STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

CONSTRUCTION PERMIT

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

BENTON'S HILL VILLAS HOMEOWNERS ASSOCIATION, LLC
Benton Hill Villas Wastewater Treatment Facility
1298 County Road 206
Cape Girardeau, MO 63701

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 28, 2025
Effective Date

April 27, 2027
Expiration Date

John Hoke, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The proposed project involves the installation of a new Amphidrome wastewater treatment system, which is a submerged attached growth bioreactor that operates in sequencing batches. The construction will include an anoxic tank, Amphidrome reactor, clearwell, ultraviolet (UV) disinfection system, alkalinity feed line, a magnetic flow meter, and emergency generator with automatic transfer switch. It will also provide a building to house the UV disinfection system, flow meter, sampling port, blowers and blower controls, and the alkalinity feed system. This building will include a ventilation system to provide continuous ventilation. The treatment system will have a design average flow of 11,100 gallons per day (gpd).

This is a **DEMONSTRATION** project and additional monitoring requirements are included in the operating permit in accordance with the Approval Process for Innovative Technology Factsheet and 10 CSR 20-6.010(5).

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 publicly 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 Christopher L. Koehler, P.E. with Koehler Engineering and Land Surveying, Inc. and as described in this permit.

3. The department must be contacted in writing prior to making any changes to the plans and specifications that would directly or indirectly have an impact on the capacity, flow, system layout, or reliability of the proposed wastewater treatment facilities or any design parameter that is addressed by 10 CSR 20-8, in accordance with 10 CSR 20-8.110(11).

4. State and federal law does not permit bypassing of raw wastewater, therefore steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the department's Southeast Regional Office per 10 CSR 20-7.015(9)(G).

5. The wastewater treatment facility shall be located at least fifty feet from any dwelling or establishment.

6. 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.

7. 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.

8. 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.
- No treatment unit with a capacity of 22,500 gpd or less shall be located closer than the minimum distance of 200 feet to a neighboring residence and 50 feet to property line for lagoons; 200 feet to a neighboring residence for open recirculating media filters following primary treatment; and 50 feet to a neighboring residence for all other discharging facilities. 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)
- 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.
- 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)
- 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:
        - 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. 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.
- The materials utilized for storage, piping, valves, pumping, metering, and splash guards, etc., for chemical handling, shall be specially selected considering the physical and chemical characteristics of each hazardous or corrosive chemical. 10 CSR 20-8.140(9)(A)1.

- Secondary containment storage areas contain the stored volume of chemical until it can be safely transferred to alternate storage or released to the wastewater treatment plant at controlled rates that will not damage the facilities, inhibit the treatment processes, or contribute to stream pollution. Secondary containment shall be designed as follows:
    - A minimum volume of 110 percent of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when protected from precipitation; 10 CSR 20-8.140(9)(A)2.B.
    - Walls and floors of the secondary containment structure constructed of suitable material that is compatible with the specifications of the product being stored. 10 CSR 20-8.140(9)(A)2.C.
- All pumps or feeders for hazardous or corrosive chemicals shall have guards that will effectively prevent spray of chemicals into space occupied by facility personnel. 10 CSR 20-8.140(9)(A)3.
- All piping containing or transporting corrosive or hazardous chemicals shall be identified with labels every 10 feet and with at least 2 labels in each room, closet, or pipe chase. 10 CSR 20-8.140(9)(A)4.A.
- All connections (flanged or other type), except those adjacent to storage or feeder areas, shall have guards that will direct any chemical leakage away from space occupied by facility personnel. 10 CSR 20-8.140(9)(A)4.B.
- The following shall be provided to fulfill the particular needs of each chemical housing facility:
    - Provide storage for a minimum of 30 days' supply, unless local suppliers and conditions indicate that such storage can be reduced without limiting the supply; 10 CSR 20-8.140(9(B)1.
    - Equip doors with panic hardware. To prevent unauthorized access, doors lock but do not need a key to exit the locked room using the panic hardware; 10 CSR 20-8.140(9)(B)3.
    - Provide chemical storage areas with drains, sumps, finished water plumbing, and the hose bibs and hoses necessary to clean up spills and to wash equipment; 10 CSR 20-8.140(9)(B)4.
    - Construct chemical storage area floors and walls of material that is suitable to the chemicals being stored and that is capable of being cleaned; 10 CSR 20-8.140(9)(B)5.
    - Install floor surfaces to be smooth, chemical resistant, slip resistant, and well drained with 3 inches per 10 feet minimum slope; 10 CSR 20-8.140(9)(B)6.
    - Provide adequate lighting; 10 CSR 20-8.140(9)(B)7.
    - Comply with the NEC recommendation for lighting and electrical equipment based on the chemicals stored. 10 CSR 20-8.140(9)(B)8.
    - Store chemical containers in a cool, dry, and well-ventilated area; 10 CSR 20-8.140(9)(B)9.
    - Design vents from feeders, storage facilities, and equipment exhaust to discharge to the outside atmosphere above grade and remote from air intakes; 10 CSR 20-8.140(9)(B)10.
    - Locate storage area for chemical containers out of direct sunlight; 10 CSR 20-8.140(9)(B)11.

