

**STATE OF MISSOURI**  
**DEPARTMENT OF NATURAL RESOURCES**  
**MISSOURI CLEAN WATER COMMISSION**



**CONSTRUCTION PERMIT**

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

Scott & Christina Titus  
Centertown Village Apartments WWTF  
1000 Progress Dr #1236  
Liberty. MO 64086

for the construction of (described facilities):

See attached.

Permit Conditions:

See attached.

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo, and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources (Department).


As the Department does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.

A representative of the Department may inspect the work covered by this permit during construction. Issuance of a permit to operate by the Department will be contingent on the work substantially adhering to the approved plans and specifications.

This permit applies only to the construction of water pollution control components; it does not apply to other environmentally regulated areas.

September 16, 2022  
Effective Date

September 15, 2024  
Expiration Date

  
Chris Wieberg, Director, Water Protection Program

## **CONSTRUCTION PERMIT**

### **I. CONSTRUCTION DESCRIPTION**

Construction of a BioMicrobics Biobarrier 1.5 MBR treatment system with aeration, installed within a 3,000-gallon concrete tank, followed by a sampling and flow measurement chamber. An existing 1,500-gallon septic tank will continue to be used for pretreatment.

A closure plan will need to be submitted to the Central Field Operations for review and approval prior to any closure activities.

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**

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 Dennis M. Sievers, P.E., of The Sewage Doctor, 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 Central Field Operations per 10 CSR 20-7.015(9)(G).
5. The wastewater treatment facility shall be located at least fifty feet (50') 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 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 <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. In accordance with 10 CSR 20-6.010(12), a full closure plan shall be submitted to the Department's Central Field Operations for review and approval of any permitted wastewater treatment system being replaced. The closure plan must meet the requirements outlined in Standard Conditions Part III of the Missouri State Operating Permit No. MOGD00489. Closure shall not commence until the submitted closure plan is approved by the Department. Form J – *Request for Termination of a State Operating Permit*, shall be submitted to the Water Protection Program for termination of any existing Missouri state operating permit, once closure is completed in accordance with the approved closure plan.
9. 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 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 ft 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 twenty-four (24) hour automatic composite sample or grab sample of the effluent discharge can be obtained at a point after the final treatment process and before discharge to or mixing with the receiving waters. 10 CSR 20-8.140(6)(B)
- All outfalls shall be posted with a permanent sign indicating the outfall number (i.e., Outfall #001). 10 CSR 20-8.140(6)(C)
- All wastewater treatment facilities shall be provided with an alternate source of electric power or pumping capability to allow continuity of operation during power failures. 10 CSR 20-8.140(7)(A)1.
- 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 twenty-four (24) hour composite automatic sampling equipment shall be provided at all mechanical wastewater treatment facilities and at other facilities where necessary under provisions of the operating permit. 10 CSR 20-8.140(7)(F)
- 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)
- 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)
- Membrane Bioreactor design flux criteria must be satisfied with one (1) membrane module out-of-service (e.g., for external clean in place, recovery cleaning, repair). For purposes of these criteria, a membrane module is the smallest membrane unit capable of separate removal from the tank while maintaining operation of other membrane units in the same tank. 10 CSR 20-8.180(7)(A)2.
- Membranes placed in the aeration basin(s) rather than a separate membrane tank shall have—
  - Individual modules and individual diffusers that can be removed separately for maintenance and repair; 10 CSR 20-8.180(7)(A)3.A. and

