

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 Elsberry
Elsberry WWTF
100 Hatfield Road
Elsberry, MO 63343

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.

September 27, 2024
Effective Date

September 26, 2026
Expiration Date



John Hoke, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

Construction of a new mechanical treatment plant including headworks building with mechanical and manual screening, flow equalization basin, oxidation ditch, sludge storage, secondary clarifiers, UV disinfection, and flow measurement. The existing four cell lagoon system will be maintained as a wet weather storage basin in the event of a severe storm as the city's collection system experiences large inflow and infiltration (I&I). Sludge will be held on site until it can be pumped and land applied or taken to another permitted treatment facility. Design flow will be 336,000 gallons per day (gpd).

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

II. COST ANALYSIS FOR COMPLIANCE

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

The department is required to determine "findings of affordability" because the permit applies to a combined or separate sanitary sewer system for a publically-owned treatment works.

Cost Analysis for Compliance - The department has made a reasonable search for empirical data indicating the permit is affordable. The search consisted of a review of department records that might contain economic data on the community, a review of information provided by the applicant as part of the application, and public comments received in response to public notices of this draft permit. If the empirical cost data was used by the permit writer, this data may consist of median household income, any other ongoing projects that the department has knowledge, and other demographic financial information that the community provided as contemplated by Section 644. 145.3. See **APPENDIX – COST ANALYSIS FOR COMPLIANCE**.

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 David Van Leer with Cochran 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 St. Louis Regional Office per 10 CSR 20-7.015(9)(G).
5. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of one acre or more to obtain a Missouri state operating permit to discharge stormwater. The permit requires best management practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the department's ePermitting system available online at <https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem>. See <https://dnr.mo.gov/data-e-services/water/electronic-permitting-epermitting> for more information.
6. A United States Army Corps of Engineers (USACE) Clean Water Act Section 404 Department of the Army permit and a Section 401 Water Quality Certification issued by the department may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied or notification is provided that no Section 404 permit is required by the USACE. You must contact your local USACE district since they determine what waters are jurisdictional and which permitting requirements may apply. You may call the department's Water Protection Program, Operating Permits Section at 573-522-4502 for more information. See <https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality> for more information.
7. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements listed below.
 - Flood protection shall apply to new construction and to existing facilities undergoing major modification. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the 100- year flood elevation. 10 CSR 20-8.140 (2) (B)

- Unless another distance is determined by the Missouri Geological Survey or by the department's Public Drinking Water Branch, the minimum distance between wastewater treatment facilities and all potable water sources shall be at least 300 feet. 10 CSR 20-8.140 (2) (C) 1.
- Facilities shall be readily accessible by authorized personnel from a public right-of-way at all times. 10 CSR 20-8.140 (2) (D)
- The outfall shall be so constructed and protected against the effects of flood water, ice, or other hazards as to reasonably ensure its structural stability and freedom from stoppage. 10 CSR 20-8.140 (6) (A)
- All sampling points shall be designed so that a representative and discrete 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 24 hour composite automatic sampling equipment shall be provided at all mechanical wastewater treatment facilities and at other facilities where necessary under provisions of the operating permit. 10 CSR 20-8.140 (7) (F)
- Isolate all wastewater treatment components installed in a building where other equipment or offices are located from the rest of the building by an air-tight partition, provide separate outside entrances, and provide separate and independent fresh air supply. 10 CSR 20-8.140 (7) (G)
- Adequate provisions shall be made to effectively protect facility personnel and visitors from hazards. The following shall be provided to fulfill the particular needs of each wastewater treatment facility:
 - Fencing. Enclose the facility site with a fence designed to discourage the entrance of unauthorized persons and animals; 10 CSR 20-8.140 (8) (A)
 - Gratings over appropriate areas of treatment units where access for maintenance is necessary; 10 CSR 20-8.140 (8) (B)
 - First aid equipment; 10 CSR 20-8.140 (8) (C)
 - Posted "No Smoking" signs in hazardous areas; 10 CSR 20-8.140 (8) (D)
 - Appropriate personal protective equipment (PPE); 10 CSR 20-8.140 (8) (E)
 - Portable blower and hose sufficient to ventilate accessed confined spaces; 10 CSR 20-8.140 (8) (F)
 - 10 CSR 20-8.140 (8) (G) Portable lighting equipment complying with NEC requirements. See subsection (7)(B) of this rule;
 - 10 CSR 20-8.140 (8) (H) Gas detectors listed and labeled for use in NEC Class I, Division 1, Group D locations. See subsection (7)(B) of this rule;
 - Appropriately-placed warning signs for slippery areas, non-potable water fixtures (see subparagraph (7)(D)3.B. of this rule), low head clearance areas, open service manholes, hazardous chemical storage areas, flammable fuel storage areas, high noise areas, etc.; 10 CSR 20-8.140 (8) (I)

- Ventilation shall include the following:
 - Isolate all pumping stations and wastewater treatment components installed in a building where other equipment or offices are located from the rest of the building by an air-tight partition, provide separate outside entrances, and provide separate and independent fresh air supply; 10 CSR 20-8.140 (8) (J) 1.
 - Force fresh air into enclosed screening device areas or open pits more than four feet deep. 10 CSR 20-8.140 (8) (J) 2.
 - Dampers are not to be used on exhaust or fresh air ducts. Avoid the use of fine screens or other obstructions on exhaust or fresh air ducts to prevent clogging; 10 CSR 20-8.140 (8) (J) 3.
 - Where continuous ventilation is needed (e.g., housed facilities), provide at least 12 complete air changes per hour. Where continuous ventilation would cause excessive heat loss, provide intermittent ventilation of at least thirty (30) complete air changes per hour when facility personnel enter the area. Base air change demands on 100 percent fresh air; 10 CSR 20-8.140 (8) (J) 4.
 - Electrical controls. Mark and conveniently locate switches for operation of ventilation equipment outside of the wet well or building. Interconnect all intermittently operated ventilation equipment with the respective wet well, dry well, or building lighting system. The manual lighting/ventilation switch is expected to override the automatic controls. For a two-speed ventilation system with automatic switch over where gas detection equipment is installed, increase the ventilation rate automatically in response to the detection of hazardous concentrations of gases or vapors; 10 CSR 20-8.140 (8) (J) 5.
 - Fabricate the fan wheel from non-sparking material. Provide automatic heating and dehumidification equipment in all dry wells and buildings. 10 CSR 20-8.140 (8) (J) 6.
- Explosion-proof electrical equipment, non-sparking tools, gas detectors, and similar devices, in work areas where hazardous conditions may exist, such as digester vaults and other locations where potentially explosive atmospheres of flammable gas or vapor with air may accumulate. 10 CSR 20-8.140 (8) (K)
- Provisions for local lockout/tagout on stop motor controls and other devices; 10 CSR 20-8.140 (8) (L)
- Provisions for an arc flash hazard analysis and determination of the flash protection boundary distance and type of PPE to reduce exposure to major electrical hazards shall be in accordance with NFPA 70E *Standard for Electrical Safety in the Workplace* (2018 Edition), as approved and published August 21, 2017. 10 CSR 20-8.140 (8) (M)
- All wastewater treatment facilities must have a screening device, comminutor, or septic tank for the purpose of removing debris and nuisance materials from the influent wastewater. 10 CSR 20-8.150 (2)

- All screening devices and screening storage areas shall be protected from freezing. 10 CSR 20-8.150 (4) (A) 1.
- Provisions shall be made for isolating or removing screening devices from their location for servicing. 10 CSR 20-8.150 (4) (A) 2.
- Manually cleaned screen channels shall be protected by guard railings and deck gratings with adequate provisions for removal or opening to facilitate raking. 10 CSR 20-8.150 (4) (A) 3. A. (I)
- Mechanically cleaned screen channels shall be protected by guard railings and deck gratings. 10 CSR 20-8.150 (4) (A) 3. A. (II)
- Mechanical screening equipment shall have adequate removal enclosures to protect facility personnel against accidental contact with moving parts and to prevent dripping in multi-level installations. 10 CSR 20-8.150 (4) (A) 3. B. (I)
- A positive means of locking out each mechanical screening device shall be provided. 10 CSR 20-8.150 (4) (A) 3. B. (II)
- An emergency stop button with an automatic reverse function shall be located in close proximity to the mechanical screening device. 10 CSR 20-8.150 (4) (A) 3. B. (III)
- Electrical systems and components in raw wastewater or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors that are normally present, shall comply with the NFPA 70 *National Electric Code (NEC)* (2017 Edition), as approved and published August 24, 2016, requirements for Class I, Division 1, Group D locations. 10 CSR 20-8.140 (7) (B)
- Effective flow splitting devices and control appurtenances (*e.g.* gates and splitter boxes) shall be provided to permit proper proportioning of flow and solids loading to each settling unit, throughout the expected range of flows. 10 CSR 20-8.160 (2) (B)
- Overflow weirs shall be readily adjustable over the life of the structure to correct for differential settlement of the tank. 10 CSR 20-8.160 (3) (C) 1.
- Walls of settling tanks shall extend at least 6 inches above the surrounding ground surface and shall provide not less than 12 inches of freeboard. 10 CSR 20-8.160 (3) (E)
- Safety features shall appropriately include machinery covers, lifelines, 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)
- Emergency Power. Disinfection and dechlorination processes, when used, shall be provided during all power outages. 10 CSR 20-8.190 (2) (A)
- The UV dosage shall be based on the design peak hourly flow, maximum rate of pumpage, or peak batch flow. 10 CSR 20-8.190 (5) (A) 1.
- If no flow equalization is provided for a batch discharger, the UV dosage shall be based on the peak batch flow. 10 CSR 20-8.190 (5) (A) 2.
- The UV system shall deliver the target dosage based on equipment derating factors and, if needed, have the UV equipment manufacturer verify that the scale up or scale down factor utilized in the design is appropriate for the specific application under consideration. 10 CSR 20-8.190 (5) (A) 3.
- The UV system shall deliver a minimum UV dosage of 30,000 microwatt seconds per centimeters squared ($\mu\text{W} \cdot \text{s}/\text{cm}^2$). 10 CSR 20-8.190 (5) (A) 4.
- Closed vessel UV systems. The combination of the total number of closed vessels 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) 2.
- 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.

