

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 Alton
Alton Wastewater Treatment Facility
101 Pine Street
Alton, MO 65606

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.

April 29, 2024
Effective Date

April 28, 2026
Expiration Date


John Hoke, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The Alton WWTF is located approximately 0.9 miles southeast of the intersection of Highway 160 and Highway 19 on Highway 160 in Alton. Construction at the treatment facility will include new screening, new flow measurement device, replacement of the oxidation ditch rotors, replacement of existing clarifier internal equipment, and a new ultraviolet disinfection system. Construction in the collection system includes approximately 1,330 linear feet (lf) of 8-inch SDR-35 PVC gravity line replacement, approximately 60 lf of new 8-inch SDR-35 PVC gravity line, CIPP lining of approximately 6,600 lf of 10-inch gravity line and 20,800 lf of 8-inch gravity line, and construction of 6 new manholes.

The facility will retain the existing design average flow of 108,500 gpd (0.1085 MGD) and serves a hydraulic population equivalent of approximately 1,085 people.

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

II. COST ANALYSIS FOR COMPLIANCE

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

The department is not required to determine Cost Analysis for Compliance because the permit contains no new conditions or requirements that convey a new cost to the facility.

III. CONSTRUCTION PERMIT CONDITIONS

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

1. This construction permit does not authorize discharge.
2. All construction shall be consistent with plans and specifications signed and sealed by Robert Summers, P.E., with Heartland Engineering, LLC and as described in this permit.

3. The department must be contacted in writing prior to making any changes to the plans and specifications that would directly or indirectly have an impact on the capacity, flow, system layout, or reliability of the proposed wastewater treatment facilities or any design parameter that is addressed by 10 CSR 20-8, in accordance with 10 CSR 20-8.110(11).
4. State and federal law does not permit bypassing of raw wastewater; therefore, steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the department's Southeast Regional Office per 10 CSR 20-7.015(9)(G).
5. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of one acre or more to obtain a Missouri state operating permit to discharge stormwater. The permit requires best management practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the department's ePermitting system available online at <https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem>. See <https://dnr.mo.gov/data-e-services/water/electronic-permitting-epermitting> for more information.
6. A United States Army Corps of Engineers (USACE) Clean Water Act Section 404 Department of the Army permit and a Section 401 Water Quality Certification issued by the department may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied or notification is provided that no Section 404 permit is required by the USACE. You must contact your local USACE district since they determine what waters are jurisdictional and which permitting requirements may apply. You may call the department's Water Protection Program, Operating Permits Section at 573-522-4502 for more information. See <https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality> for more information.
7. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements listed below.
 - Vacuum testing, if specified for concrete sewer manholes, shall conform to the test procedures in ASTM C1244 – 11(2017) *Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill*, as approved and published April 1, 2017, or the manufacturer's recommendation. 10 CSR 20-8.120(4)(F)1.
 - Exfiltration testing, if specified for concrete sewer manholes, shall conform to the test procedures in ASTM C969 – 17 *Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines*, as approved and published April 1, 2017. 10 CSR 20-8.120(4)(F)2.
 - 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). 10 CSR 20-8.130 (2) (A).

