

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



## CONSTRUCTION PERMIT

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

Wildflower Community Association  
c/o Jason Wyant  
10223 Wildflower Drive  
Unionville, MO 63565

for the construction of (described facilities):

See attached.

Permit Conditions:

See attached.

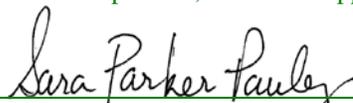
Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo, and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources (Department).

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 10, 2014  
Effective Date

  
Sara Parker Pauley, Director, Department of Natural Resources

September 9, 2016  
Expiration Date

  
John Madros, Director, Water Protection Program

## **CONSTRUCTION PERMIT**

### **I. CONSTRUCTION DESCRIPTION**

Modification of an existing two cell lagoon treatment facility by addition of a Nelson SAGR (submerged attached growth reactor); existing second cell to be partitioned with an earthen berm, first portion to be returned to service as a smaller second cell; SAGR will be placed in second portion, four way flow splitter, two SAGR cells each capable of independent operation, each 90 feet by 64 feet with a water depth of 6 feet, each cell will have four distribution laterals, cells to be filled with gravel media, coarse bubble diffusers, two 15 HP Kaeser blowers each with a capacity of 227 scfm, ultrasonic flow meter and recorder, together with all the necessary appurtenances and existing devices to make the facilities complete and usable. The upgraded treatment facility will maintain the capacity for treating waste from a population equivalent of 855 with an average daily discharge of 85,500 gallons. Peak flow factor is 2.9. This facility discharges to North Blackbird Creek, Putnam County.

### **II. FINDING OF AFFORDABILITY**

A 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 Shafer, Kline and Warren, Inc. on April 22, 2014.
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 Northeast 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 ten 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 ten 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 ten feet horizontally from any existing or proposed water main.
  - C. 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 ten 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 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 [www.dnr.mo.gov/env/wpp/epermit/help.htm](http://www.dnr.mo.gov/env/wpp/epermit/help.htm). See [www.dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm](http://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/](http://www.dnr.mo.gov/env/wpp/401/) for more information.

10. Upon completion of construction;
  - A. Submit the enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(D);
  - B. Submit an electronic copy of the as built if the project was not constructed in accordance with previously submitted plans and specifications; and
  - C. Submit a Form B, Application for an Operating Permit for Domestic or Municipal Wastewater ( $\leq 100,000$  gallons per day) along with the modification fee of \$750.00.

#### **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.pdf>.

The facility upgrade is intended to have ability to meet the anticipated ammonia limitations.

##### **2. CONSTRUCTION PURPOSE**

The existing two cell lagoon has ammonia effluent limitations become effective July 2015. In order to have the ability to meet the limits the lagoon is being upgraded. The upgrade involves adding a Nelson SAGR system to the existing lagoon.

##### **3. FACILITY DESCRIPTION**

The existing treatment facility is a two cell facultative lagoon with a design flow of 85,500 GPD. The upgrade includes splitting the second cell in two and placing a SAGR system in the final portion of the second cell. The upgrade also includes adding a new flow meter.

##### **4. COMPLIANCE PARAMETERS**

Missouri State Operating Permit issued July 13, 2012 has a schedule of compliance to meet ammonia limits in three years. This upgrade will allow the facility to consistently meet the prescribed ammonia limits. It is also anticipated that e-coli limits will be required when the permit is renewed. A schedule of compliance will be given to allow time to make necessary disinfection improvements. This project anticipates the future installation of UV disinfection with utility and space allocations.

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

Existing two cell lagoon, primary cell surface area of 3.3 acres, future second cell will have a surface area of 0.8 acres, calculated treatment out of second cell is approximately 55 mg/l BOD (winter), design of SAGR based on receiving lagoon effluent with a BOD of 75 mg/l and Ammonia of 20 mg/l; Missouri does not have design standards for SAGR treatment, review was based on Iowa design guidelines, all major design points are met; two independent cells, cell dimensions are 90 feet by 64 feet, each cell has 3.0 days of volume at design flow, each cell served by four distribution laterals that distribute water the length of the cell (90 feet), each lateral can be turned on or off, the minimum length of travel through the gravel media is approximately 12 feet, gravel media is covered by an insulating cover of mulch or similar material, gravel size is at least 80% between 3/8 inch and 1-inch, (actual sieve specs are more detailed) aeration is provided to the bottom of the cells through coarse bubble diffusers, two blowers provided each with 100% treatment capability, 15 HP Kaeser, positive displacement blowers each with a capacity of 227 scfm, aeration design factor includes providing 1.5 lbs. of oxygen for every lb. of BOD and 4.6 lbs. of oxygen for every lb. of ammonia, cells will be lined with a 60 mil HDPE liner; new ultrasonic flow meter to be placed at existing parshall flume; design flow of 85,000 GPD and outfall location remain unchanged.