8. Upon completion of construction:

- A. The City of Elsberry will become the continuing authority for operation and maintenance of these facilities;
- B. Submit an electronic copy of the as built's if the project was not constructed in accordance with previously submitted plans and specifications; and
- C. Submit the Statement of Work Completed form to the department in accordance with 10 CSR 20-6.010(5)(N) (<https://dnr.mo.gov/document-search/wastewater-construction-statement-work-completed-mo-780-2155>)

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

A new packaged mechanical oxidation ditch is being constructed to replace the existing four cell lagoon which has had issues with meeting permit discharge limits. Additionally, the town of Elsberry experiences significant I&I issues and the current system has difficulty keeping up in times of wet weather flows. Lastly, over the next 10 years several housing developments are planned in the Elsberry area and more treatment is required for the new system users.

2. FACILITY DESCRIPTION

The existing system is a four-cell non-aerated lagoon with influent settling cell, large treatment cell and final polishing cell. The plant currently utilizes an influent lift station and contains no disinfection technology.

The Elsberry WWTF is located at 100 Hatfield Road, City of Elsberry, in Lincoln County, Missouri. The facility currently has a design average flow of 236,000 gpd and serves a hydraulic population equivalent of approximately 2,166 people. After construction is completed the design average flow will be 336,000 gpd serving a PE of 3,360 people.

3. COMPLIANCE PARAMETERS

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

Parameter	Units	Monthly average limit
Biochemical Oxygen Demand ₅	mg/L	30
Total Suspended Solids	mg/L	30
Ammonia as N-summer	mg/L	0.6
Ammonia as N-winter	mg/L	1.2
pH	SU	6.5-9.0
<i>E. coli</i>	#/100mL	206

4. ANTIDegradation

The department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated April 30, 2019, due to the increase in design flow and new outfall location. See **APPENDIX – ANTIDegradation**.

5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

- Components are designed for a Population Equivalent of 3,360 based on hydraulic loading to the system.
- Relocated Outfall – The new outfall location is approximately 6,500 feet (ft) northeast and upstream from the current outfall location. The outfall consists of a discharge pipe following the UV disinfection and flow measurement weir.
- Wet Weather Flow Equalization – Wet weather flow equalization is utilized during wet weather events where the peak flow is greater than the design peak capacity of the treatment facility. Once the wet weather event subsides, the flow should be returned to the head of the treatment facility for full secondary treatment.
 - The equalization basin at the head of the plant is connected to the oxidation ditch. It has a design volume of 0.027 MG. The equalization basin is approximately 16.75 ft x 20 ft x 11 ft deep. All flows will pass through this basin during treatment.
 - The additional wet weather flow basin composed of the existing four cell lagoon is approximately 900 ft x 850 ft x 8ft, ~17 MG, across all four cells. An overflow pipe directs water into the existing lagoon if flows exceed the additional capacity of the equalization basin added to the oxidation ditch. A pump and manhole are going to be added to the berm of the earthen basin to move water back to the

treatment system when capacity opens. The slope of the wet weather basin is 3:1, which meets the requirements of 10 CSR 20-8.200(6)(A)3. The berm width is 8 ft which meets the 8-foot requirement in 10 CSR 20-8.200(6)(A)2.

- To return flow from the wet weather flow equalization basin back to the headworks, a manhole will be constructed along with a 2-pump lift station. The pump station will have a firm capacity of 215 gpm with 18.5 ft of TDH with both pumps active. The pump design point for a single in operation and typical basin fill level is 200 gpm at 17.5 ft TDH.
- Flow Measurement – Installation of accurate flow measurement devices will give the treatment facility a means of improved data analysis.
 - Parshall Flume – A 3-inch throat effluent Parshall flume with electromagnetic flow sensor shall measure the secondary treated and disinfected wastewater prior to discharge at Outfall No. 001.
 - Electromagnetic Meter – An effluent electromagnetic 3-inch flow meter shall measure the secondary treated and disinfected wastewater flow through the Parshall flume prior to discharge at Outfall No. 001.
- Screening – Installation of screening devices removes nuisance inorganic materials from raw wastewater. Headworks screening devices are rated for a peak flow of 1 MGD.
 - Manual Coarse Bar Screen – The manual coarse bar screen will have clear bar spacings of 1/4-inch and be positioned at an angle of 45 degrees from the horizontal to allow for manual raking of the screen.
 - Automatic Screw Auger – A 12 in. diameter spiral auger positioned at an angle of 45 degrees from the horizontal will carry solids from the influent stream up into a receptacle for disposal.
- Housed Facility – The proposed wastewater treatment headworks shall be housed in a 30 ft by 15 ft section of the shared headworks and office building. Ventilation will be provided which will offer 30 air changes per hour when the fan is switched ON.
- Oxidation Ditch – The design SRT is 10-30 days with a design MLSS of 3,000-6,000 mg/L. The hydraulic retention time is 8-36 hrs at design flow of 0.336 MGD. The side water depth of the treatment train is 10 ft. The volume of the anoxic zone is dependent upon operation of the blowers. Two blowers with 50 HP motors are capable of providing a maximum air rate of 829 standard cubic feet per minute (scfm) each at 6 psig. The F/M ratio in the anoxic zone was designed to be 0.05-0.3. Total peak oxygen required is 1,492 lb/day, with a standard oxygen transfer rate design of 0.427 lb O₂ /hp-hr. The peak SOR is 3,493 lb/hr and the ratio between AOR/SOR is 0.74 (Metcalf & Eddy). Peak flow is 0.336 MGD.
- Secondary Clarifier – 2 secondary clarifiers will be constructed with a total surface area of 1060.8 sf at the 0.336 MGD peak or 530.4 sf per clarifier. The clarifiers will have a 30 ft diameter which is greater than the required 26 ft diameter for surface overflow rate. The sidewater depth will be 12 ft. The weir loading rate is 1,979 gpd which meets the requirements of 10 CSR 20-8.160(3)(C)2 of being less than or equal to 20,000 gpd/sf. The solids loading rate is 8.39 lbs/day/sf which meets the requirements of 10 CSR 20-8.160(3)(B)3 of less than or equal to 35 lbs/day/sf at peak flow. Peak flow is 336,000 GPD.

- Waste Activated Sludge (WAS) Pump Station – Construction of a duplex WAS pump station and associated valves. The WAS self-priming, centrifugal pump will be capable of pumping 175 gpm at 12 ft of TDH with a 2.5 HP motor. The WAS pumps are utilized to pump WAS from the secondary clarifiers to the sludge holding basin. 84,000 gpd is the design basis of the WAS going to the basin. There will be 2 pumps, 1 operational and 1 standby.
- Return Activated Sludge (RAS). The RAS rate is 75-150 percent of the design average flow, 0.336 MGD. The RAS MLSS is expected to be 3,000 mg/L. The RAS pumps are designed for 237 gpm at 11 ft TDH. There will be 2 pumps, 1 operational and 1 standby.
- Sludge Storage – Construction of one aerated sludge holding basin that is approximately 34.5 ft x 26.5 ft by 12 ft, with a total volume of 63,224 gallons. Two blowers with 30 HP motors are capable of providing a maximum air rate of 302 standard cubic feet per minute (scfm) at 6 psig. Biosolids are removed via pump truck and taken to another permitted facility or land applied.
- Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms.
 - Non-Contact Ultraviolet (UV) – A closed channel, gravity flow, low pressure high intensity UV non-contact disinfection system capable of treating a peak flow of 0.336 MGD while delivering a minimum UV intensity of 30 mJ/cm² with an expected ultraviolet transmissivity of 65 percent or greater. The enclosed UV system consists of 1 reactor with 48 lamps. The disinfected effluent will flow by gravity through flow measurement equipment and to Outfall No. 001.
- Emergency Power – A 200 kVA standby diesel generator and automatic transfer switch will be provided to operate the treatment facility in event of power failure.

6. OPERATING PERMIT

Operating permit MO-00054691 will require a modification to reflect the construction activities. The modified Elsberry WWTF, MO-00054691, was successfully public noticed from August 7, 2024, to September 7, 2024, with no comments received. 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.

This facility does not meet the requirements of the MOGD issued on July 1, 2019, for the following reason: design flow is over 50,000 gpd.

