

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

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

Raccoon Creek Operating Utility Company, Inc.
Villages at Whiteman WWTF
SE 170 Rd and SE 125 Rd Intersection
Knob Noster, MO 65336

for the construction of (described facilities):

See attached.

Permit Conditions:

See attached.

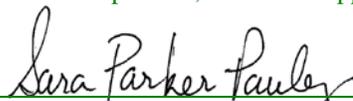
Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo, and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources (Department).

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 7, 2015
Effective Date


Sara Parker Pauley, Director, Department of Natural Resources

April 6, 2017
Expiration Date


John Madras, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

This is a DEMONSTRATION project and additional monitoring requirements are included in the operating permit in accordance with the draft Approval Process for Innovative Technology Factsheet.

The upgrade will be a demonstration project for the patent pending NitrOx™ Reactor System developed by Triplepoint Environmental. The NitrOx™ MBBR is designed for an average daily flow of 100,000 gpd with a maximum daily flow of 200,000 gpd. The upgrade will convert lagoon cell 1 to sludge holding, lagoon cell 2 will proceed the NitrOx™ 2-stage covered Moving Bed Biological Reactor (MBBR), followed by cell 3 for clarification. The existing tablet chlorination/tablet dechlorination system will remain in operation. With construction, a pump station will be built to pump water to the MBBR system from cell 2.

II. FINDING OF AFFORDABILITY

The Finding of Affordability is not applicable. The permittee is not a combined or separate sanitary sewer system or 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 in accordance with the plans and specifications submitted by 21 Design Group on December 15, 2014 and December 23, 2015.
3. The department must be contacted in writing prior to making any changes to the approved 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(8).
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)(E)2.
5. This construction permit is invalid for projects required to comply with the requirements contained in 10 CSR 20-4, "Grants and Loans"

6. Protection of drinking water supplies shall be in accordance with 10 CSR 20-8.120(10). “There shall be no physical connections between a public or private potable water supply system and a sewer, or appurtenance thereto which would permit the passage of any wastewater or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer manhole.”
7. Sewers in relation to water works structures shall meet the requirements of 10 CSR 23-3.010 with respect to minimum distances from public water supply wells or other water supply sources and structures.
 - A. Sewer mains shall be laid at least 10 feet horizontally from any existing or proposed water main. The distances shall be measured edge-to-edge. In cases where it is not practical to maintain a 10 foot separation, the department may allow a deviation on a case-by-case basis, if supported by data from the design engineer. Such a deviation may allow installation of the sewer closer to a water main, provided that the water main is in a separate trench or on an undisturbed earth shelf located on either side of the sewer and at an elevation so the bottom of the water main is at least 18 inches above the top of the sewer. If it is impossible to obtain proper horizontal and vertical separation as described above for sewers, the sewer must be constructed of slip-on or mechanical joint pipe or continuously encased and be pressure tested to 150 pounds per square inch to assure water tightness.
 - B. Manholes should be located at least 10 feet horizontally from any existing or proposed water main.
 - C. Manholes shall be located with the top access at or above grade level.
 - D. Sewers crossing water mains shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. The crossing shall be arranged so that the sewer joints will be equidistant and as far as possible from the water main joints. Where a water main crosses under a sewer, adequate structural support shall be provided for the sewer to maintain line and grade. When it is impossible to obtain proper vertical separation as stipulated above, one of the following methods must be specified:
 - a. The sewer shall be designed and constructed equal to the water pipe and shall be pressure tested to assure water tightness prior to backfilling; or
 - b. Either the water main or sewer line may be continuously encased or enclosed in a watertight carrier pipe which extends 10 feet on both sides of the crossing, measured perpendicular to the water main. The carrier pipe shall be of materials approved by the department for use in water main construction.
8. 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

www.dnr.mo.gov/env/wpp/epermit/help.htm. See www.dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm for more information.