- Aeration basin(s) volume sized for complete nitrification; 10 CSR 20-8.180(7)(A)3.B.
- Membrane Bioreactor preliminary treatment systems shall be consistent with the membrane manufacturer recommendations; 10 CSR 20-8.180(7)(B)1.
- Grit removal facilities are required for wastewater treatment facilities that utilize membrane bioreactors for secondary treatment. 10 CSR 20-8.150(6) and 10 CSR 20-8.180(7)(B)2.
- Membrane Bioreactors shall provide oil and grease removal when the levels in the influent may cause damage to the membranes; 10 CSR 20-8.180(7)(B)3.
- The Membrane Bioreactor's aeration blowers must provide adequate air for membrane scour and process demands. 10 CSR 20-8.180(7)(C)
- Redundancy. The Membrane Bioreactor shall have at least one (1) of the following:
  - The ability to run in full programmable logic control (PLC) or standby power mode in case of an automatic control failure; 10 CSR 20-8.180(7)(D)1.
  - An operational battery backup PLC if manual control is not possible; or 10 CSR 20-8.180(7)(D)2.
  - Sufficient standby power generating capabilities to provide continuous flow through the membranes during a power outage (e.g., preliminary screening, process aeration, recycle/RAS/permeate pumps, air scour, vacuum pumps) or an adequate method to handle flow for an indefinite period (e.g., private control of influent combined with contingency methods). 10 CSR 20-8.180(7)(D)3.
- Operations and Maintenance. The MBR design shall—
  - Include provisions to monitor membrane integrity; 10 CSR 20-8.180(7)(E)1.
  - Include provisions to remove membrane cassette for cleaning, considering the membrane cassette wet weight plus additional weight of the solids accumulated on the membranes. 10 CSR 20-8.180(7)(E)3.

10. Upon completion of construction:

- A. Scott & Christina Titus will become the continuing authority for operation and maintenance of these facilities;
- B. Submit an electronic copy of the as-built plans 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)

When the facility applies for their next operating permit renewal, they will be expected to include an updated facility description on their application.

#### **IV. REVIEW SUMMARY**

##### **1. CONSTRUCTION PURPOSE**

The facility is being upgraded to meet final effluent limits for ammonia.

## **2. FACILITY DESCRIPTION**

The extended-aeration facility was constructed prior to 1990, with a design average flow of 1,000 gpd. No increase in flow is proposed with this project. In 2012, construction permit CP0001350 was issued to upgrade the WWTF to add disinfection (chlorination and dechlorination).

The existing septic tank will be left in place, and the extended-aeration and disinfection systems will be removed during this project. Following the septic tank, a BioMicrobics Biobarrier 1.5 MBR treatment system with aeration will be installed in a 3,000-gallon concrete tank, followed by a sampling and flow measurement chamber.

The Centertown Village Apartments WWTF is located at 118 Shangri La Rd., Centertown, in Cole County, Missouri. The facility has a design average flow of 1,000 gpd and serves a hydraulic population equivalent of approximately 20 people.

## **3. COMPLIANCE PARAMETERS**

The existing facility can generally meet the parameters listed in Table C of MOGD00489 other than ammonia. The proposed project is required to meet the requirements of MOGD00489 Table C with an expiration date of June 30, 2024.

## **4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA**

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

- Existing concrete septic tank (rated at 1,500 gallons) with effluent filter. The summary of design states the tank is 12.7 ft by 5.6 ft. The tank should provide at least 1.5 days of retention at the design average flow.

**Construction will cover the following items:**

- Components are designed for the existing design average flow of 1,000 gpd, based on previous permitting and no changes to the existing population equivalent of 20 based on hydraulic loading to the system. The current condition includes 11 small apartments and a rarely used remote office space.
- Grit Removal – Installation of grit removal facilities removes grit and inert inorganics from raw wastewater. Grit removal prevents downstream abrasion and wear on mechanical components and accumulation at the bottom of basins or channels.
  - The existing septic tank is proposed to remove grit from the influent wastewater. No additional grit removal is proposed.
- Membrane Bioreactor (MBR) - The MBR system is by BioMicrobics. The system will be a single 1,500-gpd system (the smallest available).
  - The membrane is a flat-plate membrane using ultrafiltration.