- Facilities shall be readily accessible by authorized personnel from a public right-of-way at all times. 10 CSR 20-8.140 (2) (D). 10 CSR 20-8.130 (2) (B)
- The outfall shall be so constructed and protected against the effects of flood water, ice, or other hazards as to reasonably ensure its structural stability and freedom from stoppage. 10 CSR 20-8.140 (6) (A)
- All sampling points shall be designed so that a representative and discrete 24 hour automatic composite sample or grab sample of the effluent discharge can be obtained at a point after the final treatment process and before discharge to or mixing with the receiving waters. 10 CSR 20-8.140 (6) (B)
- All outfalls shall be posted with a permanent sign indicating the outfall number (i.e., Outfall #001). 10 CSR 20-8.140 (6) (C)
- All wastewater treatment facilities shall be provided with an alternate source of electric power or pumping capability to allow continuity of operation during power failures. 10 CSR 20-8.140 (7) (A) 1.
- Disinfection and dechlorination, when used, shall be provided during all power outages. 10 CSR 20-8.140 (7) (A) 2.
- Electrical systems and components in raw wastewater or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors that are normally present, shall comply with the NFPA 70 *National Electric Code (NEC)* (2017 Edition), as approved and published August 24, 2016, requirements for Class I, Division 1, Group D locations. 10 CSR 20-8.140 (7) (B)
- An audiovisual alarm or a more advanced alert system, with a self-contained power supply, capable of monitoring the condition of equipment whose failure could result in a violation of the operating permit, shall be provided for all wastewater treatment facilities. 10 CSR 20-8.140 (7) (C)
- No piping or other connections shall exist in any part of the wastewater treatment facility that might cause the contamination of a potable water supply. 10 CSR 20-8.140 (7) (D) 1.
- 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 4 feet deep. 10 CSR 20-8.140 (8) (J) 2.
 - Dampers are not to be used on exhaust or fresh air ducts. Avoid the use of fine screens or other obstructions on exhaust or fresh air ducts to prevent clogging; 10 CSR 20-8.140 (8) (J) 3.
 - Where continuous ventilation is needed (e.g., housed facilities), provide at least 12 complete air changes per hour. Where continuous ventilation would cause excessive heat loss, provide intermittent ventilation of at least 30 complete air changes per hour when facility personnel enter the area. Base air change demands on 100 percent fresh air; 10 CSR 20-8.140 (8) (J) 4.
 - Electrical controls. Mark and conveniently locate switches for operation of ventilation equipment outside of the wet well or building. Interconnect all intermittently operated ventilation equipment with the respective wet well, dry well, or building lighting system. The manual lighting/ventilation switch is expected to override the automatic controls. For a 2 speed ventilation system with automatic switch over where gas detection equipment is installed, increase the ventilation rate automatically in

- response to the detection of hazardous concentrations of gases or vapors; 10 CSR 20-8.140 (8) (J) 5.
- Fabricate the fan wheel from non-sparking material. Provide automatic heating and dehumidification equipment in all dry wells and buildings. 10 CSR 20-8.140 (8) (J) 6.
- Explosion-proof electrical equipment, non-sparking tools, gas detectors, and similar devices, in work areas where hazardous conditions may exist, such as digester vaults and other locations where potentially explosive atmospheres of flammable gas or vapor with air may accumulate. 10 CSR 20-8.140 (8) (K)
- Provisions for local lockout/tagout on stop motor controls and other devices; 10 CSR 20-8.140 (8) (L)
- Provisions for an arc flash hazard analysis and determination of the flash protection boundary distance and type of PPE to reduce exposure to major electrical hazards shall be in accordance with NFPA 70E *Standard for Electrical Safety in the Workplace* (2018 Edition), as approved and published August 21, 2017. 10 CSR 20-8.140 (8) (M)
- The identification and hazard warning data included on chemical shipping containers, when received, shall appear on all containers (regardless of size or type) used to store, carry, or use a hazardous substance. 10 CSR 20-8.140 (9) (E)
- 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)

- Where two (2) or more mechanically cleaned bar screens are used, the design shall provide for taking the largest unit out-of-service without sacrificing the capability to handle the average design flow. Where only one mechanically cleaned screen is used, it shall be sized to handle the design peak instantaneous flow. 10 CSR 20-8.150 (4) (B)
- Provisions for location and safety of comminutors shall be in accordance with screening devices,
 - Manually cleaned 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 channels shall be protected by guard railings and deck gratings. 10 CSR 20-8.150 (4) (A) 3. A. (II)
 - Mechanical 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 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 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 six inches (6") above the surrounding ground surface and shall provide not less than twelve inches (12") of freeboard. 10 CSR 20-8.160 (3) (E)
- Safety features shall appropriately include machinery covers, life lines, handrails on all stairways and walkways, and slip resistant surfaces. For additional safety follow the provisions listed in 10 CSR 20-8.140(8). 10 CSR 20-8.160 (5) (A)
- The design shall provide for convenient and safe access to routine maintenance items such as gear boxes, scum removal mechanism, baffles, weirs, inlet stilling baffle areas, and effluent channels. 10 CSR 20-8.160 (5) (B)
- For electrical equipment, fixtures, and controls in enclosed settling basins and scum tanks, where hazardous concentrations of flammable gases or vapors may accumulate, follow the provisions in 10 CSR 20-8.140(7)(B). The fixtures and controls shall be conveniently located and safely accessible for operation and maintenance. 10 CSR 20-8.160 (5) (C)

- 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 thirty thousand microwatt seconds per centimeters squared ($30,000 \mu\text{W} \cdot \text{s}/\text{cm}^2$). 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.
- Closed vessel UV systems utilizing medium-pressure lamps shall be provided with an automatic cleaning system in order to prevent algae growth. 10 CSR 20-8.190 (5) (B) 3.
- 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 Alton will become the continuing authority for operation and maintenance of these facilities;
- B. Submit an electronic copy of the as builts if the project was not constructed in accordance with previously submitted plans and specifications; 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>) with a request to issue the modified operating permit. No operating permit modification fee required.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

Construction will replace broken and worn-out equipment for the treatment plant to work appropriately. The existing chlorine disinfection system will be replaced with UV disinfection. Construction in the collection system to address issues related to inflow and infiltration. In review of the last 5 years of discharge monitoring reports, the facility has reported average flows above the design average flow; however, the facility is doing significant inflow and infiltration work as part of this project and is installing new flowmeters to help address the problems.