  - Maintain storage temperatures in accordance with relevant Material Safety Data Sheets (MSDS). 10 CSR 20-8.140(9)(B)12.
  - Control humidity as necessary when storing dry chemicals; 10 CSR 20-8.140(9)(B)13.
  - Design the storage area with designated areas for “full” and “empty” chemical containers; 10 CSR 20-8.140(9)(B)14.
- The following shall be provided, where applicable, for the design of chemical handling:
  - Make provisions for measuring quantities of chemicals used for treatment or to prepare feed solutions over the range of design application rates; 10 CSR 20-8.140(9)(C)1.
  - Select storage tanks, piping, and equipment for liquid chemicals specific to the chemicals; 10 CSR 20-8.140(9)(C)2.
  - Install all liquid chemical mixing and feed installations on corrosion resistant pedestals; 10 CSR 20-8.140(9)(C)3.
  - Provide sufficient capacity of solution storage or day tanks feeding directly for 24- hour operation at design average flow; 10 CSR 20-8.140(9)(C)4.
  - Provide a minimum of two chemical feeders for continuous operability. Provide a standby unit or combination of units of sufficient capacity to replace the largest unit out-of-service; 10 CSR 20-8.140(9)(C)5.
  - Chemical feeders shall—
    - Be designed with chemical feed equipment to meet the maximum dosage requirements for the design average flow conditions; 10 CSR 20-8.140(9)(C)6.A.
    - Be able to supply, at all times, the necessary amounts of chemicals at an accurate rate throughout the range of feed; 10 CSR 20-8.140(9)(C)6.B.
    - Provide proportioning of chemical feed to the rate of flow where the flow rate is not constant; 10 CSR 20-8.140(9)(C)6.C.
    - Be designed to be readily accessible for servicing, repair, and observation; 10 CSR 20-8.140(9)(C)6.D.
    - Protect the entire feeder system against freezing; 10 CSR 20-8.140(9)(C)6.E.
    - Be located adjacent to points of application to minimize length of feed lines; 10 CSR 20-8.140(9)(C)6.F.
    - Provide for both automatic and manual operation for chemical feed control systems; 10 CSR 20-8.140(9)(C)6.G.
    - Provide screens and valves on the chemical feed pump suction lines; 10 CSR 20-8.140(9)(C)6.I.
- The following chemical safety items shall be provided in addition to the safety provisions in section (8) of this rule:
  - Appropriate personal protective equipment (PPE). 10 CSR 20-8.140(9)(D)1.
  - Eye wash fountains and safety showers utilizing potable water shall be provided in the laboratory and on each level or work location involving hazardous or corrosive chemical storage, mixing (or slaking), pumping, metering, or transportation unloading. The design of eye wash fountains and safety showers shall include the following:

        - Eye wash fountains with water of moderate temperature, 50 degrees to 90 degrees Fahrenheit (°F), suitable to provide 15-30 minutes of continuous irrigation of the eyes; 10 CSR 20-8.140(9) (D)2.A.
        - Emergency showers capable of discharging 20 gallons per minute (gpm) of water of moderate temperature, 50 degrees to 90 degrees °F, and at pressures of 30 to 50 pounds per square inch (psi); 10 CSR 20-8.140(9)(D)2.B.
        - Eye wash fountains and emergency showers located no more than 25 feet from points of hazardous chemical exposure; CSR 20-8.140 (9)(D)2.C.
        - Eye wash fountains and showers that are to be fully operable during all weather conditions; 10 CSR 20-8.140(9)(D)2.D.
    - Warning signs requiring use of goggles shall be located near chemical stations, pumps, and other points of frequent hazard. 10 CSR 20-8.140(9)(D)3.
- 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)
- A septic tank must have a minimum capacity of at least 1,000 gallons. 10 CSR 20-8.180(2)(A)
- The septic tank shall be baffled. 10 CSR 20-8.180(2)(B)
- The project specifies the installation of an Enaqua M-3 UV disinfection system to provide disinfection prior to discharge. Department regulations pertaining to UV disinfection are split into “open channel” and “closed vessel” system classifications, and non-contact UV systems do not technically fall under either of these terms. Regulations pertaining to both open channel and closed vessel UV disinfection systems are therefore included below. Though addressing either open channel or closed vessel systems, these requirements below are determined to be applicable for the non-contact UV disinfections system.
- The UV dosage shall be based on the design peak hourly flow, maximum rate of pumpage, or peak batch flow. 10 CSR 20-8.190(5)(A)1.
- The UV system shall deliver the target dosage based on equipment derating factors and, if needed, have the UV equipment manufacturer verify that the scale up or scale down factor utilized in the design is appropriate for the specific application under consideration. 10 CSR 20-8.190(5)(A)3.
- The UV system shall deliver a minimum UV dosage of 30,000 microwatt seconds per centimeters squared ($\mu W \cdot s/cm^2$). 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.

9. Upon completion of construction:

   A. The BENTON'S HILL VILLAS HOMEOWNERS ASSOCIATION, LLC will become the continuing authority for operation and maintenance of these facilities;

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

   C. Submit the 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) and request the operating permit public noticed from October 24, 2024, to November 25, 2024, be issued. The operating permit fee has been paid.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The purpose of the construction is to receive and treat domestic wastewater from the new Benton Hill Villas subdivision in Cape Girardeau County.

2. FACILITY DESCRIPTION

The new collection system and discharging wastewater treatment system is being constructed to serve 12 lots that are part of the proposed new Benton Hill Villas subdivision near County Road 206 in Cape Girardeau County. Each lot will include either a quadplex or duplex once constructed. The collection system will consist of gravity sewer mains to convey raw sewage from the lots to the treatment plant, which is located on the Northwest side of the property. The treatment plant will be the Amphidrome system, which the department considers an innovative technology. From the collection system, raw sewage first enters the anoxic tank, after which it flows to the Amphidrome reactor, and then the clearwell. In the clearwell, a portion of the flows are recycled by the return pumps, while the rest is pumped by the effluent pump to the UV disinfection system. A chemical feed system will supply a sodium bicarbonate solution to the Amphidrome reactor to ensure there is sufficient alkalinity for nitrification, and blowers will supply air to the reactor.

The Benton Hill Villas Wastewater Treatment Facility is located at 1298 County Road 206, Cape Girardeau, in Cape Girardeau County, Missouri. The facility has a design average flow of 11,100 gpd and serves a hydraulic population equivalent of approximately 111 people.