- With one cassette removed, the design flux rate through the membranes at peak flow is 6.64 gallons/ft<sup>2</sup>/day (11.27 lm<sup>2</sup>/h) at peak flow with a maximum operating flux of 8.83 gallons/ft<sup>2</sup>/day (15 lm<sup>2</sup>/h).
- The surface area of the membranes is 150 ft<sup>2</sup>.
- The minimum filtration rate through the membranes is 0.9247 gpm, operating for approximately 18 hrs per day.
- Total air supplied through the membranes is 60 scfm.
- Disinfection is not proposed for this system, because it utilizes ultrafiltration (~0.03 µm pore size). The BioMicrobics system has been tested by National Science Foundation (NSF) and found to have an overall fecal coliform from 1.0 cfu/100 mL to 1.6 cfu/100 mL. In test done under the NSF Standard 350, the BioBarrier had a geometric average E. Coli of 1.3 MPN/100 mL.
- Relocated Outfall – The new outfall location is approximately 14 ft north and upstream from the current outfall location. The outfall consists of a discharge pipe passing through a sampling distribution box . A drop of approximately 15 inches allows for discrete effluent samples and for flow measuring via a five (5)-gallon bucket.
- Flow Measurement – Installation of accurate flow measurement devices will give the treatment facility a means of improved data analysis.
  - Flow is to be measured as required by the Missouri State Operating Permit that is issued for this facility. The design proposed using a five (5)-gallon bucket and stop watch to estimate flows.
  - This method of flow measurement will require the operator to calculate then record the flowrate. If using a five (5)-gallon bucket, divide 432,000 by the number of seconds to get gallons per day. For example, if it takes 432 seconds (7 minutes, 12 seconds), the calculation of 432,000 divided by 432 seconds is 1,000 gallons per day (gpd).
  - If using a different size container, multiply the container size (in gallons) by 86,400, then divide by the number of seconds to fill. This will give the flow in gpd.
  - Ensure the container is as level as possible, then time the number of seconds to fill to the known gradation (e.g., the 5-gallon mark). Do not just assume the top of the container is the nominal volume; there is usually some headspace at the top. It is recommended to calibrate the container used, if there is not a level marked on the container by the manufacturer.
- Emergency Power – The owner has a plan to obtain a portable generator in case of a power outage.

## **5. OPERATING PERMIT**

These construction activities do not change the effluent limits or conditions of the current operating permit. The Department will perform an internal modification to reflect the current facility description upon receipt of the Statement of Work Completed form.

Operating permit MOGD00489 will be expiring on June 30, 2024. A renewal application must be filed before April 30, 2024, regardless of the status of these construction activities. If you have questions on completing the renewal application, please contact the NPDES permitting section at 573-751-1300.

## **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:

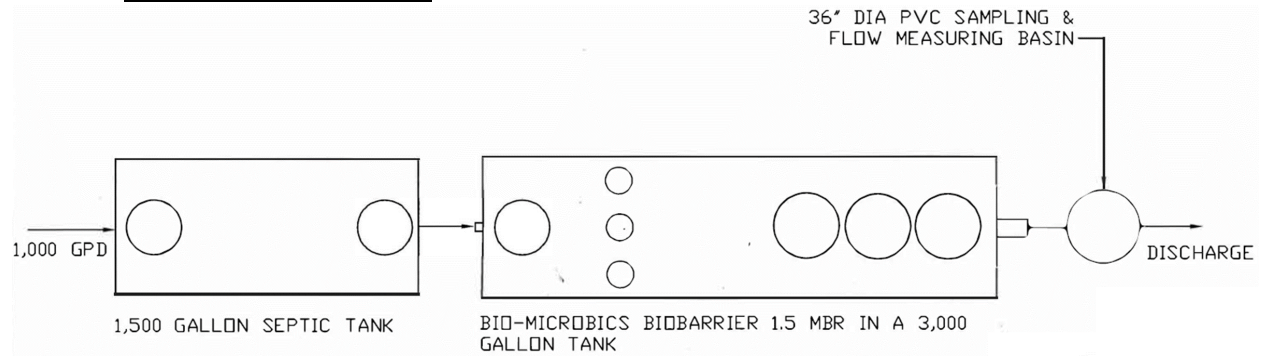
Administrative Hearing Commission  
U.S. Post Office Building, Third Floor  
131 West High Street, P.O. Box 1557  
Jefferson City, MO 65102-1557  
Phone: 573-751-2422  
Fax: 573-751-5018  
Website: <https://ahc.mo.gov>