2. FACILITY DESCRIPTION

The Alton WWTF is located approximately 0.9 miles southeast of the intersection of Highway 160 and Highway 19 on Highway 160, Alton, in Oregon County, Missouri. The facility has an existing influent lift station, oxidation ditch, clarifiers, sludge storage, sand filters, and a disinfection system. Construction will add new screening, new flow measurement device, replacement of the oxidation ditch rotors, replacement of existing clarifier internal equipment, and a new UV disinfection system. The facility has a design average flow of 108,500 (0.1085 MGD) and serves a hydraulic population equivalent of approximately 1,085 people.

Electromagnetic flow metering will be added immediately after the treatment facility lift station. The existing grit chamber structure will be repurposed to house a mechanical spiral screen (primary channel) and manual bar screen along with appropriate facilities for removal of screened waste. The existing oxidation ditch rotors will be replaced with new disc rotors along with dissolved oxygen control and variable frequency drives (VFDs). All internal components of the secondary clarifiers will be replaced, using the same existing concrete tanks. The existing chlorination/dechlorination structure will be demolished and replaced with a new ultraviolet disinfection system.

3. COMPLIANCE PARAMETERS

The proposed project replaces the chlorine disinfection system with UV disinfection. The total residual chlorine limits will be removed from the permit. No other effluent limits are changing, and the facility can meet the effluent limits established in Operating Permit MO0049492.

4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

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

- Influent/terminal pump station

- Oxidation Ditch
- Gravity sand filters
- Sludge holding basins

Construction will cover the following items:

- Collection system work:
 - Approximately 1,330 lf of 8-inch SDR-35 PVC gravity line replacement,
 - Approximately 60 ft of new 8-inch SDR-35 PVC gravity line,
 - CIPP lining of approximately 6,600 lf of 10-inch gravity line and 20,800 lf of 8-inch gravity line
 - Replacement of 18 8-inch gravity sewer wyes and 5 10-inch gravity sewer wyes
 - Lining of 830 manholes, with additional grouting in 20 manholes, and 8 with frame/cover replacements.
 - 38 manholes replaced with water-tight lids
 - Raising and resealing approximately 36 existing manholes
 - Construction of 6 new manholes
- Flow Measurement – Installation of accurate flow measurement devices will give the treatment facility a means of improved data analysis.
 - Electromagnetic Meter – An influent electromagnetic flow meter shall measure the raw influent wastewater.
 - A second electromagnetic meter will be installed on the return activated sludge.
- Screening – Installation of screening devices removes nuisance inorganic materials from raw wastewater. The existing headworks grit chamber is being repurposed to house a mechanical spiral screen and manual bar screen.
 - Mechanical Fine Screw Screen – One mechanically-cleaned fine screen capable of treating a design average flow of 108,500 (0.1085 MGD) and a peak flow of 350,000 gpd (0.35 MGD).
 - The Fine Screen System shall be a self-contained screening system, consisting of a spiral assembly, screen basket, transport tube, press zone assembly, drive system, pivot stand, and controls. The influent stream to be screened will be introduced to the internal surface of the screen basket with the solids being retained on the surface of the basket until transported up the spiral.
 - The screen unit will be installed at a 35-degree angle relative to the concrete channel finished floor in a 12-inch-wide channel.
 - The depth of the screen channel will be 36-inches.
 - The screen unit will have a clearance of 48-inches between the top of the channel and the chute/guard.
- A manually-cleaned coarse bar screen shall be in the bypass channel with clear bar spacings of 1/8 inch and be positioned at an angle of 45 degrees from the horizontal to allow for manual raking of the screen. The addition of a

manually-cleaned coarse bar screen provides redundancy and a means of unit isolation for the mechanically-cleaned fine screen. The screening structure is followed by the oxidation ditch.