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>

Alex Bielefeldt, E.I.
Engineering Section
alex.bielefeldt@dnr.mo.gov

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

APPENDIX

Optional

- **CAFCOM**

Missouri Department of Natural Resources
Water Protection Program
Cost Analysis for Compliance
(In accordance with RSMo 644.145)
Elsberry WWTF, Operating Permit Modification
City of Elsberry
Missouri State Operating Permit #MO-0054691

Section 644.145 RSMo requires the Department of Natural Resources (Department) to make a “finding of affordability” when “issuing permits under” or “enforcing provisions of” state or federal clean water laws “pertaining to any portion of a combined or separate sanitary sewer system for publicly-owned treatment works.” This cost analysis does not dictate how the permittee will comply with new permit requirements.

New Permit Requirements

The permit requires compliance with new increased monitoring requirements for Biochemical Oxygen Demand and Total Suspended Solids.

Connections

The number of connections was reported by the permittee on the 2019 permit renewal application.

Connection Type	Number
Residential	780
Commercial	67
Industrial	0
Total	847

Data Collection for this Analysis

This cost analysis is based on data available to the Department as provided by the permittee and data obtained from readily available sources. For the most accurate analysis, it is essential that

the permittee provides the Department with current information about the City’s financial and socioeconomic situation. The financial questionnaire available to permittees on the Department’s website (<http://dnr.mo.gov/forms/780-2511-f.pdf>) is a required attachment to the permit renewal application. If the financial questionnaire is not submitted with the renewal application, the Department sends a request to complete the form with the welcome correspondence. If certain data was not provided by the permittee to the Department and the data is not obtainable through readily available sources, this analysis will state that the information is “unknown”.

Eight Criteria of 644.145 RSMo

The Department must consider the eight criteria presented in subsection 644.145 RSMo to evaluate the cost associated with new permit requirements.

(1) A community’s financial capability and ability to raise or secure necessary funding;

Criterion 1 Table. Current Financial Information for the City of Elsberry	
Current Monthly User Rates per 5,000 gallons*	\$42.35
Median Household Income (MHI) ¹	\$38,416
Current Annual Operating Costs (excludes depreciation)**	\$500

*User Rates were obtained from the 2018 Missouri Public Utility Alliance Water and Wastewater Rate Survey.

** From the 2019 CAFCom completed with the renewal

(2) Affordability of pollution control options for the individuals or households at or below the median household income level of the community;

The following tables outline the estimated costs of the new permit requirements:

Criterion 2A Table. Estimated Cost Breakdown of New Permit Requirements			
New Requirement	Frequency	Estimated Cost	Estimated Annual Cost
Biochemical Oxygen Demand – Influent	Monthly	\$41	\$492
Total Suspended Solids - Influent	Monthly	\$16	\$192
Total Estimated Annual Cost of New Permit Requirements			\$684

Criterion 2B Table. Estimated Costs for New Permit Requirements		
(1)	Estimated Annual Cost	\$684
(2)	Estimated Monthly User Cost for New Requirements ²	\$0.07
	Estimated Monthly User Cost for New Requirements as a Percent of MHI ³	0.002%
(3)	Total Monthly User Cost*	\$42.42
	Total Monthly User Cost as a Percent of MHI ⁴	1.32%

* Current User Rate + Estimated Monthly Costs of New Sampling Requirements

Due to the minimal cost associated with new permit requirements, the Department anticipates an extremely low to no rate increase will be necessary, which could impact individuals or households of this community.

(3) An evaluation of the overall costs and environmental benefits of the control technologies;

This analysis is being conducted based on new requirements in the permit, which will not require the addition of new control technologies at the facility. However, the new sampling requirements are being established in order to provide data regarding the health of the receiving stream’s aquatic life and to ensure that the existing permit limits are providing adequate protection of aquatic life. Improved wastewater provides benefits such as avoided health costs due to water-related illness, enhanced environmental ecosystem quality, and improved natural resources. The preservation of natural resources has been proven to increase the economic value and sustainability of the surrounding communities. Maintaining Missouri’s water quality standards fulfills the goal of restoring and maintaining the chemical, physical, and biological integrity of the receiving stream; and, where attainable, it achieves a level of water quality that provides for the protection and propagation of fish, shellfish, wildlife, and recreation in and on the water.

(4) Inclusion of ongoing costs of operating and maintaining the existing wastewater collection and treatment system, including payments on outstanding debts for wastewater collection and treatment systems when calculating projected rates:

From the 2019 permit renewal, the community reported that their outstanding debt for their current wastewater collection and treatment systems is \$77,861. The community reported that each user pays \$42.35 monthly, of which, \$15.00 is used toward payments on the current outstanding debt.

(5) An inclusion of ways to reduce economic impacts on distressed populations in the community, including but not limited to low and fixed income populations. This requirement includes but is not limited to:

- (a) Allowing adequate time in implementation schedules to mitigate potential adverse impacts on distressed populations resulting from the costs of the improvements and taking into consideration local community economic considerations.
- (b) Allowing for reasonable accommodations for regulated entities when inflexible standards and fines would impose a disproportionate financial hardship in light of the environmental benefits to be gained.

The following table characterizes the current overall socioeconomic condition of the community as compared to the overall socioeconomic condition of Missouri. The following information was compiled using the latest U.S. Census data.

Criterion 5 Table. Socioeconomic Data ^{1,5-9} for the City of Elsberry

No.	Administrative Unit	Elsberry City	Missouri State	United States
1	Population (2017)	2,106	6,075,300	321,004,416
2	Percent Change in Population (2000-2017)	2.9%	8.6%	14.1%
3	2017 Median Household Income (in 2018 Dollars)	\$38,416	\$52,801	\$59,060
4	Percent Change in Median Household Income (2000-2017)	-8.7%	-7.7%	-6.7%
5	Median Age (2017)	36.7	38.4	37.8
6	Change in Median Age in Years (2000-2017)	2.6	2.3	2.5
7	Unemployment Rate (2017)	19.4%	5.8%	6.6%
8	Percent of Population Below Poverty Level (2017)	22.1%	14.6%	14.6%
9	Percent of Household Received Food Stamps (2017)	22.7%	12.2%	12.6%
10	(Primary) County Where the Community Is Located	Lincoln County		

(6) An assessment of other community investments and operating costs relating to environmental improvements and public health protection;

The community has applied for a construction permit to expand and upgrade the existing wastewater treatment plant. The facility will be a new activated sludge plant with ultraviolet disinfection. The facility is funding the project through USDA and the community's user rates are expected to increase.

(7) An assessment of factors set forth in the United States Environmental Protection Agency's guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial Capability Assessment and Schedule Development" that may ease the cost burdens of implementing wet weather control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards;

The new requirements associated with this permit will not impose a financial burden on the community, nor will they require the City of Elsberry to seek funding from an outside source.

(8) An assessment of any other relevant local community economic conditions.

The Department contracted with Wichita State University to complete an assessment tool that would allow for predictions on rural Missouri community populations and future sustainability. The purpose of the study is to use a statistical modeling analysis in order to determine factors associated with each rural Missouri community that would predict the future population changes that could occur in each community. A stepwise regression model was applied to 19 factors which were determined as predictors of rural population change in Missouri. The model established a hierarchy of the predicting factors which allowed the model to place a weighted value on each of the factors. A total of 745 rural towns and villages in Missouri received a weighted value for each of the predicting factors. The weighted values for each town / village were then added together to determine an overall decision score. The overall decision scores were then divided into five categories and each town was assigned to a different categorical group based on the overall decision score. The categorical groups were developed from the range of overall scores across all rural towns and villages within Missouri.

Based on the assessment tool, the City of Elsberry has been determined to be a category 3 community. This means that the City of Elsberry's socioeconomic status and population is predicted to remain stable over time. Future changes in only a few of the 19 weighted factors could cause this community to experience either a rise or decline of population. If this community experiences a decline in population which results in the inability to secure the necessary funding for an upgrade to meet the new requirements within this permit, a modification to the schedule of compliance may be necessary. The community may contact the Department and send an application for a modification to the schedule of compliance with justification for the time necessary to comply with this permit.

CONCLUSION AND FINDING

As a result of new regulations, the Department is proposing modifications to the current operating permit that may require the permittee to increase monitoring. The Department has considered the eight criteria presented in subsection 644.145 RSMo to evaluate the cost associated with the new permit requirements.

This analysis examined whether the new sampling requirements affect the ability of an individual customer or household to pay a utility bill without undue hardship or unreasonable sacrifice in the essential lifestyle or spending patterns of the individual or household. After reviewing the above criteria, the Department finds that the new sampling requirements may result in a low burden with regard to the community's overall financial capability and a low financial impact for most individual customers/households; therefore, the new permit requirements are affordable.

References

- (A) 2017 MHI in 2017 Dollar: United States Census Bureau. United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, Table B19013: Median Household Income in the Past 12 Months (in 2017 Inflation-Adjusted Dollars).
http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B19013&prodType=table.

(B) 2000 MHI in 1999 Dollar: (1) For United States, United States Census Bureau (2003) 2000 Census of Population and Housing, Summary Social, Economic, and Housing Characteristics, PHC-2-1 Part 1. United States Summary, Table 5. Work Status and Income in 1999: 2000, Washington, DC. <https://www.census.gov/prod/cen2000/phc-2-1-pt1.pdf>. (2) For Missouri State, United States Census Bureau (2003) 2000 Census of Population and Housing, Summary Social, Economic, and Housing Characteristics, PHC-2-27, Missouri, Table 10. Work Status and Income in 1999: 2000, Washington, DC. <https://www.census.gov/prod/cen2000/phc-2-27-pt1.pdf>.

