STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

CONSTRUCTION PERMIT

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

Rustic Trails RV Park
18376 Campground Rd
Phillipsburg, MO 65722

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.

November 2, 2020
Effective Date

Edward B. Galbraith

Edward B. Galbraith, Director, Division of Environmental Quality

November 1, 2022
Expiration Date

Chris Wieberg

Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The proposed project includes installation of a two Norweco Singulair Bio-Kinetic WWT System Model 960 extended aeration package plants each capable of treating a design average flow of 1,500 gpd each for a total design flow of 3,000 gpd. The effluent from the package plant will flow to a subsurface drip irrigation system.

Each package plant will include a pretreatment chamber that will provide at least 18 hours of retention. Wastewater will flow by gravity through a transfer tee to the aeration chamber providing at least 24 hours of retention time. Aeration will be provided with mechanical aerators. Wastewater from the aeration chamber will flow by gravity to the Bio-Kinetic System in the clarification chamber. The Bio-Kinetic System installed in the clarification chamber provides non-mechanical flow equalization ports that control flow through all plant processes including pretreatment, aeration, and clarification, and includes baffled and unbaffled settling zones. Sludge from the clarification chamber is returned to the aeration chamber.

Each Norweco unit will discharge by gravity to one of two pump tanks (No. 1 and No. 2). A third tank will contain the pumps for the subsurface drip system. All three tanks are connected near the top and bottom of the tanks for equalization. Return lines from the subsurface drip irrigation system discharge into tank No. 2. Pumps in tank No. 3 will pump effluent to the irrigation area.

The soils at this site are rated for 0.2 gpd/sf and were determined to be acceptable for this system. A geoflow subsurface drip dispersal system will dose a total area of 0.34 acres.

The existing lagoon will be closed out when the contents of the lagoon have been entirely pumped out and in accordance with a closure plan approved by the Southwest Regonal Office and any requirements of the Compliance Agreement.

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

II. COST ANALYSIS FOR COMPLIANCE

Pursuant to Section 644.145, RSMo, when issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or publicly owned treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or [publicly owned] treatment works, the Department of Natural Resources shall make a "finding of affordability" on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this

chapter and the Federal Water Pollution Control Act. This process is completed through a cost analysis for compliance. Permits that do not include new requirements may be deemed affordable.

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

III. CONSTRUCTION PERMIT CONDITIONS

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

1. This construction permit does not authorize discharge.

2. All construction shall be consistent with plans and specifications signed and sealed by Ralph Tate with Tate Engineering 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 Southwest Regional Office per 10 CSR 20-7.015(9)(G).

5. The completed project shall be field tested to verify actual pumped volume of each dose. The timer controls shall be set to ensure a dosing rate not to exceed the allowable rate of 0.2 gallons per square foot per day.

6. The wastewater treatment facility shall be located at least fifty feet (50') from any dwelling or establishment per 10 CSR 20-8.140(C)(2)

7. The wastewater treatment facility shall be located above the twenty-five (25)-year flood level.

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

9. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of 1 acre or more to obtain a Missouri state operating permit to

discharge stormwater. The permit requires best management practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the Department's ePermitting system available online at dnr.mo.gov/env/wpp/epermit/help.htm. See dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm for more information.

10. A United States (U.S.) Army Corps of Engineers (COE) permit (404) and a Water Quality Certification (401) issued by the Department or permit waiver may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied. If construction activity will disturb any land below the ordinary high water mark of jurisdictional waters of the U.S. then a 404/401 will be required. Since the COE makes determinations on what is jurisdictional, you must contact the COE to determine permitting requirements. You may call the Department's Water Protection Program at 573-751-1300 for more information. See dnr.mo.gov/env/wpp/401/ for more information.

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

10 CSR 20-8.140 Wastewater Treatment Facilities

- Flood protection shall apply to new construction and to existing facilities undergoing major modification. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the one hundred- (100-) year flood elevation. 10 CSR 20-8.140 (2) (B)

- Unless another distance is determined by the Missouri Geological Survey or by the department's Public Drinking Water Branch, the minimum distance between wastewater treatment facilities and all potable water sources shall be at least three hundred feet (300'). 10 CSR 20-8.140 (2) (C) 1.

