STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

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

Confluence Rivers Utility Operating Company, Inc. North of Hillside Circle Orrick, MO 64077

for the construction of (described	d facilities):
See attached.	
Permit Conditions:	
See attached.	
	in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo, and it may be revoked by the Department of Natural Resources (department).
As the department does not examine structural for include approval of these features.	eatures of design or the efficiency of mechanical equipment, the issuance of this permit does not
	the work covered by this permit during construction. Issuance of a permit to operate by the antially adhering to the approved plans and specifications.
This permit applies only to the construction of w	rater pollution control components; it does not apply to other environmentally regulated areas.
May 16, 2025 Effective Date	A) ((₄
May 15, 2027	Muffee
Expiration Date	John Hoke, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The proposed construction is the installation of a sideline single stage moving bed biofilm reactor (MBBR) that will receive flow from the recirculation tank and return the MBBR effluent to the recirculation tank to improve ammonia treatment. It will also include the construction of a two unit closed vessel ultraviolet (UV) disinfection system to treat for *E. coli* along with a bypass line for the nonrecreational season. Additionally, a magnetic flow meter will be added to the discharge line. One recirculating sand filter dosing pump in the existing recirculation tank will be relocated to allow for the installation of two MBBR dosing pumps. The existing STEP septic tanks, pressurized collection system, recirculating sand filters, and outfall will remain unchanged. The facility will retain the existing design flow of 5,520 gallons per day (gpd).

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

II. COST ANALYSIS FOR COMPLIANCE

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

The department is 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 Benjamin Kuenzel, P.E. with 21 Design Group, 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 Kansas City Regional Office per 10 CSR 20-7.015(9)(G).
- 5. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of one acre or more to obtain a Missouri state operating permit to discharge stormwater. The permit requires best management practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the department's ePermitting system available online at https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem. See <a href="https://dnr.mo.gov/data-e-services/water/electronic-permitting-epermitting-permitting-epermitting-permitting-epe
- 6. A United States Army Corps of Engineers (USACE) Clean Water Act Section 404
 Department of the Army permit and a Section 401 Water Quality Certification issued by
 the department may be required for the activities described in this permit. This permit is
 not valid until these requirements are satisfied or notification is provided that no Section
 404 permit is required by the USACE. You must contact your local USACE district since
 they determine what waters are jurisdictional and which permitting requirements may
 apply. You may call the department's Water Protection Program, Operating Permits
 Section at 573-522-4502 for more information. See https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality
 for more information.
- 7. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements listed below.
- Flood protection shall apply to new construction and to existing facilities undergoing major modification. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the 100-year flood elevation. 10 CSR 20-8.140(2)(B).
- Unless another distance is determined by the Missouri Geological Survey or by the department's Public Drinking Water Branch, the minimum distance between wastewater treatment facilities and all potable water sources shall be at least 300 feet. 10 CSR 20-8.140(2)(C)1.

- 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 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)

- 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)
 - o Gratings over appropriate areas of treatment units where access for maintenance is necessary; 10 CSR 20-8.140(8)(B)
 - o First aid equipment; 10 CSR 20-8.140(8)(C)
 - o Posted "No Smoking" signs in hazardous areas; 10 CSR 20-8.140(8)(D)
 - o Appropriate personal protective equipment (PPE); 10 CSR 20-8.140(8)(E)
 - o Portable blower and hose sufficient to ventilate accessed confined spaces; 10 CSR 20-8.140(8)(F)
 - o 10 CSR 20-8.140(8)(G) Portable lighting equipment complying with NEC requirements. See subsection (7)(B) of this rule;
 - o 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;
 - O 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)
 - Explosion-proof electrical equipment, non-sparking tools, gas detectors, and similar devices, in work areas where hazardous conditions may exist, such as digester vaults and other locations where potentially explosive atmospheres of flammable gas or vapor with air may accumulate. 10 CSR 20-8.140(8)(K)
 - Provisions for local lockout/tagout on stop motor controls and other devices;
 10 CSR 20-8.140(8)(L)
 - Provisions for an arc flash hazard analysis and determination of the flash protection boundary distance and type of PPE to reduce exposure to major electrical hazards shall be in accordance with NFPA 70E Standard for Electrical Safety in the Workplace (2018 Edition), as approved and published August 21, 2017. 10 CSR 20-8.140(8)(M)
- Emergency Power. Disinfection and dechlorination processes, when used, shall be provided during all power outages. 10 CSR 20-8.190(2)(A)
- The UV dosage shall be based on the design peak hourly flow, maximum rate of pumpage, or peak batch flow. 10 CSR 20-8.190(5)(A)1.
- 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 (μ W s/cm²). 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.
 - o The ON/OFF status of each lamp in the system; 10 CSR 20-8.190(5)(C)1.C. and
 - The total number of operating hours of each bank or each closed vessel system. 10 CSR 20-8.190(5)(C)1.D.
- The UV system shall include an alarm system. Alarm systems shall comply with 10 CSR 20-8.140(7)(C). 10 CSR 20-8.190(5)(C)2.
- 8. Upon completion of construction:
 - A. Confluence Rivers Utility Operating Company, Inc will become the continuing authority for operation and maintenance of these facilities;
 - B. Submit an electronic copy of the as builts if the project was not constructed in accordance with previously submitted plans and specifications; and
 - C. Submit the Statement of Work Completed form to the department in accordance with 10 CSR 20-6.010(5)(N) (https://dnr.mo.gov/document-search/wastewater-construction-statement-work-completed-mo-780-2155).