3. COMPLIANCE PARAMETERS

The proposed project is required to meet final effluent limits as established in Operating Permit MO-0140431. Because this is a demonstration project, for the first year of operation following construction additional monitoring will be required before and after the Amphidrome process.

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

Parameter	Units	Monthly average limit
Biochemical Oxygen Demand$_5$	mg/L	10
Total Suspended Solids	mg/L	10
E. coli	#/100mL	126
Ammonia as N-1st Quarter	mg/L	2.1
Ammonia as N-2nd Quarter	mg/L	0.6
Ammonia as N-3rd Quarter	mg/L	0.6
Ammonia as N-4th Quarter	mg/L	2.1
Total Phosphorus	mg/L	*
Total Kjeldahl Nitrogen	mg/L	*
Nitrite + Nitrate	mg/L	*
Total Nitrogen	mg/L	*
pH	SU	6.5-9.0

The following parameters shall also be monitored at the influent and effluent for the first year of operation to assess performance of the innovative technology:

Parameter	Units	Measurement Frequency
Biochemical Oxygen Demand$_5$	mg/L	twice/month
Total Suspended Solids	mg/L	twice/month
Ammonia as N	mg/L	twice/month
Total Phosphorus	mg/L	once/month
Total Kjeldahl Nitrogen	mg/L	once/month
Nitrite + Nitrate	mg/L	once/month

4. ANTIDEGRADATION

The department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated November 2022, to evaluate the proposed new discharge. See **APPENDIX – ANTIDEGRADATION**.

5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

Construction will cover the following items:

- Construction of approximately 614 linear feet (ft) of 8-inch PVC pipe with 5 manholes

- Anoxic/Flow Equalization Tank – a 21.5 ft by 11.5 ft by 9.75 ft tank, with an operating depth of 5.75 ft and a capacity of 8,600 gallons when operating in the forward flow mode, and operating depth of 6.75 ft and a capacity of 10,100 gallons when operating in the reverse flow mode.
    - Influent wastewater enters the treatment system through the anoxic/equalization tank with an equalization zone, settling zone, and sludge storage zone. This unit serves as both a method of primary treatment and as flow equalization to handle variability and peak flows.
    - In addition to the influent wastewater from the collection system, the tank will receive return flows and backwash from the Amphidrome reactor by 6-inch line.
    - From the anoxic tank, flows will go to the Amphidrome reactor through a 6-inch line.
    - 8,600 gallon capacity provides approximately 18 hours of detention time at a design average flow of 11,100 gpd.

- Amphidrome Reactor – an 8 ft diameter 15.33 ft deep reactor, with an operating depth of about 10.1 ft.
    - The Amphidrome reactor is a submerged attached growth reactor with operation alternating between forward flow and reverse flow modes. Reverse flow is accomplished by pumping from the clearwell through the reactor and to the anoxic tank.
    - A layer of silica sand media, 6 ft deep in the Amphidrome reactor shall be placed on top of the gravel support layers.
        - Total media required for BOD and nitrogen removal is 260 ft^3, which is approximately 5.17 ft of media.
            - BOD removal is 160 ft^3 of media.
            - Nitrogen removal is 100 ft^3 of media.
        - The system is designed for 0.15 gpm/ft^2 of media at design average flow and 0.65 gpm/ft^2 of media at peak flow.
        - The sand shall be Tetra #5 media, well-rounded, not flat or angular, with a maximum uniformity coefficient of ≤ 1.40.

- The 6-inch influent line will enter at the top of the operating level.
- The 8-inch return/backwash line will be approximately 12.25 ft from the bottom of the reactor to take flows back to the anoxic tank when operating in the reverse flow mode.
- The Amphidrome Reactor will have air lateral lines extending across the filter floor with a reactor underdrain system. For aeration, a minimum of four air discharge ports shall be provided for each square foot of filter bottom area.
- Alkalinity will be dosed in the Amphidrome reactor.

- Clearwell – a 12 ft by 10 ft by 6.25 ft deep tank for working volume of approximately 5,600 gallons that will house the backwash/return flow pumps and the effluent pumps.
  - 5,600-gallon capacity provides approximately 12 hours of detention time at a design average flow of 11,100 gpd.
  - Return/Backwash Pumps – two return/backwash pumps transfer wastewater from the clear well to the anoxic tank while operating in the reverse flow mode.
    - The pumps will be submersible, centrifugal and shall be driven by a single phase, 60 hertz motor.
    - Each pump capable of operating at about 162.9 gpm at 23.6 ft of TDH.
  - Effluent Pumps – two effluent pumps transfer wastewater from the clearwell to the UV disinfection system.
    - The pumps will be submersible, centrifugal and shall be driven by a single phase, 60 hertz motor.
    - Each pump capable of operating at about 33.2 gpm at 36.8 ft of TDH.

- 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 100,800 gpd while delivering a minimum UV intensity of 30 mJ/cm^2 with an expected ultraviolet transmissivity of 65 percent or greater. The enclosed UV system consists of 8 lamps per reactor. The disinfected effluent will flow by gravity through flow measurement equipment and to Outfall No. 001.

- Flow Measurement – Installation of accurate flow measurement devices will give the treatment facility a means of improved data analysis.
  - Electromagnetic Meter – An Enviromag 2000 Electromagnetic Flow Meter with rated flow range between 2.33 and 93.36 gpm or equivalent shall measure the treated and disinfected wastewater following the UV disinfection system and prior to discharge.