(C) 2018 CPI, 2017 CPI and 1999 CPI: U.S. Department of Labor Bureau of Labor Statistics (2018) Consumer Price Index - All Urban Consumers, U.S. City Average. All Items. 1982-84=100.
http://data.bls.gov/timeseries/CUUR0000SA0?data_tool=Xgtable.

(D) 2017 MHI in 2018 Dollar = 2017 MHI in 2017 Dollar x 2018 CPI / 2017 CPI; 2000 MHI in 2018 Dollar = 2000 MHI in 1999 Dollar x 2018 CPI / 1999 CPI.

(E) Percent Change in Median Household Income (2000-2017) = (2017 MHI in 2018 Dollar - 2000 MHI in 2018 Dollar) / (2000 MHI in 2018 Dollar).
2. $(\$684/847)/12 = \0.07 (Estimated Monthly User Cost for New Requirements)

3. $(\$0.07/(\$38,416/12))100\% = 0.002\%$ (New Sampling Only)

4. $(\$42.42/(\$38,416/12))100\% = 1.32\%$ (Total User Cost)
- (A) Total Population in 2017: United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, Table B01003: Total Population - Universe: Total Population.
http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B01003&prodType=table.

(B) Total Population in 2000: (1) For United States, United States Census Bureau (2002) 2000 Census of Population and Housing, Summary Social, Economic, and Housing Characteristics, PHC-1-1 Part 1. United States Summary, Table 1. Age and Sex: 2000, Washington, DC. <https://www.census.gov/prod/cen2000/phc-1-1-pt1.pdf>. (2) For Missouri State, United States Census Bureau (2002) 2000 Census of Population and Housing, Summary Population and Housing Characteristics, PHC-1-27, Missouri, Table 2. Age and Sex: 2000, Washington, DC. <http://www.census.gov/prod/cen2000/phc-2-27-pt1.pdf>.

(C) Percent Change in Population (2000-2017) = (Total Population in 2017 - Total Population in 2000) / (Total Population in 2000).
- (A) Median Age in 2017: United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, Table B01002: Median Age by Sex - Universe: Total population.
http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B01002&prodType=table.

(B) Median Age in 2000: (1) For United States, United States Census Bureau (2002) 2000 Census of Population and Housing, Summary Social, Economic, and Housing Characteristics, PHC-1-1 Part 1. United States Summary, Table 1. Age and Sex: 2000, Washington, DC., Page 2. <https://www.census.gov/prod/cen2000/phc-1-1-pt1.pdf>. (2) For Missouri State, United States Census Bureau (2002) 2000 Census of Population and Housing, Summary Population and Housing Characteristics, PHC-1-27, Missouri, Table 2. Age and Sex: 2000, Washington, DC., Pages 64-92. <http://www.census.gov/prod/cen2000/phc-2-27-pt1.pdf>.

(C) Change in Median Age in Years (2000-2017) = (Median Age in 2017 - Median Age in 2000).
7. United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, B23025: Employment Status for the Population 16 Years and Over - Universe: Population 16 years and Over.
http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B23025&prodType=table.

8. United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, Table S1701: Poverty Status in the Past 12 Months.
http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_S1701&prodType=table.
9. United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, Table B22003: Receipt of Food Stamps/SNAP in the Past 12 Months by Poverty Status in the Past 12 Months for Households - Universe: Households.
http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B22003&prodType=table

- **Antidegradation**

Water Quality and Antidegradation Review

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

Lost Creek

by

Elsberry Wastewater Treatment Facility



April, 2019

Table of Contents

1. Facility Information	23
2. Water Quality Information.....	23
2.1. Water Quality History:.....	23
3. Receiving Waterbody Information	24
4. General Comments.....	24
5. Antidegradation Review Information	24
5.1. TIER DETERMINATION	24
Table 1. Pollutants of Concern and Tier Determination	25
5.2. EXISTING WATER QUALITY	25
5.3. NO DISCHARGE EVALUATION	25
5.4. LOSING STREAM ALTERATIVE DISCHARGE LOCATION	25
5.5. DEMONSTRATION OF INSIGNIFICANCE	26
Table 2. Net Change in Loadings Based upon Current and Proposed Permit Limits. ..	26
5.6. DEMONSTRATION OF NECESSITY AND SOCIAL AND ECONOMIC IMPORTANCE.....	27
6. General Assumptions of the Water Quality and Antidegradation Review	27
7. Mixing Considerations.....	27
8. Permit Limits and Monitoring Information	28
TABLE 3. EFFLUENT LIMITS FOR OUTFALL #001	28
9. Receiving Water Monitoring Requirements	29
10. Derivation and Discussion of Limits	29
10.1. OUTFALL #001 – MAIN FACILITY OUTFALL	29
10.2. LIMIT DERIVATION	29
11. ANTIDEGRADATION REVIEW PRELIMINARY DETERMINATION	33
Appendix A: Map of Discharge Location Outfall #001 represented by “new outfall location” Error! Bookmark not defined.	
Appendix B: Antidegradation Review Summary Attachments Error! Bookmark not defined.	

1. FACILITY INFORMATION

FACILITY NAME: Elsberry Wastewater Treatment Facility (WWTF)

NPDES #: MO-0054691

FACILITY TYPE/DESCRIPTION:

FACILITY TYPE: POTW– SIC #4952

Facility Description: The existing facility consists of an influent lift station and four-cell lagoon with a design flow of 236,000 gpd. The applicant is proposing the addition of an activated sludge with extended aeration treatment system including UV disinfection to comply with effluent limit requirements. The facility will be increasing the design flow to 336,000 gpd with the additions. The outfall will be relocated 0.15 miles upstream of the existing outfall location.

COUNTY: Lincoln

UTM COORDINATES: X= 692,099 / Y=4,336,982

12- DIGIT HUC: 07110004-1104

LEGAL DESCRIPTION: Landgrant 01760

EDU*: Central
Plains/Cuivre/Salt

ECOREGION: Mississippi River Alluvial Plain

* - 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 difficulty of the existing facility to meet ammonia limits. The facility reported six exceedances of ammonia limits in the last 15 monthly reports. Three exceedances of BOD limits have been recorded in the last five years with none since 2016. The average values over the sampling period from 1/1/14 to 4/15/19 were as follows: Daily Maximum NH₃ (summer) – 3.0 mg/L and (winter) – 7.6 mg/L, BOD₅ – 25.6 mg/L, TSS – 34.5 mg/L.

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	RECEIVING WATERBODY	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	0.52	Secondary	Lost Creek (8-20-13 MUDD V1.0)	0.0

3. RECEIVING WATERBODY INFORMATION

WATERBODY NAME	CLASS	WBID	LOW-FLOW VALUES (CFS)			DESIGNATED USES**
			1Q10	7Q10	30Q10	
Lost Creek (8-20-13 MUDD V1.0)	C	3960	-	-	-	AQL, IRR, LWW, SCR, WBC(B), HHP, General Criteria

** Irrigation (IRR), Livestock & Wildlife Protection (LWP), 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: Lost Creek

Upper end segment* UTM coordinates: X = 691,983 / Y= 4,337,177 (Outfall)

Lower end segment* UTM coordinates: X= 692,303 / Y= 4,336,389 (Confluence with downstream tributary)

*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

James Bensman P.E. of MECO Engineering Company prepared, on behalf of The City of Elsberry, the Elsberry WWTF *Antidegradation Review Application* received 3/12/2019.

Applicant elected to determine that discharge of all pollutants of concern (POC) is non-degrading 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 not submitted for this facility upgrade. The stream is gaining for discharge purposes (Appendix A: Map).

A Missouri Department of Conservation Natural Heritage Review Report was not submitted by the applicant.

5. ANTIDEGRADATION REVIEW INFORMATION

The following is a review of the *Elsberry Antidegradation Review Application* dated March 12, 2019.

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 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 2 is assumed for all 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
BOD ₅ /DO	*	Insignificant	
Total Suspended Solids (TSS)	**	Insignificant	
Ammonia as N	*	Insignificant	
pH	***	Insignificant	Permit limits applied
Oil & Grease (mg/L)	*	Insignificant	
<i>Escherichia coli</i> (<i>E. coli</i>)	*	Insignificant	Permit limits applied
Total Phosphorus	*	Insignificant	
Total Nitrogen	*	Insignificant	

Tier determination not possible with the demonstration of mass loading maintenance. Tier determination not possible: ** No in-stream standards for these parameters. *** Standards for these parameters are ranges.

5.2. EXISTING WATER QUALITY

No existing water quality data was submitted.

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.

5.4. LOSING STREAM ALTERNATIVE 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 the *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 *Antidegradation Review Application* received March 12, 2019, 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 2. Net Change in Loadings Based upon Current and Proposed Permit Limits.