- No treatment unit with a capacity of twenty-two thousand five hundred gallons per day (22,500 gpd) or less shall be located closer than the minimum distance of 50' to a neighboring residence. See 10 CSR 20-2.010(68) for the definition of a residence. 10 CSR 20-8.140 (2) (C) 2

- Facilities shall be readily accessible by authorized personnel from a public right–of-way at all times. 10 CSR 20-8.140 (2) (D)

- 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)

- 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)

10 CSR 20-8.180 Biological Treatment.

- A septic tank must have a minimum capacity of at least one thousand (1,000) gallons. 10 CSR 20-8.180 (2) (A)

- The septic tank shall be baffled. 10 CSR 20-8.180 (2) (B)

10 CSR 20-8.200 Wastewater Treatment Lagoons and Wastewater Irrigation Alternatives.

- Subsurface systems shall—
  - Exclude unstabilized fill and soils that have been highly compacted and/or disturbed, such as old road beds, foundations, or similar things; 10 CSR 20-8.200 (7) (A) 1. A.
  - Provide adequate surface drainage where slopes are less than two percent (2%);10 CSR 20-8.200 (7) (A) 1. B.
  - Provide surface and subsurface water diversion where necessary, such as a curtain or perimeter drain; 10 CSR 20-8.200 (7) (A) 1. C. and
  - Have a ten foot (10') buffer from the property line. 10 CSR 20-8.200 (7) (A) 1. D.

- The vertical separation between the bottom of the drip lines and/or the trench and a limiting layer, including but not limited to, bedrock; restrictive horizon; or seasonal high water table, shall be no less than:
  - Twenty-four inches (24"); 10 CSR 20-8.200 (7) (A) 2. A. or
  - Twelve inches (12") for systems dispersing secondary or higher quality effluent; 10 CSR 20-8.200 (7) (A) 2. B. or
  - Forty-eight inches (48") where karst features are present unless the site can be reclassified. 10 CSR 20-8.200 (7) (A) 2. C.

- Subsurface systems shall be, at a minimum, preceded by preliminary treatment. 10 CSR 20-8.200 (7) (B)

- Loading rates shall not exceed the values assigned by the site and soil evaluation. 10 CSR 20-8.200 (7) (C)

- The location and size of the drains and buffers must be factored into the total area required for the drip dispersal system. 10 CSR 20-8.200 (9) (A) 1.

- The drip dispersal lines shall be placed at a minimum depth of six inches (6") below the surface. 10 CSR 20-8.200 (9) (B) 1.

- Emitters and drip dispersal lines shall be placed at a minimum on a two foot (2') spacing to achieve even distribution of the wastewater and maximum utilization of the soil. 10 CSR 20-8.200 (9) (B) 2.

12. Upon completion of construction:

A. Rustic Trails RV Park 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 enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N) and request that the General permit for land application of domestic wastewater, MO-G823 be issued.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The applicant identified the need to address noncompliance issues with the existing lagoon system, as noted in a Letter of Warning and Compliance Agreement issued on February 6, 2020. The proposed project will treat a design flow of 3,000 gallons per day from an existing RV Park with 56 RV sites (20 on full sewer, and 36 with no hookups).

2. FACILITY DESCRIPTION

The existing facility is a 2-cell lagoon. All wastewater flow will be diverted to the proposed new Norweco Singulair Bio-Kinetic treatment system and then to a new subsurface drip irrigation system. The wastewater in the existing lagoon will be gradually pumped to the new system. The existing lagoon will be closed out when the contents of the lagoon have been entirely pumped out and in accordance with any requirements of the Compliance Agreement.

The Rustic Trails RV Park WWTF is located at 18376 Campground Road, Phillipsburg, in Laclede County, Missouri. The facility has a design average flow of 3,000 gpd and serves an organic population equivalent of approximately 150 people.