- Housed Facility – The UV disinfection system, blowers, electromagnetic meter, and control panel shall be housed in a 17 ft by 21 ft building with 10 ft tall ceilings. Ventilation will provide at least 757 cfm which will afford approximately 12.7 air changes per hour when the fan is switched ON.
    - One alkalinity storage tank to be constructed of UV resistant polyethylene with a total volume of 50 gallons. Tank to be situated on spill containment pallet rated for 62 gallons.
        - Estimated required dosing of soda ash is 79 mg/L. With a design flow of 11,100 gpd and assuming an influent wastewater alkalinity of 150 mg/L as $CaCO_3$, this would equate to approximately 3 gpd of 25 percent soda ash solution. The 50-gallon storage tank therefore provides about 16 days of soda ash solution supply. In order to provide at least 30 days supply of soda ash in accordance with 10 CSR 20-8.140(9)(B)1., bags of dry soda ash will be stored in the housed facility and will be readily available to be mixed into solution as needed.
        - Two chemical feed pumps to supply alkalinity to the Amphidrome reactor.
            - The pumps shall be Stenner 45 MJL1, 120 volt, single phase.
            - Each pump capable of dosing between 0.2 gpd and 3.0 gpd.
    - One mixer to keep alkalinity solution in suspension. Mixer will be LMI 10590 and be 60 hertz.

- Emergency Power – A 100 kW natural gas emergency standby generator and automatic transfer switch will be provided to operate the treatment facility in event of power failure.

6. OPERATING PERMIT

The new Benton Hill Villas WWTF, MO-0140431, was successfully public noticed from October 24, 2024, to November 25, 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 be issued. The operating permit fee has been paid.

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

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APPENDICES

- **Summary of Design and Process Flow Diagram**

RECEIVED
OCT 31 2023
Water Protection Program

ENGINEERING REPORT FOR BENTON HILL VILLAS DOMESTIC WASTEWATER TREATMENT FACILITY

OWNER:

Wayne Boehme
1298 County Road 206
Cape Girardeau, MO 63701
573-270-3100

CONTINUING AUTHORITY:

Benton's Hill Villas Homeowners Association, LLC
2845 Professional Ct
Cape Girardeau, MO 63703
MANDREWS@LAYTONSOUTHARDLAW.COM

PREPARED BY:

Koehler Engineering & Land Surveying, Inc.

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Cape Girardeau, MO 63701
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573-335-3026

OCTOBER 13, 2023

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REPORT:

Benton Hill Villas Domestic Wastewater Treatment Facility Engineering Report

INTRODUCTION & DEFINITION OF PROBLEM

Benton Hill Villas Subdivision is a new housing development to be constructed off County Road 206 in Cape Girardeau County, MO. The proposed development will be subdivided into 12 lots, with a duplex or quadplex on each lot. One of the lots shall be used for the wastewater treatment plant. There are no existing systems close enough to provide wastewater collection or treatment services to the proposed development. Therefore, in accordance with Missouri Department of Natural Resources guidelines, the development will require an approved plan for the collection and treatment of wastewater generated before the treated water is discharged. Koehler Engineering and Land Surveying, Inc. has been contracted to develop an engineering report and facility plan for the collection of wastewater and operation of a wastewater treatment facility (WWTF) in accordance with these guidelines. There are currently no future phases or expansions planned for the development.

In conjunction with the site development, a new well will be dug on-site to provide water to the homes. The proposed location for this well is at the northeast corner of the site, approximately 520 feet from the wastewater treatment facility.

HYDRAULIC CAPACITY AND ORGANIC WASTE LOAD

According to regulation 10 CSR 20-8.110(4)(C), the new wastewater collection and treatment system for this development must be designed based on the design average flow and design peak flow through the system as described in 10 CSR 20-8.110(3)(B)1 and the organic waste load through the system as described in 10 CSR 20-8.110(3)(B)2.

Hydraulic Capacity

The property on which the proposed residential development is to be built is currently being developed and has been used as residential property previously. The client wishes the land to have 7 duplexes and 4 quadplexes located on individual lots once development is completed. It is assumed that within 20 years of development completion the residential area will have reached its maximum capacity. According to Table 1-2 in Section 1.1.2 of the Missouri Department of Natural Resources (MDNR) Wastewater Design

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Guides, residences can be estimated to have a Capita/Unit value of 3.7. Based on this guideline and the developer's desired residential layout, the population on a twenty-year planning period can be projected as follows:

$$\textbf{Population} = 3.7\frac{\textbf{capita}}{\textbf{unit}} \times \textbf{30 units} = \textbf{111.0 people}$$

Hydraulic Capacity

The residential development will have 12 lots, with a duplex or quadplex on each of 11 lots. The remaining lot is for the WWTF. According to the Missouri Department of Natural Resources Wastewater Design Guides 1.1.2 Table 1-1, the quantity of domestic sewage flow from a single-family dwelling is estimated to be 100 gallons per day per capita. Residences have a Capita/Unit value of 3.7. Based on these guidelines, the design average flow rate is estimated as shown below:

$$\text{Q Design Avg} = \text{design avg flow} = 100\frac{\text{gallons}}{\text{person} \times \text{day}} * 3.7\frac{\text{capita}}{\text{unit}} * 30 \text{ units} = 11{,}100 \text{ gpd}$$

$$\textbf{Design Average Flow} = \textbf{11,100 gpd}$$

The ratio of peak hourly flow to design average flow (peaking factor) is as follows:

$\text{Peaking factor} = \frac{\text{Q Peak Hourly}}{\text{Q Design Avg}} = \frac{18+\sqrt{P}}{4+\sqrt{P}}$ (Equation 110-1 from 10 CSR 20-8.030(3)(B)B; note P=population in thousands for this equation).

Therefore, the design peak hourly flow is calculated as follows:

$$\text{Population} = 111.0 \text{ people}$$

$$\text{P} = \text{Population in Thousands} = 0.111 \text{ people in thousands}$$

$$\text{Q Peak Hourly} = \left(\frac{18+\sqrt{\text{P}}}{4+\sqrt{\text{P}}}\right) \times \text{Q Design Avg} = \left(\frac{18+\sqrt{0.111}}{4+\sqrt{0.111}}\right) \times 11{,}100 \text{ gpd}$$

$$\textbf{Peak Flow} = \textbf{46,962 gpd, or 1,957 gph, or 32.6 gpm}$$

Organic Waste Load

According to the MDNR Wastewater Design Guides 1.1.2 Table 1-1, the organic loading rate from a single-family dwelling is estimated to be 0.22 pounds BOD_5 per day per capita. Per the MDNR Wastewater Design

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Guides 1.1.2, for new collection systems, Total Kjeldahl Nitrogen (TKN) can be estimated using 0.036 pounds TKN per capita per day. According to the calculation above, the design population of this development is 111 people. Based on these guidelines, the design organic waste load is estimated as shown below.