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The existing treatment facility does not consistently meet ammonia or *E. coli* effluent limitations. Improvements will provide additional ammonia treatment to help achieve compliance with the final ammonia effluent limits and disinfection to help achieve compliance with *E. coli* effluent limits.

2. FACILITY DESCRIPTION

The existing treatment system is STEP septic tanks at each individual residence, pressurized collection system, and a recirculating sand filter. The facility treats domestic wastewater from a 12 lot residential development, currently only seven lots are developed each containing a single family home.

Construction will add a sideline MBBR unit that will be dosed from the recirculation tank, with the MBBR effluent being returned to the recirculation tank. Construction will also include installation of a two unit closed vessel UV disinfection system and a magnetic flow meter.

The Countryside Meadows WWTF is located North of Hillside Circle, Orrick, in Ray County, Missouri. The facility has a design average flow of 5,520 gpd and serves a hydraulic population equivalent of approximately 55 people.

3. COMPLIANCE PARAMETERS

The proposed project is needed to meet final monthly ammonia effluent limits of 1.2 mg/L (April 1 – September 30) and 2.8 mg/L (October 1 – March 31), and final monthly *E. coli* limit of 206#/100mL as established in Operating Permit MO-0119822.

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

Parameter	Units	Monthly average limit	
Biochemical Oxygen Demand ₅	mg/L	30	
Total Suspended Solids	mg/L	30	
Ammonia as N-summer	mg/L	1.2	
Ammonia as N-winter	mg/L	2.8	
pH	SU	6.5-9.0	
E. coli	#/100mL	206	

4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

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

- Septic Tank Effluent Pumped Collection System Each house has a septic tank that pumps wastewater to the treatment plant.
- Recirculation Sand Filter The existing sand filters were designed for 5,520 gpd, with duplex Orenco 110V dosing pumps which have a combined maximum flow rate of 40 gpm. Recirculating sand filter effluent goes to a splitter valve, which discharges 20 percent of flows to Outfall No. 001 and returns 80 percent of flows to the recirculation tank.

Construction will cover the following items:

 Moving Bed Biofilm Reactor (MBBR) – Installation of one single-stage MBBR capable of treating a design average flow of 5,520 gpd and a peak flow of 16,560 gpd. The MBBR tank is approximately 6 ft diameter and 8 ft deep with a sidewater depth of 6 ft for a volume of approximately 1,269 gallons. The hydraulic retention time at design flow is 5.52 hours. The MBBR will be filled approximately 50 percent with 14.5 mm (0.57 in) diameter, 9.14 mm (0.36 in) long high surface area media. The high surface area media will have a surface area to media volume of 259 ft²/ft³, which exceeds the recommended 152 ft²/ft³. The MBBR will be provided with an aluminum cover. Aeration will be provided by means of two blowers each capable of supplying 38 scfm with 1.5 HP motors to the coarse air diffusers. The effluent from the single-stage MBBR will flow by gravity back to the recirculation tank.