POLLUTANTS OF CONCERN	CURRENT LIMIT (MG/L)	PROPOSED LIMIT (MG/L)	CURRENT LOADING (LBS/DAY)	PROPOSED LOADING (LBS/DAY)	NET CHANGE (LBS/DAY)
BOD5 (AML/AWL)	45 / 65	30 / 45	88.6 / 127.9	84.1 / 126.1	-4.5 / -1.8
Total Suspended Solids (TSS) (AML/AWL)	70 / 110	30 / 45	137.8 / 216.5	84.1 / 126.1	-53.7 / -90.4
pH	6.5-9.0 SI units	6.5-9.0 SI units	Not applicable	Not applicable	Not applicable
Ammonia: Summer (AML/MDL)	1.2 / 6.0	0.6 / 1.0	2.4 / 11.8	1.7 / 2.8	-0.7 / -9.0
Ammonia: Winter (AML/MDL)	2.4 / 12.1	1.2 / 1.6	4.7 / 23.8	3.4 / 4.5	-1.4 / -19.3
<i>Escherichia coli</i> (<i>E. coli</i>)	206/1030	206/1030	Not applicable	Not applicable	Not applicable
Oil and Grease (AML/MDL)	10/15	10/15	Not applicable	Not applicable	Not applicable

Load calculation:

Current design flow (Qd) = 0.236 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) * 45 mg/L * 0.236 MGD = 88.6 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 USE ATTAINABILITY WHOLE BODY CONTACT
 STUDY CONDUCTED (Y OR N): ANALYSIS CONDUCTED (Y OR N): USE RETAINED (Y OR N):

OUTFALL #001
 WET TEST (Y OR N): FREQUENCY: ONCE/PERMIT CYCLE AEC: 100% METHOD: GRAB

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		45	30	NDEL	ONCE/MONTH
TSS***	MG/L		45	30	NDEL	ONCE/MONTH
pH	SU	6.5 – 9.0		6.5 – 9.0	FSR	ONCE/MONTH
AMMONIA AS N (APRIL 1 – SEPT 30)	MG/L	1.0		0.6	NDEL	ONCE/MONTH
AMMONIA AS N (OCT 1 – MAR 31)	MG/L	1.6		1.2	NDEL	ONCE/MONTH
OIL & GREASE	MG/L	15		10	FSR	ONCE/MONTH
<i>ESCHERICHIA COLIFORM (E. COLI)</i>	NOTE 1	1030**		206**	FSR	ONCE/WEEK
WET TESTING	TU	*		*	FSR	ONCE/PERMIT CYCLE
TOTAL NITROGEN	MG/L	*		*	FSR	ONCE/QUARTER
TOTAL PHOSPHORUS	MG/L	*		*	FSR	ONCE/QUARTER

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 sample is collected during a calendar week (Sunday through Saturday).
- *** This facility is required to meet a removal efficiency of 85 percent or more for BOD₅ and TSS. Influent BOD₅ and TSS data should be reported to ensure removal efficiency requirements are met.

9. RECEIVING WATER MONITORING REQUIREMENTS

No receiving water monitoring requirements recommended at this time.

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:

$$C = \frac{(C_s \times Q_s) + (C_e \times Q_e)}{(Q_e + Q_s)} \quad (\text{EPA/505/2-90-001, Section 4.5.5})$$

Where: C = downstream concentration

C_s = upstream concentration

Q_s = upstream flow

C_e = effluent concentration

Q_e = 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 (WLA_c) 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 (BOD₅).** BOD₅ limits of 30 mg/L monthly average, 45 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 demonstrated to satisfy non-degrading expansion limitation requirements. The table below shows that the loading to the stream due to expanded design flow will be less compared to the current permitted loading. This non-degrading demonstration satisfies the requirements of the AIP. These limitations are both non-degrading and technology based effluent limits and protective of existing water quality.

Table below proposes the maximum non-degrading effluent limit

	Limit	Current Limit (mg/L)	conversion	Current Qd (MGD)	Current Load (lbs/day)	New Qd (MGD)	New Limit (mg/L)
BOD	monthly	45	8.34	0.236	88.6	0.336	31.6
	weekly	65	8.34	0.236	127.9	0.336	45.7

The maximum non-degrading effluent limits as shown are less stringent compared to technology based secondary limitation requirements, therefore; the less degrading limits of 30 mg/L AML and 45 MDL are applied.

Influent monitoring may be required for this facility in its Missouri State Operating Permit.

- **Total Suspended Solids (TSS).** TSS limits of 30 mg/L monthly average, 45 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 demonstrated to satisfy non-degrading expansion limitation requirements. The table below shows that the loading to the stream due to expanded design flow will be less compared to the current permitted loading. This non-degrading demonstration satisfies the requirements of the AIP. These limitations are both non-degrading and technology based effluent limits and protective of existing water quality.

Table below proposes the maximum non-degrading effluent limit

Parameter	Limit	Current Limit (mg/L)	conversion	Current Qd (MGD)	Current Load (lbs/day)	New Qd (MGD)	New Limit (mg/L)
TSS	monthly	70	8.34	0.236	137.8	0.336	49.2
	weekly	110	8.34	0.236	216.5	0.336	77.3

The maximum non-degrading effluent limits as shown are less stringent compared to technology based secondary limitation requirements, therefore; the less degrading limits of 30 mg/L AML and 45 MDL are applied.

Influent monitoring may be required for this facility in its Missouri State Operating Permit.

- **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.
- **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

Season	Temp (°C)	pH (SU)	Total Ammonia Nitrogen CCC (mg N/L)	Total Ammonia Nitrogen CMC (mg N/L)

Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

Summer: April 1 – September 30, Winter: October 1 – March 31.

The Department calculated the following water quality-based limitations (WQBEL) to be protective of water quality standards for the expanded discharge design flow. The table below shows the maximum daily and average monthly limitations for winter and summer.

Summer

$$C_e = (((Q_c + Q_s) * C) - (Q_s * C_s)) / Q_c$$

Chronic WLA: $C_e = ((0.52 + 0.0)1.5 - (0.0 * 0.01)) / 0.52$

$$C_e = 1.5 \text{ mg/L}$$

Acute WLA: $C_e = ((0.52 + 0.0)12.1 - (0.0 * 0.01)) / 0.52$

$$C_e = 12.1 \text{ mg/L}$$

$LTA_c = 1.5 \text{ mg/L} (0.780) = 1.2 \text{ mg/L}$ [CV = 0.6, 99th Percentile, 30 day avg.]

$LTA_a = 12.1 \text{ mg/L} (0.321) = 3.88 \text{ mg/L}$ [CV = 0.6, 99th Percentile]

$MDL = 1.2 \text{ mg/L} (3.11) = 3.7 \text{ mg/L}$ [CV = 0.6, 99th Percentile]

$AML = 1.2 \text{ mg/L} (1.19) = 1.4 \text{ mg/L}$ [CV = 0.6, 95th Percentile, n = 30]

Winter

Chronic WLA: $C_e = ((0.52 + 0.0)3.1 - (0.0 * 0.01)) / 0.52$

$$C_e = 3.1 \text{ mg/L}$$

Acute WLA: $C_e = ((0.52 + 0.0)12.1 - (0.0 * 0.01)) / 0.52$

$$C_e = 12.1 \text{ mg/L}$$

$LTA_c = 3.1 \text{ mg/L} (0.780) = 2.4 \text{ mg/L}$ [CV = 0.6, 99th Percentile, 30 day avg.]

$LTA_a = 12.1 \text{ mg/L} (0.321) = 3.9 \text{ mg/L}$ [CV = 0.6, 99th Percentile]

$MDL = 2.4 \text{ mg/L} (3.11) = 7.5 \text{ mg/L}$ [CV = 0.6, 99th Percentile]

$AML = 2.4 \text{ mg/L} (1.19) = 2.9 \text{ mg/L}$
 [CV = 0.6, 95th Percentile, n = 30]

Season	Maximum Daily Limit (mg/l)	Average Monthly Limit (mg/l)
Summer	3.7	1.4
Winter	7.5	2.9

No degradation Limitation Calculations

The following tables are presented because the facility was recently renewed with lower ammonia limitations and, secondly, to give the applicant-provided antidegradation review loading calculations consideration. The first table represents to the recently expired permit. It represents the bulk of the historic loading to the Meramec River. The recently renewed loading with lower ammonia limitation is the second table. The limitations are more stringent and use correct low flow values.

Maximum Non-Degrading Effluent Concentration Demonstration:

Parameter	Limit	Current Limit (mg/L)	conversion	Current Qd (MGD)	Current Load (lbs/day)	New Qd (MGD)	New Limit (mg/L)
Ammonia (Summer)	monthly	1.2	8.34	0.236	2.4	0.336	0.8
	daily max	6	8.34	0.236	11.8	0.336	4.2
Parameter	Limit	Current Limit (mg/L)	conversion	Current Qd (MGD)	Current Load (lbs/day)	New Qd (MGD)	New Limit (mg/L)
Ammonia (Winter)	monthly	2.4	8.34	0.236	4.7	0.336	1.7
	daily max	12.1	8.34	0.236	23.8	0.336	8.5

Proposed Non-Degrading Expansion Limitations

Season	Maximum Daily Limit (mg/L)	Average Monthly Limit (mg/L)
Summer	1.0	0.6
Winter	1.6	1.2

The non-degrading limits proposed by the applicant are more stringent compared to the calculated wate quality effluent limits. Therefore, the proposed limits are applied.

- ***Escherichia coli (E. coli)***. Monthly average of 206 per 100 mL as a geometric mean and Daily Maximum of 1030 during the recreational season (April 1 – October 31), to protect Whole Body Contact Recreation (B) 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).

Rule for monitoring requirements is 10 CSR 20-7.015 (9)(D)7.A.