Estimated Organic Waste Load in Untreated Wastewater from Residences:

$$BOD_5 \text{ per day} = 0.22\frac{\text{lbs}}{\text{day} \times \text{capita}} * 3.7\frac{\text{capita}}{\text{unit}} * 30 \text{ units} = 24.4\frac{\text{lbs}}{\text{day}}$$

$$BOD_5 = 24.4\frac{\text{lbs}}{\text{day}} * \frac{1 \text{ day}}{11{,}100 \text{ gal}} * \frac{1 \text{ mg}}{2.2046 \times 10^{-6}\text{lb}} * \frac{1 \text{ gal}}{3.79 \text{ L}} = 263.1\frac{\text{mg}}{\text{L}}$$

$$\text{TKN per day} = 0.036\frac{\text{lbs}}{\text{day} \times \text{capita}} * 3.7\frac{\text{capita}}{\text{unit}} * 30 \text{ units} = 4.0\frac{\text{lbs}}{\text{day}};$$

$$\text{TKN} = 4.0\frac{\text{lbs}}{\text{day}} * \frac{1\text{day}}{11{,}100 \text{ gal}} * \frac{1 \text{ mg}}{2.2046 \times 10^{-6} \text{ lb}} * \frac{1 \text{ gal}}{3.79 \text{ L}} = 43.1\frac{\text{mg}}{\text{L}}$$

Therefore, the total waste load per day for the entire development is estimated to be $24.4\frac{\text{lbs BOD}_5}{\text{day}}\left(263.1\frac{\text{mg BOD}_5}{\text{L}}\right)$ and $4.0\frac{\text{lbs TKN}}{\text{day}}\left(43.1\frac{\text{mg TKN}}{\text{L}}\right)$.

IMPACT ON EXISTING WASTEWATER FACILITIES

No public wastewater facilities currently exist on the project site or sufficiently near to the project site to serve it. The nearest public wastewater facility is located approximately 1.2 miles away, and the cost to lay sewer line to connect this development to the public system would be exorbitant. Additionally, annexation of the subject property and all properties along the route would be required. This is discussed further in the Regionalization subsection of the Detailed Evaluation of Alternatives, on Page 10. It is therefore necessary for new wastewater facilities to be constructed to serve the development and meet the guidelines set forth by the Missouri Department of Natural Resources. Based on the alternative selected in this plan, the outfall from the new facility will enter an unnamed tributary to Ranney Creek, and should not add to the load of pre-existing wastewater facilities downstream of the development.

PROJECT DESCRIPTION

The designs required for this project are two-fold. Firstly, a gravity sanitary sewer line must be designed to collect sanitary sewer waste and carry it to the wastewater treatment facility. Secondly, the type of treatment performed at the facility must be chosen, and the selected treatment system must be designed with the capability of improving the graywater quality to the point that discharge is allowable. Full descriptions of the alternatives considered for this system are included in the Facility Plan corresponding to this project.

LOCATION OF FACILITIES

The development site is located within the NW ¼ of the SE ¼ of Section 4 and the NW ¼ of the NE ¼ of Section 29, T30N, R13E of the Fifth Principle Meridian in Cape Girardeau County, MO. The site is situated at 1298 County Road 206. The WWTF will be located at the northwest corner of the development site, approximately 520 feet from the multi-family well to be dug at the northeast corner of the site. The WWTF outfall will be at an elevation approximately 58 feet lower than the well and will enter a tributary of Ranney Creek, which flows away from the well. A map of this site is provided in Appendix A.

SITE INFORMATION

The site is located at the west side of CR 206 just north of Royal Lake Drive in Cape Girardeau, MO. The proposed access road of the development will connect solely to CR 206. There are no proposed expansions or future phases for this development currently.

The owner intends for the land to be subdivided into 12 lots with either a duplex or quadplex on each of 11 of the lots. Because the owner wishes this development to be composed of rental units, it is desirable for lots to be smaller, thereby decreasing the lawn maintenance required by the residents. Additionally, an increased number of lots will increase the economic benefits of development for the owner.

Ground elevation of the undeveloped site slopes downward from the northeast corner, which has an elevation of approximately 513 MSL, to the northwest corner, which has an approximate elevation of 452 MSL. Prior to construction, the grading will be performed across the site while retaining the northwest facing slope. Post-grading, the well elevation should remain at an elevation of approximately 507 MSL, with the low point in the northwest corner remaining at approximate elevation of 452 MSL. The wastewater treatment facility should be located near this low point.

The proposed WWTF is planned to be in the northwest corner of the development. Each housing unit on the development will be located on separate lots, and each lot will be connected to the sanitary sewer system by an individual service line. The sanitary sewer system will be a traditional gravity system.

The only creek on the site is an unnamed tributary of Ranney Creek which exhibits flows to the south. The outfall from the wastewater treatment facility will enter this tributary.

A geohydrologic evaluation (included in Appendix B) of the site was conducted in accordance with 10 CSR 20-8.030(5)(E)G on April 19, 2022, by Kirsten N. Schaefer, RG. This report found the surface material to be clay and clay loam with sparse gravel clasts, with low permeability. Depth to bedrock was not observed on site. There are 11 known sinkholes and 12 faults within 1 mile of the site, but none were found on the site. Groundwater velocity was found to be low to moderate, with local recharge of groundwater. There are no known springs or geologic structures located at the site.