- Recirculation Tank The existing recirculation tank will have one of the
 dosing pumps to the recirculating sand filter relocated to allow for the
 installation of the two MBBR dosing pumps. The MBBR dosing pumps will
 be Goulds EP04 0.4 HP pumps each capable of pumping 45 gallons per
 minute at 13 feet of total dynamic head.
- UV Disinfection Vault 6 ft diameter concrete vault with aluminum cover houses the flow meter and UV disinfection system.
 - Electromagnetic Meter A 1-inch diameter in-line effluent electromagnetic flow meter shall measure the secondary treated effluent prior to UV disinfection and discharge at Outfall No. 001. The flow meter shall have a measurement range of 1.0 ft/s to 39.4 ft/s (2.4 gpm to 96.5 gpm).
 - Disinfection Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms.
 - Closed vessel Ultraviolet (UV) A Sanitron S37C closed vessel, gravity flow UV disinfection system capable of treating a peak flow of 80,000 gpd while delivering a minimum UV intensity of 30,000 μW s/cm2 with an expected ultraviolet transmissivity of 65 percent or greater. The UV system consists of two Sanitron S37C units in series with a single low pressure high intensity lamp per unit. Each unit is rated for a peak flow of 12 gpm. The disinfected effluent will flow to Outfall No. 001.
 - Three 2-inch ball valves after the magnetic flow meter will allow for bypass of the UV disinfection system during the non-recreational season.

5. OPERATING PERMIT

The construction activities require a modification of the operating permit under 10 CSR 20-6.010. This facility's operating permit is in the process of being renewed and will be evaluated for conversion to a general operating permit during this time. If the facility is not converted to a general permit during the renewal process, the department will conduct an internal modification to reflect the current facility description upon receipt of the Statement of Work Completed form.

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:

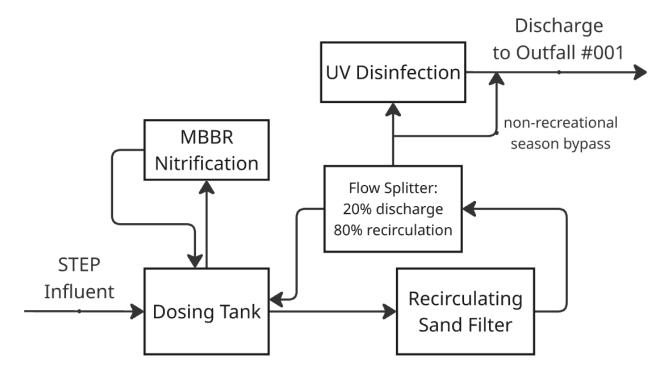
Administrative Hearing Commission U.S. Post Office Building, Third Floor 131 West High Street, P.O. Box 1557 Jefferson City, MO 65102-1557 Phone: 573-751-2422

Fax: 573-751-5018
Website: https://ahc.mo.gov

Katrice Williams, E.I. Engineering Section katrice.williams@dnr.mo.gov

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

<u>APPENDIX - Process Flow Diagram</u>





MISSOURI DEPARTMENT OF NATURAL RESOURCES WATER PROTECTION PROGRAM

APPLICATION FOR CONSTRUCTION PERMIT --WASTEWATER TREATMENT FACILITY

MO	V A	177	20	100
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RECEIVED

FOR DE	PARTMENT	USE	ONLY
NO.	CP NO.		

Water Protection Programme RECEIVED CHECK NO.

DATE RECEIVED

APPLICATION OVERVIEW	
The Application for Construction Permit - Wastewater Treatment Facility form has been	developed in a modular format and consist
of Part A and B. All applicants must complete Part A. Part B should be completed for	or applicants who currently land-apply

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 th completing this form. Submittal of an incomplete application may result in the					
PART A – BASIC INFORMATION					
1.0 APPLICATION INFORMATION (Note – If any of the questions in this section considered incomplete and returned.)	are answered NO, this application may be				
1.1 Is this a Federal/State funded project? YES N/A Funding Agency	y: Project #:				
1.2 Has the Missouri Department of Natural Resources approved the proposed property of N/A ✓ N/A	oject's antidegradation review?				
1.3 Has the department approved the proposed project's facility plan*?✓ YES Date of Approval: 11/17/22 ☐ 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.) 				
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 Environment	ental Protection Agency? 🔲 YES 🛮 🗷 NO				
1.9 Is the appropriate fee or JetPay confirmation included with this application? See Section 7.0	✓ YES NO				
* Must be affixed with a Missouri registered professional engineer's seal, signature	and date.				
2.0 PROJECT INFORMATION					
2.1 NAME OF PROJECT	2.2 ESTIMATED PROJECT CONSTRUCTION COST				
Countryside Meadows	\$ 100,000				
2.3 PROJECT DESCRIPTION Addition a Moving Bed Biological Reactor and UV disinfection to existing treatment	facility.				
2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION					
Sludge disposal by contract hauler					
2.5 DESIGN INFORMATION					
A. Current population: 21; Design population: 28					
B. Actual Flow: <u>1575</u> gpd; Design Average Flow: <u>2,100</u> gpd; Actual Peak Daily Flow: <u>gpd</u> ; Design Maximum Daily Flow: <u>6,300</u> g	pd; Design Wet Weather Event:				
2.6 ADDITIONAL INFORMATION					
A. Is a topographic map attached? YES NO					
B. Is a process flow diagram attached? VES NO					