9. A United States (U.S.) Army Corps of Engineers (COE) permit (404) and a Water Quality Certification (401) issued by the department or permit waiver may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied. If construction activity will disturb any land below the ordinary high water mark of jurisdictional waters of the U.S. then a 404/401 will be required. Since the COE makes determinations on what is jurisdictional, you must contact the COE to determine permitting requirements. You may call the department's Water Protection Program at 573-751-1300 for more information. See www.dnr.mo.gov/env/wpp/401/ for more information.
10. Upon completion of construction;
 - A. The Raccoon Creek Operating Utility Company, Inc. will become the continuing authority for operation, maintenance, and modernization of these facilities;
 - B. Submit the enclosed form Statement of Work Completed to the department in accordance with 10 CSR 20-6.010(5)(D);
 - C. Submit an electronic copy of the as builts; and
 - D. Submit a Form B - Application for an Operating Permit for Domestic or Municipal Wastewater, along with the Statement of Work Completed to receive the modified operating permit.

IV. REVIEW SUMMARY

1. AMMONIA

The Water Protection Program is providing this notice to inform permittees that EPA's published ammonia criteria for aquatic life protection is lower than the current Missouri criteria. The department has initiated stakeholder discussions on this topic and at this time, there is no firm target date for starting the rulemaking to adopt new standards. More information can be found at <http://dnr.mo.gov/pubs/pub2481.htm>.

The draft operating permit further discussed the proposed ammonia effluent limits. The treatment plant is being designed to meet the proposed 2013 EPA ammonia effluent limits.

2. CONSTRUCTION PURPOSE

The upgrade will be a demonstration project for the patent pending NitrOx™ Reactor System developed by Triplepoint Environmental. The upgrade will convert lagoon cell 1 to sludge holding, lagoon cell 2 will proceed the NitrOx™ 2-stage covered Moving Bed Biological Reactor (MBBR), followed by cell 3 for clarification. The existing tablet chlorination/tablet dechlorination system will remain in operation. With construction, a pump station will be built to pump water to the MBBR system from cell 2.

3. FACILITY DESCRIPTION

The existing facility is a three cell aerated lagoon with chlorine disinfection with dechlorination. The chlorine disinfection was installed under CP0000922 in 2011-2012. The permit was renewed February 1, 2014 with a schedule of compliance to meet ammonia effluent limits by January 31, 2017. Below is a summary of the existing facility's performance.

Parameter	Units	Permit Monthly Effluent Limit	Average discharge*
Flow	MGD	*	0.025
Biochemical Oxygen Demand ₅	mg/L	30	21.2
Total Suspended Solids	mg/L	30	14.5
Ammonia as N-summer	mg/L	*	14.6
Ammonia as N-winter	mg/L	*	18.9

* monitoring only

* discharge monitoring reports January 1, 2010 through March 1, 2015

4. COMPLIANCE PARAMETERS

The construction is to meet more protective effluent limits. As this is a demonstration project, for the first year of operation following construction, additional monitoring will be required before and after the MBBR. 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	1.4
Ammonia as N-winter	mg/L	2.8
pH	SU	6.5-9.0
Total Residual Chlorine	µg/L	8 (130 ML)
E. Coli	#/100mL	206

5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

The current design guides, 10 CSR 20-8 do not contain design parameters for this configuration of technology or for moving bed bioreactors. As a demonstration project, the data gathered with the operating permit will be used to help develop design criteria for future projects.

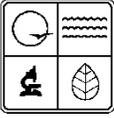
The NitrOx™ MBBR is designed for an average daily flow of 100,000 gpd with a maximum daily flow of 200,000 gpd. The influent to the reactor is assumed to have 45 mg/l BOD and TSS, and 33 mg/l ammonia. There are 2 tanks 11 ft x 11 ft x 15 ft deep with a side water depth of 12 ft. Total volume of the 2 tanks is 21,722 gallons. The average flow hydraulic retention time is 5.2 hours and the peak flow hydraulic retention time is 2.6 hours. An immersion tank heater will be installed during cold temperatures to maintain a minimum temperature of 5°C. The target dissolved oxygen residual after the MBBR process is 6 mg/l. There will be 2 tri-lobe positive displacement blowers. The lagoon cells will not have aeration only the NitrOx™ MBBR. The effluent from the MBBR will flow to the polishing lagoon cell prior to disinfection and discharge.