ALTERNATIVE SELECTION

For the project site to be developed into residential housing according to the client's wishes, it is necessary for Koehler Engineering & Land Surveying, Inc. to plan and acquire proper permits for collection and treatment of wastewater from the development. Per 10 CSR 20-8.110(2)(B) and 10 CSR 20-8.110(5)(D), all wastewater treatment alternatives considered and evaluated prior to finalization of the project plan must be included in the facility plan. Each of the options was considered and evaluated based on criteria given in 10 CSR 20-8.110(5)(E), as well as the client's desires and economic feasibility. This is a new proposed development with no existing collection systems servicing the project area. In compliance with the aforementioned rules, the full list of alternatives considered is given below.

1. No action. Development will not proceed, negating the need for any sort of wastewater treatment. According to 10 CSR 20-8.110(5)(D), this option must be considered in every WWTF design.
2. No Discharge Options. According to 10 CSR 20-8.110(5)(E)3, no-discharge option(s) must be considered in every wastewater treatment facility plan. In this case, the no-discharge option considered was land application with septic tanks at each house to collect blackwater. It is the developer's wish for each house to have its own septic tank to receive blackwater from the houses for the purpose of decreasing organic

waste load to the wastewater treatment facility (should one be necessary), thus decreasing construction and operation costs. Two options were considered based on this wish:

a. Land Application On-Site. This possibility would include a gravity sewer line collecting graywater from each septic tank and applying it to an appropriate on-site location set aside for the purpose.
b. Land Application Off-Site. This would include a gravity sewer line collecting graywater from each septic tank, conveying it to an on-site wastewater storage facility before land application off-site.

3. Regionalization Option. According to 10 CSR 20-8.110(5)(E)4, this alternative must be considered in every wastewater treatment facility plan. If this alternative were implemented, then wastewater from the development would enter a gravity sewer and flow to the nearest public wastewater treatment facility.
4. Gravity Sewer Collection System and Wastewater Treatment Facility. These alternatives were considered in accordance with the client's desired site plan. Each alternative below would require a gravity sewer line to collect the wastewater, and a wastewater treatment facility to the collected wastewater before discharging the treated water to the nearby unnamed tributary of Williams Creek.
    a. Wastewater Treatment Facility Options:
        i. Recirculating Media Filters. Septic tank effluent will enter a recirculation tank where it will be mixed with sand media. The mixture will then be pumped to a media filter bed. This alternative was considered because recirculating media filters are effective in removing high concentrations of BOD and TSS; modular in design, allowing expansion if necessary; and generally low maintenance.
        ii. On-site Lagoon with Nitrox System by Triplepoint Environmental for ammonia removal, with UV disinfection, and a future need for an additional chemical feed system for phosphorous removal.
        iii. Biologically active filters (BAF) and submerged attached growth bioreactors (SAGB). A self-contained wastewater treatment system utilizing submerged media in process flow, with high biomass concentrations and short hydraulic retention times, for the treatment of screened or settled wastewater effluent.
        iv. Factory-Built Package Plants. A self-contained aerobic wastewater treatment system utilizing the activated sludge process, designed for municipal applications, providing BOD and TSS removal as well as nutrient removal, available in above- or below-grade installations.