## **6. OPERATING PERMIT MODIFICATION**

Operating permit MO-0057215 will require a modification to reflect the construction activities. Upon construction completion submit a modification fee of \$750.00 and Form B - Application for an Operating Permit for Domestic or Municipal Wastewater. A public notice of permit pending was issued 8-1-2014, and expired with no comments received.

Review Engineer: Andrew Appelbaum, P.E.  
Unit Chief: Cindy LePage, P.E.  
Date: 8-26-2014  
[Andy.Appelbaum@dnr.mo.gov](mailto:Andy.Appelbaum@dnr.mo.gov)



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

**RECEIVED**

APP. 22 2014

WATER PROTECTION PROGRAM

CPO001645  
 AP18154 C13187

FOR DEPARTMENT USE ONLY	
APP NO.	CP NO.
DATE RECEIVED 4-22-14	CHECK NO. 25270
DATE RECEIVED \$750.00	JS.

**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~~ *Statements in cover ltr*
- 1.3 Has the department approved the proposed project's facility plan\*?  
 YES Date of Approval: 5/13  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 *Will provide*
- 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: CP only No new limits or conditions.
- 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.)

**2.0 PROJECT INFORMATION**

2.1 NAME OF PROJECT  
 Wildflower Community Association Wastewater System Improvements

2.2 PROJECT DESCRIPTION  
 Relocate part of the existing berm for cell 2 to reduce the size of the lagoon and install a SAGR treatment system.

2.3 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION  
 New sludge is to be retained in the lagoons after project completion. Cell 2 has just been cleaned out and properly land applied. Cell 1 will likely be cleaned out within the next 12 months.

2.4 DESIGN INFORMATION  
 A. Current population: varies; Design population: 855  
 B. Actual Flow: 69,300 gpd; Design Average Flow: 85,500 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

**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

**3.0 WASTEWATER TREATMENT FACILITY**

NAME Wildflower Community Association Wastewater		TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS	
ADDRESS (PHYSICAL) behind the dam of Lake Thunderhead	CITY Unionville, MO	STATE MO	ZIP CODE 63565	COUNTY Putnam
Wastewater Treatment Facility: Mo- 0057215 (Outfall 001 Of 001 )				
3.1 Legal Description: _____ ¼, _____ ¼, SE _____ ¼, Sec. 10, T 66N, R 19W (Use additional pages if construction of more than one outfall is proposed.)				
3.2 UTM Coordinates Easting (X): _____ Northing (Y): _____ For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)				
3.3 Name of receiving streams: <input checked="" type="checkbox"/> N Blackbir				

**4.0 PROJECT OWNER**

NAME Wildflower Community Association, c/o Jason Wyant		TELEPHONE NUMBER WITH AREA CODE (660) 947-3267	E-MAIL ADDRESS jason@wcalakethunderhead.com	
ADDRESS 10223 Wildflower Drive	CITY Unionville	STATE MO	ZIP CODE 63565	

**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 Same as owner		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  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 *N.A.*

**6.0 ENGINEER**

ENGINEER NAME / COMPANY NAME Dennis Stith & Barbara Li, Shafer, Kline & Warren, Inc.		TELEPHONE NUMBER WITH AREA CODE (573) 234-2609	E-MAIL ADDRESS bli@SKW-INC.COM	
ADDRESS 3200 Penn Terrace, Suite 100	CITY Columbia	STATE MO	ZIP CODE 65202	

**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  
*Jason Wyant*

PRINTED NAME  
*Jason Wyant*

DATE  
*4-11-14*

TITLE OR CORPORATE POSITION  
*Lake Manager*

TELEPHONE NUMBER WITH AREA CODE  
*660-947-3267*

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.**