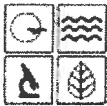
Scott Adams, P.E.  
Engineering Section  
[scott.adams@dnr.mo.gov](mailto:scott.adams@dnr.mo.gov)



## **APPENDIX**

- **Process Flow Diagram**





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

**FOR DEPARTMENT USE ONLY**

APP NO.	CP NO.
FEE RECEIVED	CHECK NO.
DATE RECEIVED	

**APPLICATION OVERVIEW**

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

**PART A – BASIC INFORMATION**

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

- 1.1 Is this a Federal/State funded project? ☐ YES ☒ N/A Funding Agency: \_\_\_\_\_ Project #: \_\_\_\_\_
- 1.2 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?  
☐ YES Date of Approval: 06/08/22 ☒ N/A
- 1.3 Has the department approved the proposed project's facility plan\*?  
☒ YES Date of Approval: 06/08/22 ☐ 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 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 Centertown Village Apartments WWT 2.2 ESTIMATED PROJECT CONSTRUCTION COST \$40,000.00

2.3 PROJECT DESCRIPTION  
An MBR is replacing an old Extended Aeration plant that is not meeting ammonia & coliform standards

2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION

Pumped & hauled to an appropriate treatment plant.

**2.5 DESIGN INFORMATION**

A. Current population: \_\_\_\_\_; Design population: 24  
B. Actual Flow: 1,000 gpd; Design Average Flow: 1,500 gpd;  
Actual Peak Daily Flow: \_\_\_\_\_ gpd; Design Maximum Daily Flow: \_\_\_\_\_ 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

RECEIVED  
JUL 01 2022  
Water Protection Program

**3.0 WASTEWATER TREATMENT FACILITY**

NAME <i>Centertown Village Apartments WWTf</i>		TELEPHONE NUMBER WITH AREA CODE		E-MAIL ADDRESS	
ADDRESS (PHYSICAL) <i>118 Shangri La Rd</i>		CITY <i>Centertown</i>	STATE <i>MO</i>	ZIP CODE <i>65203</i>	COUNTY
Wastewater Treatment Facility: Mo- (Outfall 1 Of 1)					
3.1 Legal Description: _____ 1/4, _____ 1/4, _____ 1/4, Sec. _____, T _____, R _____ (Use additional pages if construction of more than one outfall is proposed.)					
3.2 UTM Coordinates Easting (X): <i>38.6445</i> Northing (Y): <i>32.40443</i> For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)					
3.3 Name of receiving streams: _____					

**4.0 PROJECT OWNER**

NAME <i>Scott &amp; Christina Titus</i>		TELEPHONE NUMBER WITH AREA CODE		E-MAIL ADDRESS	
ADDRESS <i>1000 Progress Dr #1236</i>		CITY <i>Liberty</i>	STATE <i>MO</i>	ZIP CODE <i>64086</i>	

**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 <i>Same as Owner</i>		TELEPHONE NUMBER WITH AREA CODE		E-MAIL ADDRESS	
ADDRESS		CITY	STATE	ZIP CODE	

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 ☐ NOB. 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 ☐ NOC. 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 ☐ NOD. 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 <i>Dennis M. Sievers / The Sewage Doctor, LLC</i>		TELEPHONE NUMBER WITH AREA CODE <i>573-808-1875</i>		E-MAIL ADDRESS <i>thesewagedoctor@gmail.com</i>	
ADDRESS <i>1200 Stratton Dr</i>		CITY <i>Columbia</i>	STATE <i>MO</i>	ZIP CODE <i>65203</i>	

**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

*Scott Titus*

DATE

*6/21/2022*

TITLE OR CORPORATE POSITION

*Owner*

TELEPHONE NUMBER WITH AREA CODE

*816-225-3147*

E-MAIL ADDRESS

*TRP@choosetitus.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.**