For facilities greater than 100,00 gpd: At a minimum, weekly monitoring is required during the recreational season (April 1 – October 31), with compliance to be determined by calculating the geometric mean of all samples collected during the reporting period (samples collected during the calendar week for the weekly average, and samples collected during the calendar month for the monthly average). The weekly average requirement is consistent with EPA federal regulation 40 CFR 122.45(d). Please see **GENERAL ASSUMPTIONS OF THE WQAR #7**.

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.

- **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.** Monitoring required for facilities greater than 100,000 gpd design flow per 10 CSR 20-7.015(9)(D)7. Once per quarter sampling for one permit cycle or up to 5 years if permit cycle is less than 5 years.

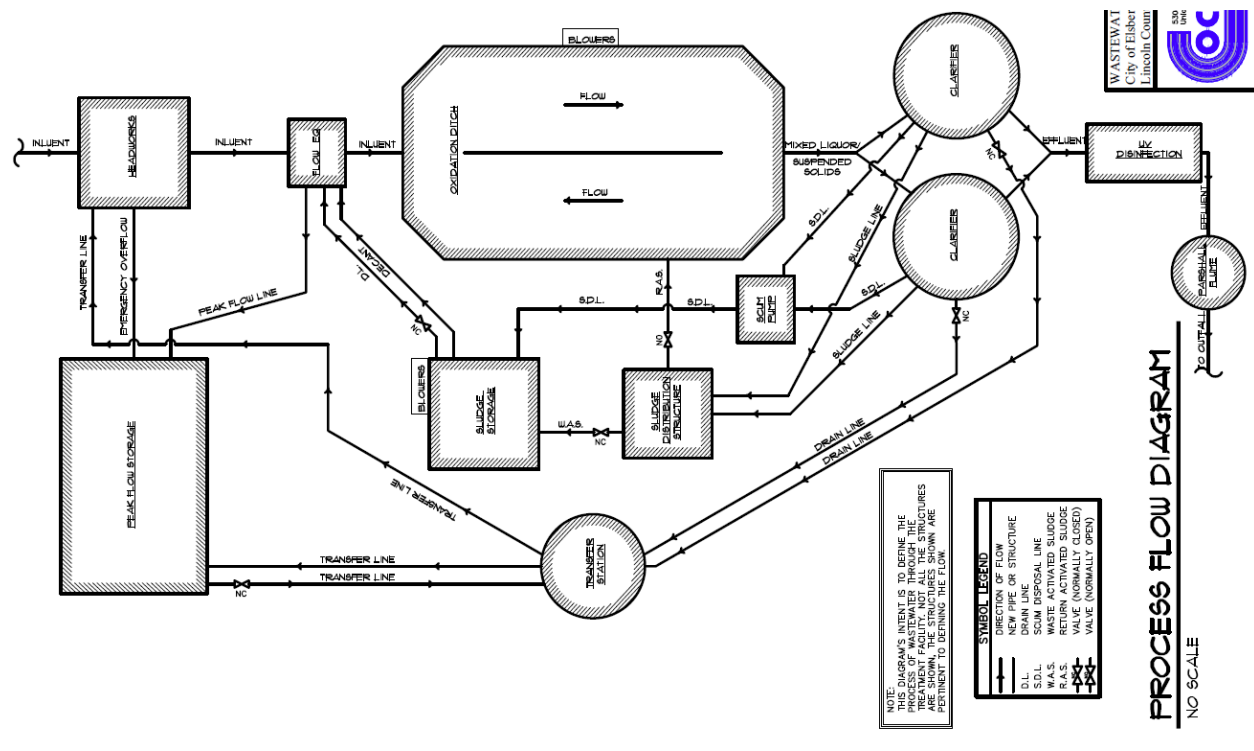
ANTIDegradation REVIEW PRELIMINARY DETERMINATION

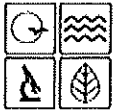
The proposed facility discharge will result in no degradation of the segment identified in Lost Creek. Per the requirements of the AIP, the effluent limits in this review were developed to be protective of beneficial uses and to retain the remaining assimilative capacity. The Department has determined that the submitted review is sufficient and meets the requirements of the AIP. No further analysis is needed for this discharge.

Reviewer: Aaron Sawyer
 Date: 4/25/19

Unit Chief: John Rustige, P.E. JR

• **Process Flow Diagram**





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

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

APPLICATION OVERVIEW

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

PART A – BASIC INFORMATION

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

- 1.1 Is this a Federal/State funded project? YES N/A Funding Agency: ARPA Project #: 4601631A7FE6
- 1.2 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?
 YES Date of Approval: 1-8-24 N/A
- 1.3 Has the department approved the proposed project's facility plan*?
 YES Date of Approval: 1-8-24 NO (If No, complete No. 1.4.)
- 1.4 [Complete only if answered No on No. 1.3.] Is a copy of the facility plan* for wastewater treatment facilities included with this application?
 YES NO Exempt because _____
- 1.5 Is a copy of the appropriate plans* and specifications* included with this application?
 YES Denote which form is submitted: Hard copy Electronic copy (See instructions.) NO
- 1.6 Is a summary of design* included with this application? YES NO
- 1.7 Has the appropriate operating permit application (A, B, or B2) been submitted to the department?
 YES Date of submittal: _____
 Enclosed is the appropriate operating permit application and fee submittal. Denote which form: A B B2
 N/A: However, in the event the department believes that my operating permit requires revision to permit limitation such as changing equivalent to secondary limits to secondary limits or adding total residual chlorine limits, please share a draft copy prior to public notice? YES NO
- 1.8 Is the facility currently under enforcement with the department or the Environmental Protection Agency? YES NO
- 1.9 Is the appropriate fee or JetPay confirmation included with this application? YES NO
 See Section 7.0

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

2.0 PROJECT INFORMATION

2.1 NAME OF PROJECT Elsberry Wastewater Treatment Facility	2.2 ESTIMATED PROJECT CONSTRUCTION COST \$ 6,080,638.00
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2.3 PROJECT DESCRIPTION
 New oxidation ditch to meet new effluent limits to be constructed with the closure of existing lagoon facility per MoDNR guidelines.

2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION
 The treatment plant will have sludge collected in a digester, the supernate pumped back into the process flow & remaining sludge will be hauled by a licensed hauler to an accepting facility. Lagoon sludge to remain on site & mixed with soil & spread over the area.

2.5 DESIGN INFORMATION
 A. Current population: 1,937; Design population: 3,336
 B. Actual Flow: 175,000gpd; Design Average Flow: _____ gpd;
 Actual Peak Daily Flow: _____ gpd; Design Maximum Daily Flow: 336,000gpd; Design Wet Weather Event: 880,000

2.6 ADDITIONAL INFORMATION
 A. Is a topographic map attached? YES NO
 B. Is a process flow diagram attached? YES NO

3.0 WASTEWATER TREATMENT FACILITY

NAME Elsberry WWTF		TELEPHONE NUMBER WITH AREA CODE 573-898-5588	E-MAIL ADDRESS elsberrymayor@att.net	
ADDRESS (PHYSICAL) 100 Hatfield Road	CITY Elsberry	STATE MO	ZIP CODE 63343	COUNTY Lincoln

Wastewater Treatment Facility: Mo- 0054691 (Outfall Of)

3.1 Legal Description: _____ ¼, _____ ¼, _____ ¼, Sec. _____, T _____, R _____
(Use additional pages if construction of more than one outfall is proposed.)

3.2 UTM Coordinates Easting (X): 692099 Northing (Y): 4336982
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

3.3 Name of receiving streams: Lost Creek

4.0 PROJECT OWNER

NAME City of Elsberry		TELEPHONE NUMBER WITH AREA CODE 573-898-5588	E-MAIL ADDRESS elsberrymayor@att.net	
ADDRESS 201 Broadway	CITY Elsberry	STATE MO	ZIP CODE 63343	

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

NAME City of Elsberry		TELEPHONE NUMBER WITH AREA CODE 573-898-5588	E-MAIL ADDRESS elsberrymayor@att.net	
ADDRESS 201 Broadway	CITY Elsberry	STATE MO	ZIP CODE 63343	

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

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

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

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

A. Is a copy of the as-filed restrictions and covenants included with this application? YES NO

B. Is a copy of the as-filed warranty deed, quitclaim deed or other legal instrument which transfers ownership of the land for the wastewater treatment facility to the association included with this application? YES NO

C. Is a copy of the as-filed legal instrument (typically the plat) that provides the association with valid easements for all sewers included with this application? YES NO

D. Is a copy of the Missouri Secretary of State's nonprofit corporation certificate included with this application? YES NO

6.0 ENGINEER

ENGINEER NAME / COMPANY NAME David Van Leer, P.E./Cochran		TELEPHONE NUMBER WITH AREA CODE 636-584-0540	E-MAIL ADDRESS dvanleer@cochraneng.com	
ADDRESS 530A East Independence Drive	CITY Union	STATE MO	ZIP CODE 63084	

7.0 APPLICATION FEE

CHECK NUMBER JETPAY CONFIRMATION NUMBER

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

PROJECT OWNER SIGNATURE


PRINTED NAME
Steve Wilch

TITLE OR CORPORATE POSITION
Mayor

TELEPHONE NUMBER WITH AREA CODE
573-898-5588

E-MAIL ADDRESS
elsberrymayor@att.net

Mail completed copy to: MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
P.O. BOX 176
JEFFERSON CITY, MO 65102-0176

END OF PART A.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHETHER PART B NEEDS TO BE COMPLETE.