With the modification to the treatment plant, a new pump station will be built to pump water from cell 2 to the MBBR system. The pump station will be a Keen Pump packaged system with centrifugal KG-21 grinder pumps. The pump has a capacity of 104 gpm with total head of 53 feet. Along with the pump station, approximately 51 linear feet of 8 inch ductile iron pipe and 25 linear feet of 2 inch PVC SDR-21 forcemain will be installed and all necessary appurtenances to make a complete and usable wastewater treatment plant.

6. OPERATING PERMIT MODIFICATION

Operating permit MO-0109142 will require a modification to reflect the construction activities. Upon construction completion submit a Form B - Application for an Operating Permit for Domestic or Municipal Wastewater ($\leq 100,000$ gallons per day) with their Statement of Work Complete. The draft operating permit was public noticed February 20, 2015 through March 23, 2015 with no comments received. The facility has already paid for the operating permit modification. The modification and upgrades to the treatment plant removes the schedule of compliance from the operating permit.

Leasue Meyers, EI
Engineering Section
leasue.meyers@dnr.mo.gov



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: _____
 Attached is the No Degradation Evaluation Conclusion of Antidegradation Review form
 - 1.3 Has the department approved the proposed project's facility plan*?
 YES Date of Approval: _____ NO N/A (If Not Applicable, complete No. 1.4.)
 - 1.4 [Complete only if answered Not Applicable on No. 1.3.] Is a copy of the engineering report* for wastewater treatment facilities with a design flow less than 22,500 gpd included with this application?
 YES NO
 - 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 submittal. Denote which form: A B B2
 N/A Please explain: _____
 - 1.8 Is the facility currently under enforcement with the department or the Environmental Protection Agency? YES NO
 - 1.9 Is the appropriate fee included with this application? YES NO (See instructions for appropriate fee.)
- * Must be affixed with a Missouri registered professional engineer's seal, signature and date.

2.0 PROJECT INFORMATION

2.1 NAME OF PROJECT
Wastewater Treatment Facility Serving Villages at Whiteman Subdivision

2.2 PROJECT DESCRIPTION
 Project will consist of installing a new Moving Bed Biofilm Reactor (MBBR) between cells 2 and 3. Cell 3, the final cell, will continue to operate as a polishing cell.

2.3 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION
 Existing lagoon cell will be used for sludge storage.

2.4 DESIGN INFORMATION
 A. Current population: _____; Design population: 1,000
 B. Actual Flow: 64,000 gpd; Design Average Flow: 100,000 gpd;
 Actual Peak Daily Flow: _____ gpd; Design Maximum Daily Flow: _____ gpd

2.5 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 Villages at Whiteman WWTF		TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS	
ADDRESS (PHYSICAL) SE 170 Rd & SE 125 Rd Intersection	CITY Knob Noster	STATE MO	ZIP CODE 65336	COUNTY Johnson
Wastewater Treatment Facility: Mo- (Outfall 001 Of 001)				
3.1 Legal Description: _____ ¼, _____ SW ¼, _____ NE ¼, Sec. 35, T 46N, R 24W (Use additional pages if construction of more than one outfall is proposed.)				
3.2 UTM Coordinates Easting (X): 454205.29E Northing (Y): 4287169.47N 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 Raccoon Creek Operating Utility Company, Inc.		TELEPHONE NUMBER WITH AREA CODE (314) 283-7316	E-MAIL ADDRESS	
ADDRESS 3636 South Geyer Rd, Suite 100	CITY St. Louis	STATE MO	ZIP CODE 63127	

5.0 CONTINUING AUTHORITY: Permanent organization that will serve as the continuing authority for the operation, maintenance and modernization of the wastewater collection system.

NAME Raccoon Creek Operating Utility Company, Inc.		TELEPHONE NUMBER WITH AREA CODE (314) 283-7316	E-MAIL ADDRESS	
ADDRESS 3636 South Geyer Rd, Suite 100	CITY St. Louis	STATE MO	ZIP CODE 63127	

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.

