geographic location in the state, surveys may be necessary. Additionally, because land use conditions change and animals move, the existence of an occurrence record does not mean the species/habitat is still present. Therefore, Reports include information about records near but not necessarily on the project site.

The Natural Heritage Report is not a site clearance letter for the project. It provides an indication of whether or not public lands and sensitive resources are known to be (or are likely to be) located close to the proposed project. Incorporating information from the Natural Heritage Program into project plans is an important step that can help reduce unnecessary impacts to Missouri's sensitive fish, forest and wildlife resources. However, the Natural Heritage Program is only one reference that should be used to evaluate potential adverse project impacts. Other types of information, such as wetland and soils maps and on-site inspections or surveys, should be considered. Reviewing current landscape and habitat information, and species' biological characteristics would additionally ensure that Missouri Species of Conservation Concern are appropriately identified and addressed in planning efforts.

**U.S. Fish and Wildlife Service – Endangered Species Act (ESA) Coordination:** Lack of a Natural Heritage Program occurrence record for federally listed species in your project area does not mean the species is not present, as the area may never have been surveyed. Presence of a Natural Heritage Program occurrence record does not mean the project will result in negative impacts. The information within this report is not intended to replace Endangered Species Act consultation with the U.S. Fish and Wildlife Service (USFWS) for listed species. Direct contact with the USFWS may be necessary to complete consultation and it is required for actions with a federal connection, such as federal funding or a federal permit; direct contact is also required if ESA concurrence is necessary. Visit the USFWS Information for Planning and Conservation (IPaC) website at https://ecos.fws.gov/ipac/ for further information. This site was developed to help streamline the USFWS environmental review process and is a first step in ESA coordination. The Columbia Missouri Ecological Field Services Office may be reached at 573-234-2132, or by mail at 101 Park Deville Drive, Suite A, Columbia, MO 65203.

**Transportation Projects:** If the project involves the use of Federal Highway Administration transportation funds, these recommendations may not fulfill all contract requirements. Please contact the Missouri Department of Transportation at 573-526-4778 or www.modot.mo.gov/ehp/index.htm for additional information on recommendations.

**Species or Communities of Conservation Concern within the Area:**

There are records for species listed under the Federal Endangered Species Act, and possibly also records for species listed Endangered by the state, or Missouri Species and/or Natural Communities of Conservation Concern within or near the the defined Project Area. Please contact the U.S. Fish and Wildlife Service and the Missouri Department of Conservation for further coordination.

MDC Natural Heritage Review
Resource Science Division
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65102-0180
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NaturalHeritageReview@mdc.mo.gov

U.S. Fish and Wildlife Service
Ecological Service
101 Park Deville Drive
Suite A
Columbia, MO
65203-0007
Phone: 573-234-2132

**Other Special Search Results:**

No results have been identified for this project location.

**Project Type Recommendations:**
**Waste Transfer, Treatment, and Disposal - Liquid Effluent Discharge - New or Renewal of Permit:** Clean Water Act permits issued by other agencies regulate both construction and operation of wastewater systems, and provide many important protections for fish and wildlife resources throughout the project area and at some distance downstream. Fish and wildlife almost always benefit when unnatural pollutants are removed from water, and concerns are minimal if construction is managed to minimize erosion and sedimentation/runoff to nearby streams and lakes, including adherence to any "Clean Water Permit" conditions.
Revegetation of disturbed areas is recommended to minimize erosion, as is restoration with of native plant species compatible with the local landscape and for wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crown vetch and sericea lespedeza.

**Project Location and/or Species Recommendations:**

**Endangered Species Act Coordination - Indiana bats** *(Myotis sodalis*, federal- and state-listed endangered) and **Northern long-eared bats** (*Myotis septentrionalis,* federal-listed threatened) may occur near the project area. Both of these species of bats hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in wooded areas, often riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats or Northern long-eared bats, especially from September to April. **If any trees need to be removed for your project, please contact the U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132 ext. 100 for Ecological Services) for further coordination under the Endangered Species Act.**

The project location submitted and evaluated is within the geographic range of nesting Bald Eagles in Missouri. Bald Eagles (*Haliaeetus leucocephalus*) may nest near streams or water bodies in the project area. Nests are large and fairly easy to identify. Adults begin nesting activity in late December and January and young birds leave the nest in late spring to early summer. While no longer listed as endangered, eagles continue to be protected by the federal government under the Bald and Golden Eagle Protection Act. Work managers should be alert for nesting areas within 1500 meters of project activities, and follow federal guidelines at: http://www.fws.gov/midwest/MidwestBird/EaglePermits/index.html if eagle nests are seen.

The project location submitted and evaluated is within the range of the Gray Myotis (i.e., Gray Bat) in Missouri. Depending on habitat conditions of your project's location, Gray Myotis (*Myotis grisescens*, federal and state-listed endangered) could occur within the project area, as they forage over streams, rivers, lakes, and reservoirs. Avoid entry or disturbance of any cave inhabited by Gray Myotis and when possible retain forest vegetation along the stream and from the cave opening to the stream. See http://mdc.mo.gov/104 for best management recommendations.