PART B – LAND APPLICATION ONLY

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

8.0 FACILITY INFORMATION

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

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

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

9.0 STORAGE BASINS

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

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

9.3 Storage basin dimensions at inside top of berm (feet). Report freeboard as feet from top of berm to emergency spillway or overflow pipe.

Basin #1:	Length _____	Width _____	Depth _____	Freeboard _____	Depth _____	Safety _____	% Slope _____
Basin #2:	Length _____	Width _____	Depth _____	Freeboard _____	Depth _____	Safety _____	% Slope _____
Basin #3:	Length _____	Width _____	Depth _____	Freeboard _____	Depth _____	Safety _____	% Slope _____

9.4 Storage Basin operating levels (report as feet below emergency overflow level).

Basin #1:	Maximum operating water level _____ ft	Minimum operating water level _____ ft
Basin #2:	Maximum operating water level _____ ft	Minimum operating water level _____ ft
Basin #3:	Maximum operating water level _____ ft	Minimum operating water level _____ ft

9.5 Design depth of sludge in storage basins.

Basin #1: _____ ft Basin #2: _____ ft Basin #3: _____ ft

9.6 Existing sludge depth, if the basins are currently in operation.

Basin #1: _____ ft Basin #2: _____ ft Basin #3: _____ ft

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

10.0 LAND APPLICATION SYSTEM

10.1 Number of irrigation sites _____ Total Acres _____ Maximum % field slopes _____

Location:	_____ ¼, _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
Location:	_____ ¼, _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
Location:	_____ ¼, _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres

(Use additional pages if greater than three irrigation sites.)

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

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

10.4 Land application rate (design flow including 1-in-10 year storm water flows):

Design:	_____ inches/year	_____ inches/hour	_____ inches/day	_____ inches/week
Actual:	_____ inches/year	_____ inches/hour	_____ inches/day	_____ inches/week

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

10.6 Actual months used for irrigation (check all that apply):

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

10.7 Land application rate is based on:

Hydraulic Loading Other (describe) _____
 Nutrient Management Plan (N&P) If N&P is selected, is the plan included? YES NO



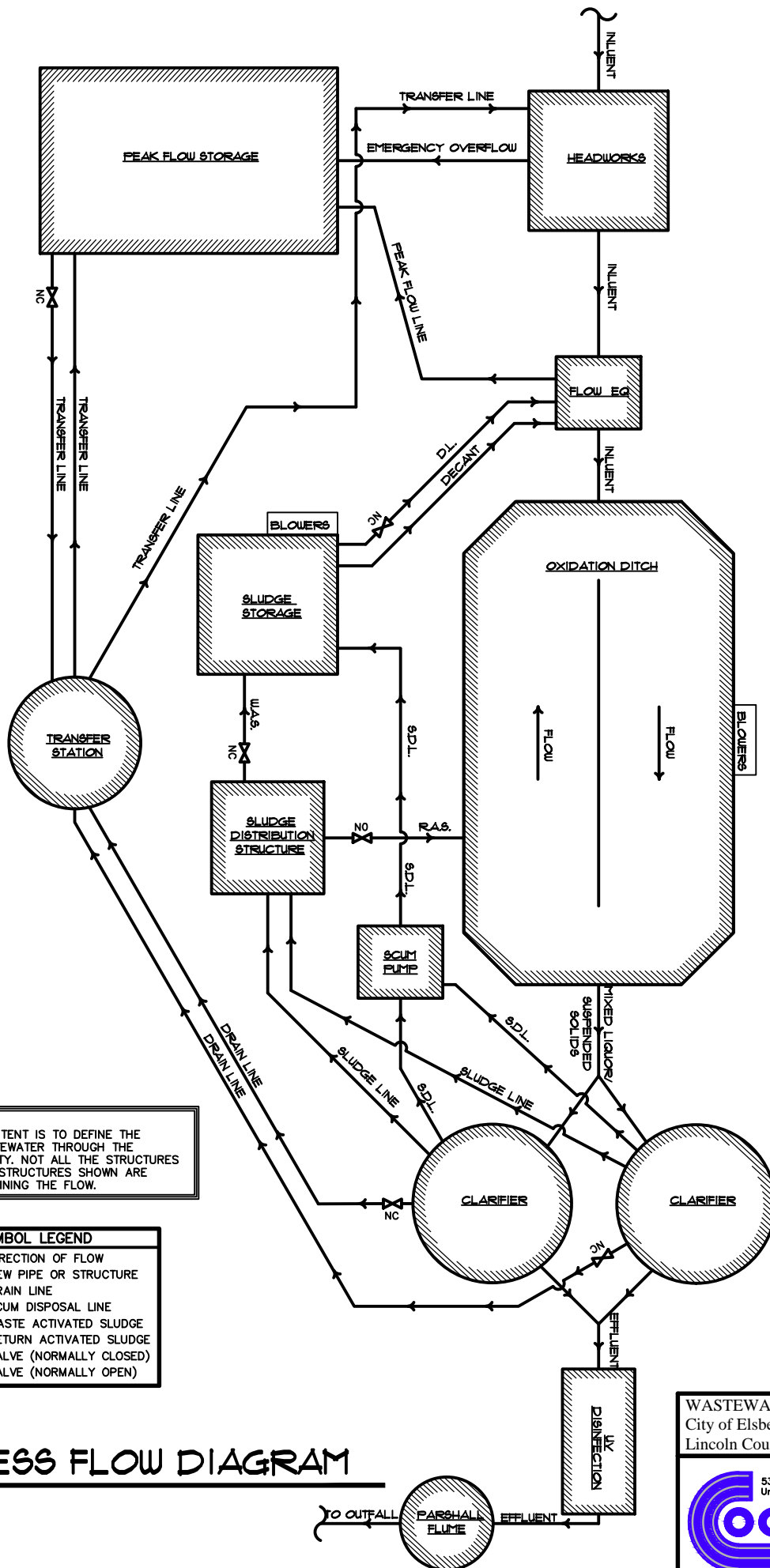
WASTEWATER TREATMENT FACILITY
 City of Elsberry
 Lincoln County, Missouri

530a E. Independence Dr.
 Union, Missouri 63084

636-584-0540 (tel.)
 636-584-0512 (fax)
 mail@cochraneng.com

COCHRAN

- Civil Engineering
- Surveying
- Architecture
- Site Development
- General Consulting
- Master Planning



NOTE:
THIS DIAGRAM'S INTENT IS TO DEFINE THE PROCESS OF WASTEWATER THROUGH THE TREATMENT FACILITY. NOT ALL THE STRUCTURES ARE SHOWN, THE STRUCTURES SHOWN ARE PERTINENT TO DEFINING THE FLOW.

SYMBOL LEGEND	
	DIRECTION OF FLOW
	NEW PIPE OR STRUCTURE
	DRAIN LINE
	SCUM DISPOSAL LINE
	WASTE ACTIVATED SLUDGE
	RETURN ACTIVATED SLUDGE
	VALVE (NORMALLY CLOSED)
	VALVE (NORMALLY OPEN)

PROCESS FLOW DIAGRAM

NO SCALE

WASTEWATER TREATMENT FACILITY
City of Elsberry
Lincoln County, Missouri

530a E. Independence Dr.
Union, Missouri 63084
636-584-0540 (tel.)
636-584-0512 (fax)
mail@cochraneng.com

- Architecture
- Site Development
- General Consulting
- Master Planning

INSTRUCTIONS FOR COMPLETING APPLICATION FOR CONSTRUCTION PERMIT – WASTEWATER TREATMENT FACILITIES

All blanks must be filled in when the application is submitted to the Missouri Department of Natural Resources. This includes the **required signature**.

Note: Use the form Application for Construction Permit – Sewer Extension, MO 780-1632, if only collection system component(s) are to be constructed.

A land disturbance permit is required if construction will result in the disturbance of one or more acres of land. A land disturbance permit is available through the department's ePermitting system at dnr.mo.gov/env/wpp/epermit/help.htm. A permit fee in accordance with 10 CSR 20-6.011 is required.

After receiving a complete application, the Department enters the application information into the Missouri Clean Water Information System. You may search for the status of a construction permit online at dnr.mo.gov/mocwis_public/applicationInprocessSearch.do.