3. COMPLIANCE PARAMETERS

The proposed project is required to meet the requirements of MOG823168 with an expiration date of August 24, 2022.

4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

Construction will cover the following items:

- Components are designed for a design flow 3,000 gpd and a population equivalent of 150 based on organic loading to the system. The proposed design flow of 3,000 gpd is based on monthly average water usage data at the facility over approximately the last two years. Reported monthly average values are mostly below 3,000 gpd, however there is one month with 3,040 gpd, and a few months with higher values due to water leaks. The estimated design flow based on 19 CSR 20-3.060(E) Table 2A is approximately 6,000 gpd. The Letter of Warning and Compliance Agreement note that design flow is estimated at 4,500 gpd. Based on this information, the facility is under the jurisdiction of the Department of Natural Resources, despite the design flow for construction being 3,000 gpd.

- Extended Aeration Package Plant – Installation of two Norweco Singulair Bio-Kinetic WWT System Model 960 extended aeration package plants each capable of treating a design average flow of 1500 gpd each. The following components are integrated into each 1,500 gpd pre-cast concrete package plant:
  - Flow equalization and Pretreatment Chamber – A pretreatment chamber will provide at least 18 hours of retention. Wastewater will flow by gravity through a transfer tee to the aeration chamber.
  - Aeration Chambers – One aeration chamber providing at least 24 hours of retention time. Aeration by means of two mechanical aerators with fresh air supplied through a vent assembly cast into the access cover above the aerator. The aeration chambers are designed to provide a minimum of 80 cubic feet of tank capacity per pound of applied BOD. Wastewater from the aeration chamber will flow by gravity to the Bio-Kinetic System in the clarifier.
  - Clarification Chamber – The final clarifier will provide a detention time of 6 hours. Three Bio-Kinetic Systems shall be installed in the mounting castings above the clarification chamber, each providing non-mechanical flow equalization ports that control flow through all plant processes including pretreatment, aeration, and clarification. The Bio-Kinetic Systems consist of a design flow and peak flow filter, baffled perimeter settling zone, flow distribution deck, level indicator, unbaffled perimeter settling zone, solids contact zone, vertical inlet zone, compartmented settling zone consisting of 42 baffled chamber plates, effluent stilling well, final discharge zone, adjustable outlet weir, and outlet zone.
  - Two Bio-Static Sludge returns will be provided to move settled sludge from the bottom of the clarification chamber to the aeration chamber as return activated sludge. Each sludge return is a passive hydraulic device with no moving parts. Aeration chamber hydraulic currents enter the sludge returns and transfer solids from the clarification chamber back to the aeration chamber for additional treatment.

- Each Norweco unit will discharge by gravity to one of two 2,000 gallon pump tanks (No. 1 and No. 2). A third tank will contain the pumps for the subsurface drip system. All three tanks are connected near the top and bottom of the tanks for equalization. Return lines from the subsurface drip irrigation system discharge into No. 2. Two submersible pumps in tank No. 3 will alternate operation and are each capable of 13.5 gpm at 98.2 ft TDH. The control panel will include a high water alarm and timer controls for the pump.

- Subsurface Soil Dispersal System – The soils at this site are rated for 0.2 gpd/sf. Soil morphology review was conducted during the facility plan application review and on site soils were determined to be acceptable for this system. The soil investigation was completed by David Fulton on February 28, 2020 with a recommended application rate of 0.2 gpd/sf.
    - Soils Report. In the soils investigation, there were 2 pits dug over the proposed site.
        - The report states that trench depth should be 12 inches and that an interceptor curtain drain is needed upslope from the absorption system at a depth of 30 inches to remove excess water during wet periods. A curtain drain is included in the design installed upslope of the drip irrigation area and daylighting to surface downslope of the drip field.
        - There is a reserve soil treatment area available of 0.5 acres.
    - The Missouri Geological Survey conducted a geohydrologic evaluation on April 29, 2020 and determined that based on the geologic and hydrologic characteristics observed, the site's potential for contamination of the groundwater by subsurface soil absorption of wastewater is minimal.
    - Drip – The facility has selected the Geoflow subsurface drip dispersal system. The system will dose 4 zones at 0.2 gpd/sq. ft, which provides 12 dosings per day. Each zone is 3,750 sf, for a total of 15,000 sf (0.34 acres). The drip distributing valve will be a one-inch solenoid value, Geoflow's automatic water control model SVLVB-100. The drip field area contains approximately 7,500 linear feet of Geoflow tubing fitted with emitters every 2 ft capable of 0.53 gph (8.28 gpm) and spaced with 2 feet between lines. Air/vacuum breakers are installed to prevent back siphoning or backpressure. A return line returns flow to pump tank No 2.