3.0 WASTEWATER TREATMENT FACILIT	Υ		To have the	No see that we see t	
NAME Countryside Meadows				e-mail Address env.comp@cswrgroup.com	
ADDRESS (PHYSICAL) North side of Hillside Creek	CITY Orrick		STATE MO	ZIP CODE 64077	COUNTY Ray
Wastewater Treatment Facility: Mo- 011982	Wastewater Treatment Facility: Mo- 0119822 (Outfall 1 Of 1)				
3.1 Legal Description: 1/4, 1/4 (Use additional pages if construction of more	,1	4, Sec. <u>7</u> , т <u>51</u> N	_, R <u>28W</u>	_	
3.2 UTM Coordinates Easting (X): 406458 Northing (Y): 4344540 For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)					
3.3 Name of receiving streams: Tributa	ry to East	Fork Rollins Creek			
4.0 PROJECT OWNER					
NAME Confluence Rivers Utility Operating Company		TELEPHONE NUMBER WITH AI	REA CODE	env.comp@csv	vrgroup.com
ADDRESS 1630 Des Peres Rd, Suite 140	St. Louis		MO STATE	63131	
5.0 CONTINUING AUTHORITY: A continuing and/or ensuring compliance with the permit re			ss, entity or p	person(s) that will	be operating the facility
NAME Same		TELEPHONE NUMBER WITH A	REA CODE	E-MAIL ADDRESS	
ADDRESS	CITY		STATE	ZIP CODE	
5.1 A letter from the continuing authority, if c					ES NO Z N/A
5.2 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHO A. Is a copy of the certificate of convenience				DENTITY. YES N	10
5.3 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHO	RITY IS A PRO	DPERTY OWNERS ASSOCIATION.			
A. Is a copy of the as-filed restrictions and c					
B. Is a copy of the as-filed warranty deed, question wastewater treatment facility to the assoc					o of the land for the
C. Is a copy of the as-filed legal instrument (included with this application? YES		ne plat) that provides the	association	with valid easem	ents for all sewers
D. Is a copy of the Missouri Secretary of Sta	_	ofit corporation certificat	e included w	rith this application	n? YES NO
6.0 ENGINEER				Carrier Trans	Hower Francisco La
ENGINEER NAME / COMPANY NAME Benjamin Kuenzel, 21 Design Group, Inc.		TELEPHONE NUMBER WITH A (636)-432-2144	REA CODE	e-MAIL ADDRESS ben@21design	aroun net
ADDRESS	CITY	(000)-402-2144	STATE	ZIP CODE	group.net
1351 Jefferson, Suite 301	Washing	ton	МО	63090	
7.0 APPLICATION FEE	F = -1				The parties and the Public A
CHECK NUMBER		JETPAY CONFIRMATION NUM		VI	
8.0 PROJECT OWNER: I certify under pen supervision in accordance with a system des submitted. Based on my inquiry of the person gathering the information, the information su aware that there are significant penalties for	signed to a n or person bmitted is,	ssure that qualified pers ns who manage the syst to the best of my knowl	connel proper tem, or those edge and be	rly gather and eva e persons directly lief, true, accurate	aluate the information responsible for e, and complete. I am
knowing violations. PROJECT OWNER GRATURE					
PRINTED NAME				DATE 10/18/2023	
Jacob O. Freeman, PE		TELEPHONE NUMBER WITH A	REA CODE	E-MAIL ADDRESS	
Engineering Director		314-380-8544		env.comp@csv	wrgroup.com
WATER P	ROTECTION 176	MENT OF NATURAL R ON PROGRAM MO 65102-0176	ESOURCES		
REFER TO THE APPLICATION O	VFRVIFW	END OF PART A.	THER PART	B NEEDS TO B	E COMPLETE