- Oxidation Ditch –The existing 15-ft-wide by 123-ft-long by 11-ft-deep oxidation ditch is being retained, only the rotors are being replaced, with new dissolved oxygen sensors added.
 - The existing rotors are being replaced with disc rotors. There will be 2 rotors, with each rotor having 9 discs.
 - Two 15-hp blowers on VFD will provide aeration to the oxidation ditch.
 - The aeration equipment shall consist of 2 complete rotary aerator assemblies designed for controlled disc submergence of 12 to 24 inches and a max 51 rpm, so that the oxygen transfer rate and power requirements can be varied with the flow and treatment requirements.
 - The rotary aerator assemblies to be furnished and installed shall be capable of delivering a standard oxygen rate (SOR) of 36.62 lb. O₂/hr.
- Secondary Clarifiers – Inside the existing secondary clarifiers, new clarifier components will be installed. Each clarifier has a sidewater depth of 12 ft, with inner diameter of 16 ft, and 1.5 ft of freeboard.
 - Each clarifier has a surface area of approximately 201 ft², with an approximate volume of 2,412.7 ft³ or 18,047 gallons.
 - Overall surface area for the 2 clarifiers: 402 ft².
 - Overall volume of the 2 clarifiers: 4,825 ft³ or 36,095 gallons
 - Hydraulic retention time (HRT) is 3.99 hours at design average flow of 0.1085 MGD and 1.24 hours at peak hourly flow of 0.35 MGD, per clarifier.
 - Both clarifiers working provides 7.98 hrs of HRT at design average flow and 2.48 hrs of HRT at peak hourly flow.
 - The surface overflow rate is 539.8 gpd/ft² for 1 clarifier or 269.9 gpd/ft² for 2 clarifiers at design average flow of 0.1085 MGD.
 - Surface overflow rate at peak hourly flow for 1 clarifier is 1,741.3 gpd/ft² at or 870.65 gpd/ft² for 2 clarifiers.
 - 2 clarifiers meet the surface overflow rate of 1,200 gpd/ft² required for activated sludge system per 10 CSR 20-8.160(3)(B)3.
 - The weir loading rate is 2,302gpd/ft for 1 clarifier or 1,151 gpd/ft for 2 clarifiers at design average flow of 0.1085 MGD.
 - Weir overflow rate is 7,427 gpd/ft with 1 clarifier at peak hourly flow or 3,713 gpd/ft for 2 clarifiers.
 - 10,937 gpd/ft is less than the maximum loading rate requirement of 20,000 gpd/ft in 10 CSR 20-8.160(3)(C)2.
 - The solids loading rate is 1.16 lbs/day/ft² with 1 clarifier or 0.58 lbs/day/ft² with 2 clarifiers at design average flow.

- The solids loading rate is 3.76 lbs/day/ft² with 1 clarifier or 1.88 lbs/day/ft² with 2 clarifiers at peak hourly flow.
 - The solids loading rate of 1.88 lbs/day/ft² meets the requirements of 10 CSR 20-8.160(3)(B)3 of less than 40 lbs/day/ft² at peak flow.
 - Flows go from the secondary clarifiers to the RAS/WAS lift station or to the gravity sand filters.
- Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms.
 - Closed Vessel Ultraviolet (UV) – A closed vessel, gravity flow, low pressure, high intensity, UV disinfection system capable of treating a peak flow of 0.388 MGD while delivering a minimum UV intensity of 30 mJ/cm² with an expected ultraviolet transmissivity of 65% or greater.
 - The UV system consists of 1 reactor with 2 banks per reactor, with each bank having 3 modules and 4 lamps per module. Thus providing 12 lamps per bank and a total of 24 lamps.
 - Each bank is capable of treating a peak flow of 0.194 MGD.
 - The disinfected effluent will flow by gravity through to Outfall No. 001.

5. OPERATING PERMIT

Operating permit MO-0049492 will require a modification to reflect the construction activities. The modified operating permit for the Alton WWTF will be public noticed to remove the total residual chlorine limits and provide an updated facility description, as the facility is converting to UV disinfection. 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.

With the construction permit application, an operating permit modification was submitted for public notice to reflect the changes in the operating permit based on construction activities. The City of Alton's operating permit application for a renewal will be due before the construction permit is expired. The modification action does not fulfill the renewal application obligation. A renewal application must be filed before January 1, 2025, regardless of the status of these construction activities. If you have questions on completing the renewal application, please contact the NPDES permitting section at 573-522-4502 or cleanwaterpermits@dnr.mo.gov.

V. NOTICE OF RIGHT TO APPEAL

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

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

Leasue Meyers, EI
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APPENDIX A- PROCESS DIAGRAM