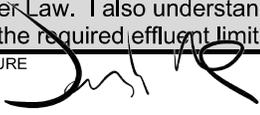
A. Is a copy of the certificate of convenience and necessity included with this application? YES NO

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 Benjamin Kuenzel, 21 Design Group		TELEPHONE NUMBER WITH AREA CODE (636) 283-0621	E-MAIL ADDRESS ben@21designgroup.net	
ADDRESS 1351 Jefferson, Suite 301	CITY Washington	STATE MO	ZIP CODE 63090	

7.0 PROJECT OWNER: I hereby certify that I am familiar with the information contained in this application and to the best of my knowledge and belief such information is true, complete, and accurate, and if granted this permit, I agree to abide by the Missouri Clean Water Law and all rules, regulations, orders, and decisions, subject to any legitimate appeal available to applicant under Missouri Clean Water Law. I also understand the issuance of the construction permit does not guarantee the proposed wastewater treatment will meet the required effluent limitations of the issued Missouri State Operating Permit for this facility.

PROJECT OWNER SIGNATURE PRINTED NAME
Josiah CoxDATE
12-11-14TITLE OR CORPORATE POSITION
President, Raccoon Creek Operating Utility Company, Inc.TELEPHONE NUMBER WITH AREA CODE
(314) 283-7316

E-MAIL ADDRESS

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.

PART B – LAND APPLICATION ONLY

(Submit only if the proposed construction project includes land application of wastewater.)

8.0 FACILITY INFORMATION

8.1 Type of wastewater to be irrigated: Domestic State/National Park Seasonal business
 Municipal Municipal with a pretreatment program or significant industrial users
 Other (explain) _____

8.2 Months when the business or enterprise will operate or generate wastewater:
 12 months per year Part of the year (list months): _____

8.3 This system is designed for:
 No-discharge.
 Partial irrigation when feasible and discharge rest of time.
 Irrigation during recreational season, April – October, and discharge during November – March.
 Other (explain) _____.

9.0 STORAGE BASINS

9.1 Number of storage basins: _____ (Use additional pages if greater than three basins.)

9.2 Type of basins: Steel Concrete Fiberglass Earthen Earthen with membrane liner

9.3 Storage basin dimensions at inside top of berm (feet). Report freeboard as feet from top of berm to emergency spillway or overflow pipe.

Basin #1:	Length _____	Width _____	Depth _____	Freeboard _____	Berm Width _____	% Slope _____
Basin #2:	Length _____	Width _____	Depth _____	Freeboard _____	Berm Width _____	% Slope _____
Basin #3:	Length _____	Width _____	Depth _____	Freeboard _____	Berm Width _____	% Slope _____

9.4 Storage Basin operating levels (report as feet below emergency overflow level).

Basin #1:	Maximum operating water level _____ ft	Minimum operating water level _____ ft
Basin #2:	Maximum operating water level _____ ft	Minimum operating water level _____ ft
Basin #3:	Maximum operating water level _____ ft	Minimum operating water level _____ ft

9.5 Design depth of sludge in storage basins.

Basin #1: _____ ft Basin #2: _____ ft Basin #3: _____ ft

9.6 Existing sludge depth, if the basins are currently in operation.

Basin #1: _____ ft Basin #2: _____ ft Basin #3: _____ ft

9.7 Total design sludge storage: _____ dry tons and _____ cubic feet

10.0 LAND APPLICATION SYSTEM

10.1 Number of irrigation sites _____ Total Acres _____ Maximum % field slopes _____

Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres

Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres

Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres

(Use additional pages if greater than three irrigation sites.)

10.2 Type of vegetation: Grass hay Pasture Timber Row crops

Other (describe) _____

10.3 Wastewater flow (dry weather) gallons per day: Average annual _____ Seasonal _____ Off-season _____

10.4 Land application rate (design flow including 1-in-10 year storm water flows):

Design: _____ inches/year _____ inches/hour _____ inches/day _____ inches/week

Actual: _____ inches/year _____ inches/hour _____ inches/day _____ inches/week

10.5 Total irrigation per year (gallons): Design: _____ gal Actual: _____ gal

10.6 Actual months used for irrigation (check all that apply):

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec

10.7 Land application rate is based on:

Hydraulic Loading Other (describe) _____

Nutrient Management Plan (N&P) If N&P is selected, is the plan included? YES NO