Part A – Basic Application Information

- 1.0 If the answer to any of the questions in this section is no, this application may be considered incomplete and returned to the applicant.
- 1.1 Check the appropriate box. If the project is funded with federal or state monies, supply the funding agency name and project number.
- 1.2 Check the appropriate box. Provide the date of department approval for the antidegradation report. Include a copy of the approved *Water Quality and Antidegradation Review* with this application. Not every construction project may require an antidegradation review. For more information, guidance documents and forms concerning antidegradation visit dnr.mo.gov/env/wpp/permits/antideg-implementation.htm.
- 1.3 Check the appropriate box and provide the date of department approval. Per 10 CSR 20-8.110(2), a facility plan must be submitted to the department prior to the submittal of a construction permit application. The department has developed a fact sheet to aid in the development of an approvable facility plan, Facility Plan Guidance for Wastewater Treatment Facilities, Fact Sheet--PUB2416.
- 1.4 Complete only if No. 1.3 is answered No. Check the appropriate box. Include the exemption reason from 10 CSR 20-6.010(4)(B).
- 1.5 Check the appropriate box. Provide a copy of the appropriate plans and specifications for department review when applying for a construction permit per 10 CSR 20-8.110 and 10 CSR 20-6.010. A Missouri registered professional engineering seal, signature and date is required on each sheet of the plans and the cover of the technical specifications. An electronic copy of the construction permit application and the information listed below in Portable Document Format (PDF) searchable format or department approved equivalent per 10 CSR 20-6.010(5)(G), along with one (1) paper copy for projects not seeking department funding or two (2) paper copies for projects seeking department funding under 10 CSR 20-4.
- 1.6 Check the appropriate box. A summary of design shall accompany the plans and specifications when applying for a construction permit per 10 CSR 20-6.010(5)(G) and 10 CSR 20-8.110(8). The department has developed a fact sheet to aid in the development of an acceptable summary of design. This document is available online at dnr.mo.gov/pubs/pub2417.htm.
- 1.7 Check the appropriate box if an operating permit modification is needed. Include the applicable operating permit application. New outfalls, discharges, projects converting to land application, or a lagoon upgrade require an operating permit modification application. Contact the Department for clarification. Projects that may not need an operating permit modification check the N/A box and indicate whether you want to review the draft prior to public notice should the Department determine a modification is required. The Department can modify your operating permit without an application for projects that are adding chlorine disinfection, constructing to meet current operating permit limits, or constructing to meet limits in a schedule of compliance.
 - Form A is available online at dnr.mo.gov/forms/780-1479-f.pdf.
 - Form B is available online at dnr.mo.gov/forms/780-1512-f.pdf.
 - Form B2 is available online at dnr.mo.gov/forms/780-1805-f.pdf.
- 1.8 Check the appropriate box. More information about the Compliance and Enforcement Water Protection Program is available online at dnr.mo.gov/env/wpp/enf/index.html.

- 1.9 Check the appropriate box. Include payment or payment confirmation for the fee with your application. See 10 CSR 20-6.011(2) and Wastewater Treatment Facility Permit Fees -- PUB2564.
Note: The department returns incomplete construction permit applications and related engineering documents and the application forfeits the fees. See 10 CSR 20-6.011(5)(A). The applicant forfeits the fees when the applicant withdraws construction applications. See 10 CSR 20-6.011(5)(B).
- 2.1 Provide the name of the proposed construction project.
- 2.2 Provide the estimated project construction cost. The estimated and final project construction cost will be useful to the department in conducting affordability analyses.
- 2.3 Briefly describe the construction project by providing the number and capacity of each new unit.
- 2.4 Briefly describe the method of sludge handling, use and disposal at the treatment facility.
- 2.5 Provide the project design information and when required in the units specified.
 - A. Provide the current population and the design population to be served by the wastewater treatment facility.
 - B. Provide the estimated design flow information in accordance with 10 CSR 20-8.110(3).
- 2.6 Provide the additional project information in accordance with 10 CSR 20-8.110(5).
 - A. Attach a topographic map of the area extending at least one mile beyond the facility property boundaries. This map must show the outline of the facility and the following information. A topographic map is available online at dnr.mo.gov/internetmapviewer or from the Department of Natural Resources' Missouri Geological Survey in Rolla, Mo., at 573-368-2125. (Submittals of more than one map may be necessary to show the entire area.)
 1. The area surrounding the wastewater treatment facility, including all unit processes.
 2. The major pipes or other structures through which wastewater enters the treatment facility and the pipes or other structures through which treated wastewater is discharged from the treatment facility. Include outfalls from bypass piping, if applicable.
 3. The actual point of discharge.
 4. Wells, springs, other surface water bodies and drinking water wells that are: 1) within ¼ mile of the property boundaries of the treatment facility and 2) listed in public record or otherwise known to the applicant.
 5. Any areas where biosolids produced by the treatment facility are treated, stored, or disposed.
 6. If the treatment facility receives waste classified as hazardous under the Resource Conservation and Recovery Act, or RCRA, by truck, rail, or special pipe, show on the map where hazardous waste enters the treatment works and where it is treated, stored or disposed.
 7. Outline any wastewater land application sites.
 - B. Provide a process flow diagram with the influent and effluent design average flow and peak flow capabilities. Also, depict all of the treatment facility components and the corresponding hydraulic capacities of each component. In addition, include all recycle flows in the diagram. If land application is used, depict all irrigation equipment and application sites.
- 3.0 Complete the Wastewater Treatment Facility information. Include the Missouri State Operation Permit number, outfall number, physical location, and other appropriate contact information.
- 3.1 Provide the project legal description. The department's mapping system is available online at dnr.mo.gov/internetmapviewer.
- 3.2 A Global Positioning System, or GPS, is a satellite-based navigation system. The department prefers that a GPS receiver is used and the displayed coordinates submitted. If access to a GPS receiver is not available, use a mapping system to approximate the coordinates.
- 3.3 Provide the name of the receiving stream(s) to which the discharge is directed and any subsequent tributary until a continuous flowing stream is reached.
- 4.0 Complete Project Owner information. Include the legal name, address, phone number with area code and email address.
- 5.0 Complete Continuing Authority contact information. If same as the Project Owner, write "Same as above". A continuing authority is a company, business, entity or person(s) that will be operating the facility and/or ensuring compliance with the permit requirements. A continuing authority is not, however, an entity or individual that is contractually hired by the permittee to sample or operate and maintain the system for a defined time period, such as a certified operator or analytical laboratory. To access the regulatory requirement regarding continuing authority, 10 CSR 20-6.010(2), please visit <https://s1.sos.mo.gov/cmsimages/adrules/csr/current/10csr/10c20-6.pdf>. A continuing authority's name must be listed exactly as it appears on the Missouri Secretary of State's (SoS's) webpage: <https://bsd.sos.mo.gov/BusinessEntity/BEsearch.aspx?SearchType=0>, unless the continuing

authority is an individual(s), government, or otherwise not required to register with the SoS. See 10 CSR 20-6.010(2) for the regulatory requirement regarding continuing authority.

- 5.1 Check the appropriate box. Include a letter signed by the continuing authority (if not same as the project owner) stating they will “accept, operate and maintain” the wastewater treatment facility after successful construction. If the continuing authority will not accept and agree to operate and maintain the wastewater treatment facility, this application will be considered incomplete.
- 5.2 Complete if the continuing authority is a Missouri Public Service Commission, or PSC, regulated entity. See 10 CSR 20-6.010(2)(B)3 for more information. This information is not necessary for existing wastewater treatment facilities currently permitted with a PSC entity as owner and continuing authority.
- 5.3 Complete if the continuing authority is a property owners association. See 10 CSR 20-6.010(2)(B)5 for more information. This information is not necessary for existing wastewater treatment facilities currently permitted with the property owners association as owner and continuing authority.
- 6.0 Complete Engineer contact information.
- 7.0 Check the appropriate box and include check or confirmation number. Applicants can pay fees online by credit card or eCheck through a system called JetPay.
- Per Section 37.001, RSMo, a transaction fee will be included. The transaction fee is paid to the third party vendor JetPay, not the Department of Natural Resources.
 - Be sure to select the correct fee type and corresponding URL to ensure your payment is applied appropriately. If you are unsure what type of fee to pay, please contact the Water Protection Program’s Budget, Fees, and Grants Management Unit by phone at (573) 522-1485 for assistance.
 - Upon successful completion of your payment, JetPay provides a payment confirmation. Submit this form with a copy of the payment confirmation if requesting a new permit or a permit modification. For permit renewals of active permits, the Department will invoice fees annually in a separate request.
 - If you are unable to make your payment online, but want to pay with credit card, you may email your name, phone number, and invoice number, if applicable, WPPFEES@dnr.mo.gov. The Budget, Fees, and Grants Management Unit will contact you to assist with the credit card payment. **Please do not include your credit card information in the email.**
 - Applicants can find fee rates in 10 CSR 20-6.011 and Wastewater Treatment Facility Permit Fees -- PUB2564 (<https://dnr.mo.gov/pubs/pub2564.htm>).

WP 04 Construction Permits: <https://magic.collectorsolutions.com/magic-ui/payments/mo-natural-resources/592/>

- 8.0 The owner of the construction project must sign the application.

Part B – Land Application

Complete Part B only if the proposed construction project includes land application of wastewater from a treatment facility.

- 8.0 Provide the applicable Facility Information land application information. Check the appropriate boxes.
- 9.0 Provide the applicable Storage Basins information. Check the appropriate boxes.
- Freeboard – The depth from the top of the berm to the emergency spillway. Minimum depth • is one foot.
 - Safety Volume – The depth to contain the 25-year, 24-hour storm event. Minimum depth is • one foot.
 - Maximum Operating Water Level – The water level at the bottom of the safety volume. • Minimum depth is two feet below the top of the berm.
 - Minimum Operating Water Level – The water level above the bottom of the lagoon basin for • seal protection. Minimum depth is two feet and may be greater when additional treatment volume is included.
 - Total Depth is from the top of the berm to the bottom of the lagoon basin including freeboard. •
- 10.0 Provide the applicable Land Application System information. Check the appropriate boxes.
- 10.7 Check the appropriate box. If the land application rate is based on a Nutrient Management Plan, or N and P, include the plan with this application for department review.

Mail the completed form and applicable fee to the department.

If there are any questions concerning this form, please contact the Department of Natural Resources, Water Protection Program at 800-361-4827 or 573-751-1300 or visit dnr.mo.gov/env/wpp.