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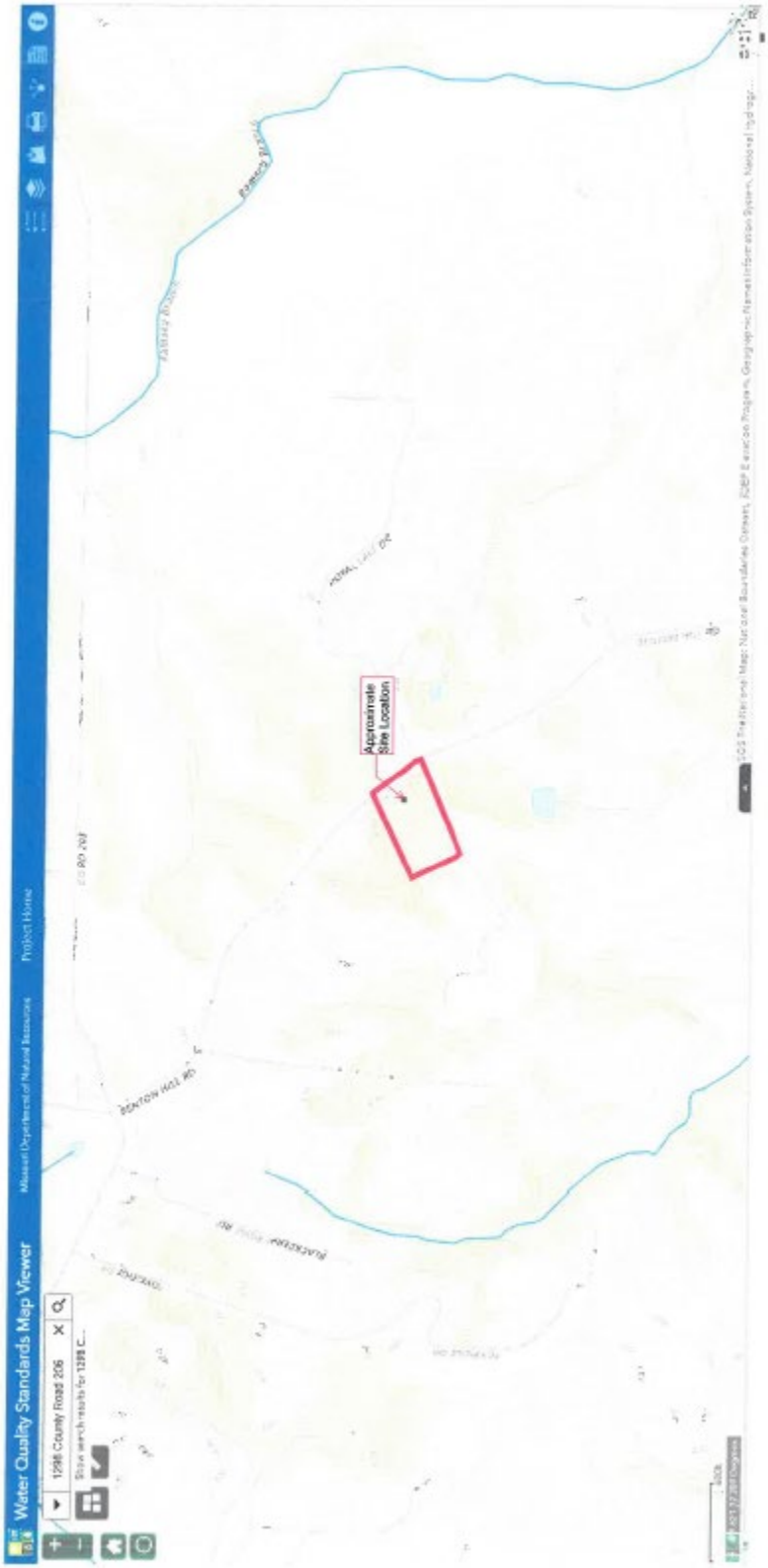
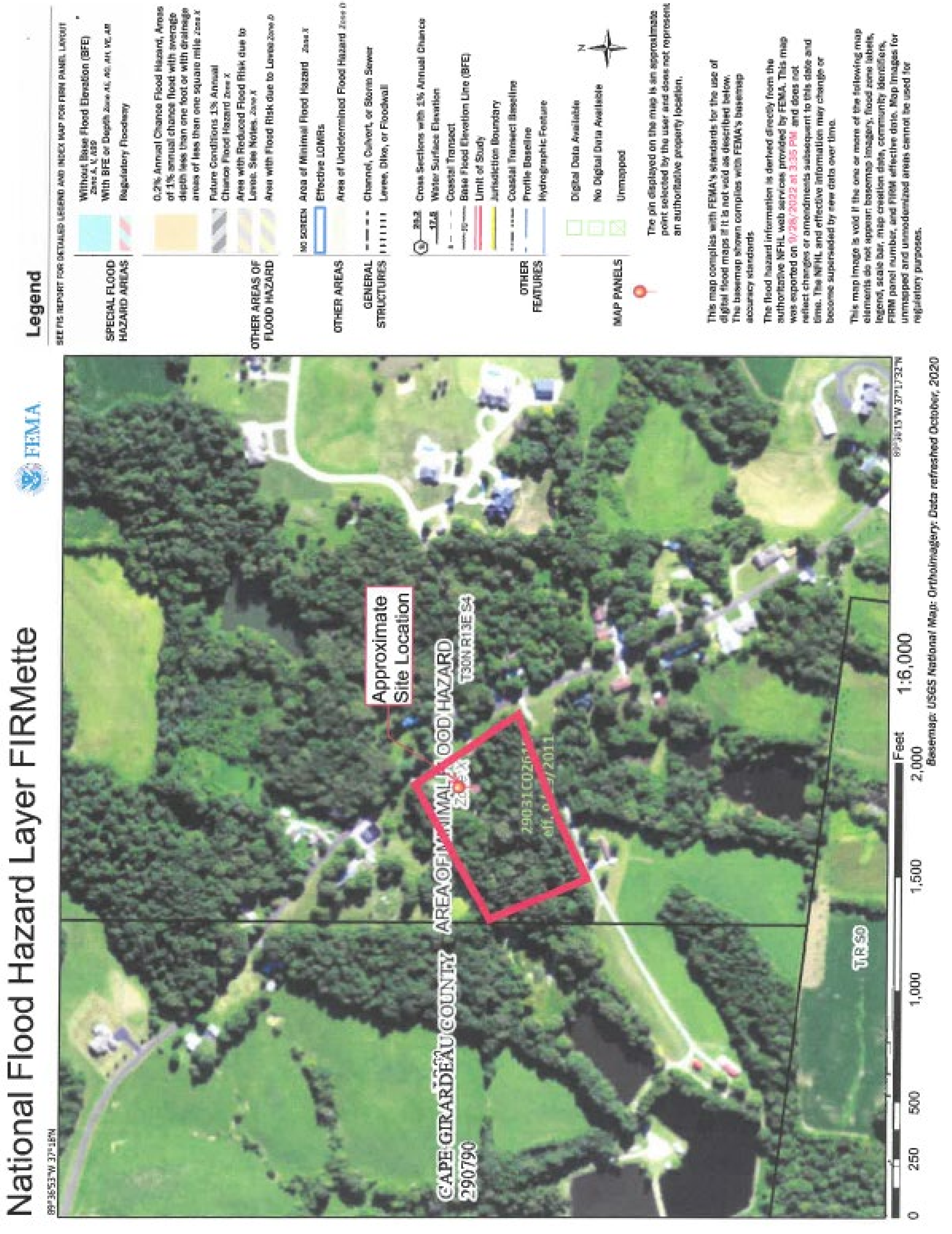
FLOOD PROTECTION PROVISIONS

According to the FEMA Flood Maps, the proposed improvements will be in Zone X, areas of minimal flood hazard, as indicated on community panel number 29031C 0261E, with an effective date of September 29, 2011. A Firmette of the FEMA Flood Insurance Rate Map for this area is included in Appendix B.