5. OPERATING PERMIT

After completion of construction project submit: statement of work completed and as-builts if the project was not constructed in accordance with previously submitted plans and specifications. Missouri State Operating Permit, General Permit MO-G823168, will be issued after receipt of the above documents.

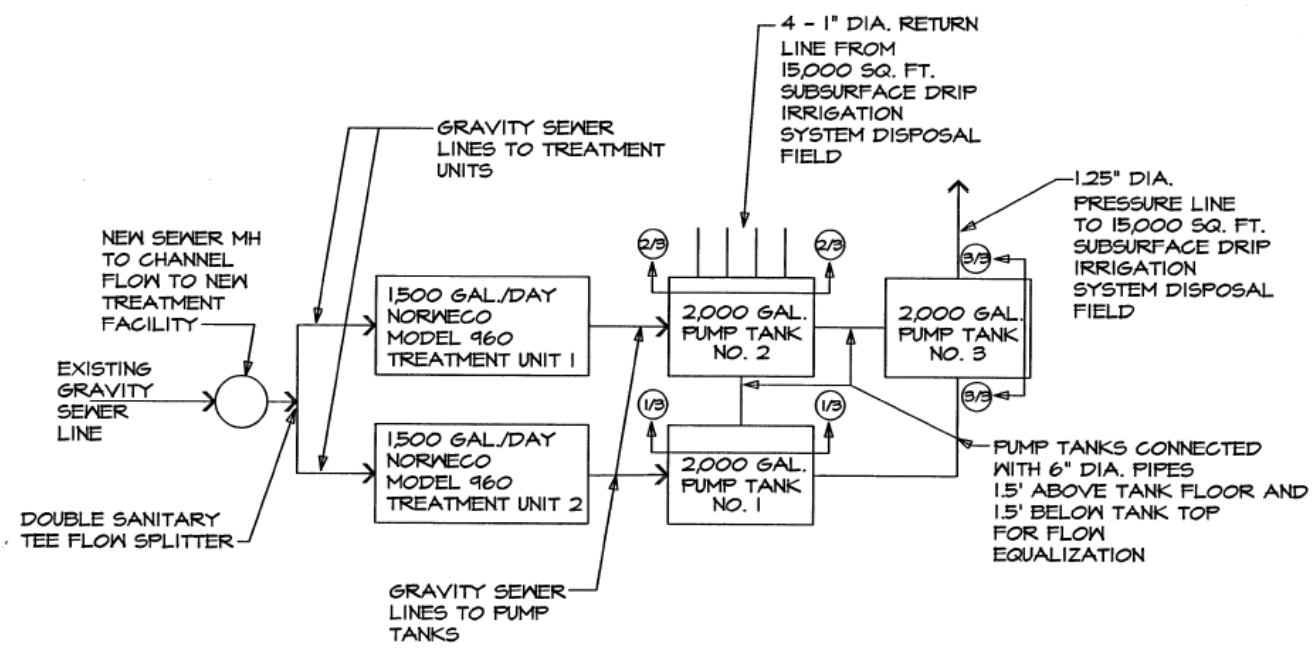
V. NOTICE OF RIGHT TO APPEAL

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

Cailie Carlile, P.E.
Engineering Section
cailie.carlile@dnr.mo.gov

APPENDIX Process Flow Diagram



TREATMENT FACILITY SCHEMATIC FLOW CHART

NOT TO SCALE