The project site submitted and evaluated is on or near Sensitive Aquatic Species Waters Gasconade River, an important stream for freshwater mussel and amphibian populations. These streams were so designated because they have highly diverse mussel communities and mussel and amphibian species identified as Species of Conservation Concern. These streams are important to maintaining, restoring, or avoiding future listing of Species of Conservation Concern. Impacts to these aquatic species and habitats can be reduced by avoiding or minimizing activities that disturb the stream substrate, including rock placement, dredging, trenching, and wetted gravel bar disturbance; and avoid introducing heavy sediment loads, chemical or organic pollutants. These streams also are included as a Missouri Nationwide Permit Regional Condition (Number 7) that must be considered if working under if working under a Clean Water Act Section 404 Permit issued by the U.S. Army Corps of Engineers (http://www.nwk.usace.army.mil/Missions/RegulatoryBranch/NationWidePermit...). A list of all streams designated under this Condition is available at http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/nationwidepermi....

The project site submitted and evaluated is on or near Fish Spawning Stream Reaches Gasconade River, one of 138 state-designated fish spawning stream segments. These stream reaches were so designated because they have highly diverse fish communities, fish Species of Conservation Concern present, and because they are important to maintaining, restoring, or avoiding future listing of Species of Conservation Concern. These stream reaches also are included as a Missouri Nationwide Permit Regional Condition (Number 2) that must be considered if working under a Clean Water Act Section 404 Permit issued by the U.S. Army Corps of Engineers (http://www.nwk.usace.army.mil/Missions/RegulatoryBranch/NationWidePermit...). A list of all stream reaches is available at http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/nationwidepermi... . Activities that alter or destabilize stream bottoms or banks should be avoided during the important fish spawning period for that stream, in order to not disrupt fish spawning (i.e., laying and fertilizing fish eggs.) The sensitive spawning period for this stream is March 15th to June 15th. At all times, avoid habitat destruction or introducing heavy sediment loads, chemical or organic pollutants.

**Invasive exotic species** are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment. Please inspect and clean equipment thoroughly before moving between project sites. See http://mdc.mo.gov//9633 for more information.

- Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
- Drain water from boats and machinery that have operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
- When possible, wash and rinse equipment thoroughly with hard spray or HOT water (?140° F, typically available at do-it-yourself car wash sites), and dry in the hot sun before using again.

**Streams and Wetlands – Clean Water Act Permits:** Streams and wetlands in the project area should be protected from activities that degrade habitat conditions. For example, soil erosion, water pollution, placement of fill, dredging, in-stream activities, and riparian corridor removal, can modify or diminish aquatic habitats. Streams and wetlands may be protected under the Clean Water Act and require a permit for any activities that result in fill or other modifications to the site. Conditions provided within the U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 permit (http://www.nwk.usace.army.mil/Missions/RegulatoryBranch.aspx ) and the Missouri Department of Natural Resources (DNR) issued Clean Water Act Section 401 Water Quality Certification (http://dnr.mo.gov/env/wpp/401/index.html), if required, should help minimize impacts to the aquatic organisms and aquatic habitat within the area. Depending on your project type, additional permits may be required by the Missouri Department of Natural Resources, such as permits for stormwater, wastewater treatment facilities, and confined animal feeding operations. Visit http://dnr.mo.gov/env/wpp/permits/index.html for more information on DNR permits. Visit both the USACE and DNR for more information on Clean Water Act permitting.

For further coordination with the Missouri Department of Conservation and the U.S. Fish and Wildlife Services, please see the contact information below.

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Ecological Service
101 Park Deville Drive
Suite A
Columbia, MO
65203-0007
Phone: 573-234-2132

**Miscellaneous Information**

FEDERAL Concerns are species/habitats protected under the Federal Endangered Species Act and that have been known near enough to the project site to warrant consideration. For these, project managers must contact the U.S. Fish and Wildlife Service Ecological Services (101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132; Fax 573-234-2181) for consultation.

STATE Concerns are species/habitats known to exist near enough to the project site to warrant concern and that are protected under the Wildlife Code of Missouri (RSMo 3 CSR 1 0). "State Endangered Status" is determined by the Missouri Conservation Commission under constitutional authority, with requirements expressed in the Missouri Wildlife Code, rule 3CSR 1 0-4.111. Species tracked by the Natural Heritage Program have a "State Rank" which is a numeric rank of relative rarity. Species tracked by this program and all native Missouri wildlife are protected under rule 3CSR 10-4.110 General Provisions of the Wildlife Code.

Additional information on Missouri's sensitive species may be found at http://mdc.mo.gov/discover-nature/field-guide/endangered-species . Detailed information about the animals and some plants mentioned may be accessed at http://mdc4.mdc.mo.gov/applications/mofwis/mofwis_search1.aspx . If you would like printed copies of best management practices cited as internet URLs, please contact the Missouri Department of Conservation.