APPENDIX A


Water Quality Standards Map Viewer
Missouri Department of Natural Resources
Project Home
1298 County Road 206
Approximate Site Location
BENTON HILL RD
BLACKBERRY RIDGE RD

APPENDIX B


National Flood Hazard Layer FIRMette
FEMA
89°36'53"W 37°18'N
CAPE GIRARDEAU COUNTY
290790
AREA OF MINIMAL FLOOD HAZARD
Approximate Site Location
T30N R13E S4
T R S0
0 250 500 1,000 1,500 2,000 Feet
1:6,000
89°36'15"W 37°17'32"N
Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020
Legend
SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT
SPECIAL FLOOD HAZARD AREAS
Without Base Flood Elevation (BFE) Zone A, V, A99
With BFE or Depth Zone AE, AO, AH, VE, AR
Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD
0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
Future Conditions 1% Annual Chance Flood Hazard Zone X
Area with Reduced Flood Risk due to Levee. See Notes. Zone X
Area with Flood Risk due to Levee Zone D
OTHER AREAS
NO SCREEN Area of Minimal Flood Hazard Zone X
Effective LOMRs
Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES
Channel, Culvert, or Storm Sewer
Levee, Dike, or Floodwall
OTHER FEATURES
Cross Sections with 1% Annual Chance
Water Surface Elevation
Coastal Transect
Base Flood Elevation Line (BFE)
Limit of Study
Jurisdiction Boundary
Coastal Transect Baseline
Profile Baseline
Hydrographic Feature
MAP PANELS
Digital Data Available
No Digital Data Available
Unmapped
N
The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards
The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/28/2022 at 3:35 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.
This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX C

Design

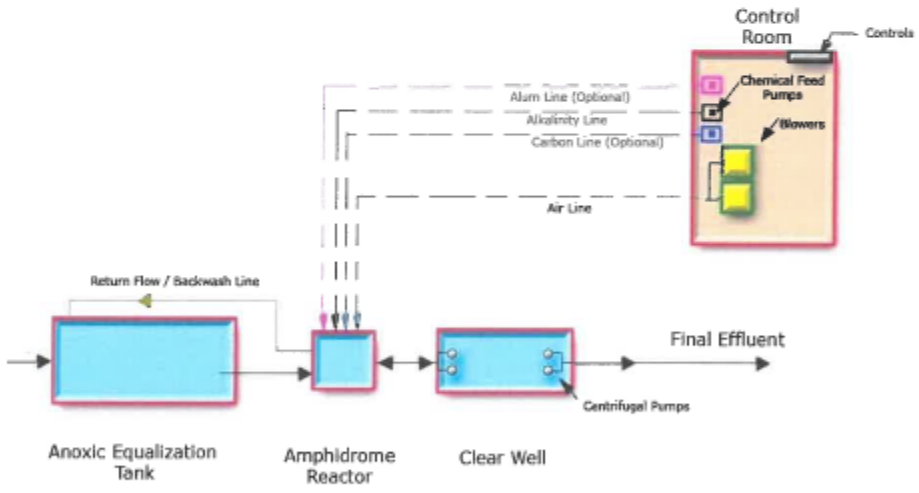
Amphidrome® Reactor
The most cost effective design for this facility is one (1) 8' diameter reactor. The reactor will have a 6.0 ft. bed depth.

Alkalinity Feed
Nitrification consumes alkalinity and the ammonia effluent limits are stringent. To ensure sufficient alkalinity, a feed system has been provided for in this proposal as no data on influent data alkalinity has been provided.

UV unit and Feed Pumps
UV unit will be by Enaqua and supplied by MEC. UV Feed pumps have been provided for in this proposal.

See Tables 1-2 For Design Information and Tank Capacities.

Process Flow Schematic



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 $1000.00	CHECK NO. 726663
DATE RECEIVED 10/31/23 JLB	

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: _____ Project #: _____

1.2 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?
☑ YES Date of Approval: 3-24-23 ☐ N/A

1.3 Has the department approved the proposed project's facility plan*?
☑ YES Date of Approval: 3-24-23 ☐ 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
Benton Hill Villas Treatment Facility

2.2 ESTIMATED PROJECT CONSTRUCTION COST
$ 471,000

2.3 PROJECT DESCRIPTION
It is planned to construct 7 duplexes and 4 quadplexes. These residential properties shall consist of a collection system with 5 manholes and 615 feet of 8" diameter sanitary sewer main. The treatment system consists of a amphidrome system and uv light treatment.

2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION
Sludge shall be checked quarterly. Sludge shall be removed from the system, when required, by an independent contractor.

2.5 DESIGN INFORMATION

A. Current population: 0 ; Design population: 111

B. Actual Flow: 0 gpd; Design Average Flow: 11100 gpd;
Actual Peak Daily Flow: 0 gpd; Design Maximum Daily Flow: 46962 gpd; Design Wet Weather Event: _____

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	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Benton Hill Villas Treatment Facility	5732703100	wlboehme@gmail.com

ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE	COUNTY
1298 County Road 206	Cape Girardeau	MO	63701	Cape Girardeau

Wastewater Treatment Facility: Mo- (Outfall Of)

3.1 Legal Description: SE ¼, NE ¼, NW ¼, Sec. 4, T 30N, R 13E
(Use additional pages if construction of more than one outfall is proposed.)

3.2 UTM Coordinates Easting (X): 1078799 Northing (Y): 533648
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

3.3 Name of receiving streams: Unnamed Tributary to Ranney Branch

4.0 PROJECT OWNER

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Wayne Boehme	5732703100	wlboehme@gmail.com

ADDRESS	CITY	STATE	ZIP CODE
PO Box 681	Jackson	MO	63755

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	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Benton's Hill Villas Homeowners Association, LLC	573 270 3100	mandrews@laytonsouthardlaw.com

ADDRESS	CITY	STATE	ZIP CODE
587 Royal Lake Drive	Cape Girardeau	MO	63701

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	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Christopher Koehler, PE / Koehler Engineering & Land	573 335 3026	ckoehler@koehlerengineering.com

ADDRESS	CITY	STATE	ZIP CODE
194 Coker Lane	Cape Girardeau	MO	63701

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	DATE
Wayne Boehme	

TITLE OR CORPORATE POSITION	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
	573 270 3100	wlboehme@gmail.com

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.