

STATE OF MISSOURI  
DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION



# CONSTRUCTION PERMIT

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

City of Bethany  
206 North 16<sup>th</sup> Street  
Bethany, MO 64424

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.

June 5, 2015  
Effective Date

  
Sara Parker Pauley, Director, Department of Natural Resources

June 4, 2017  
Expiration Date

  
John Madras, Director, Water Protection Program

## **CONSTRUCTION PERMIT**

### **I. CONSTRUCTION DESCRIPTION**

The Bethany wastewater treatment facility is a 504,000 GPD plant. The facility proposed to demolish the existing facilities and replace them with an entirely new extended aeration treatment facility. Construction will include a new influent pump station, headworks with screening and grit removal, a new extended aeration treatment process with four aeration basins, final clarification, the ultraviolet disinfection unit, aerobic sludge digesters, and sludge drying beds.

The 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 determine Cost Analysis for Compliance because the permit contains no new conditions or requirements that convey a new cost to the facility.

### **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 Snyder & Associates Engineers & Planners LLC on March 28, 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 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. A full closure plan of the current treatment plant shall be submitted to the department's Kansas City Regional Office for review and approval of any permitted wastewater treatment system being replaced. In accordance with 10 CSR 20-6.010(12), the closure plan must meet the requirements outlined in Standard Conditions Part III of the Missouri State Operating Permit No. MO- 0033502. 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.
11. Upon completion of construction;
  - A. The city of Bethany 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 if the project was not constructed in accordance with previously submitted plans and specifications; and
  - D. 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. 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 city has designed the new treatment plant with the EPA's ammonia criteria in its consideration. The proposed treatment plant is expected to be able to meet the new criteria.

## **2. CONSTRUCTION PURPOSE**

The current wastewater treatment facility contains both a mechanical wastewater treatment plant and an 18-acre single cell wastewater stabilization lagoon. This facility has provided efficient, cost-effective wastewater treatment for many years; however, it is reaching its design life. There are additional concerns that portions of the facility are subject to flooding. Future effluent limitations cannot be reliably expected from the present treatment process. After evaluating all options for future wastewater treatment, the city of Bethany decides to construct a new wastewater treatment plant at a new site, but still use the current discharging structure. The new plant uses an activated sludge processes by Aero-Mod.

## **3. FACILITY DESCRIPTION**

The city of Bethany proposed to construct a new wastewater treatment facility off-site of the existing plant. The new site locates approximately 2,500 feet east and north of the existing site without changing its effluent point. The proposed location is at higher ground elevation that will not be subject to flooding.

## **4. COMPLIANCE PARAMETERS**

The new wastewater treatment plant will help to meet effluent limitations consistently. Final effluent limits of BOD are 45 mg/L weekly average and 30 mg/L monthly average; Final effluent limits of TSS are 45 mg/L weekly average and 30 mg/L monthly average; Final effluent limits of E. Coli are 1030 #/100 mL daily maximum and 206 #/100 mL monthly average; Final effluent limits of Oil & Grease are 15 mg/L weekly average and 10 mg/L monthly average; Final effluent limits of Ammonia as N are 5.6 mg/L daily maximum and 1.6 mg/L monthly average during April 1 to September 30; Final effluent limits of Ammonia as N are 11.8 mg/L daily maximum and 3.3 mg/L monthly average during October 1 to March 31.

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

Construction will cover the following items:

- Influent Lift Station – a submersible tri-plex lift station will be constructed on-site. The proposed lift station will consist of a cast-in-place concrete wetwell containing three submersible non-clog pumps (two influent pumps and one equalization pump) and a separate concrete vault containing pump control valves and influent meter. Each influent pump has a capable of operating at 700 gallons per minute (gpm) at 26 feet of total dynamic head and equalization pump has a capable of operating at 1,400 gpm at 20 feet of total dynamic head.
- Headworks – The headworks building will contain a step style screen for the removal of solids, paper, and plastics from the influent stream. Screen shall be capable of processing the specified peak flow 2MGD. Screen bars shall be stainless steel and bar spacing will be less than ½-inch. The step screen will be followed by a vortex style grit chamber for the removal of inorganic soil particles, sand, and cinders. The grit chamber has the maximum hydraulic capacity of 2.5 MGD. The grit device shall be capable of removing 95% of grit greater than or equal to 50 mesh (300 microns) in size.

- Extended aeration treatment system – Aero-Mod Sequox design will be installed at the facility. The system utilizes a series of compartments within the treatment basin, each with a unique aeration requirement, to satisfy effluent requirements. The system includes: one selector tank (15' X 26'), two first stage aeration basins (32' X 38'), two second stage aeration basins (15' X 82'), and two aerobic digesters (24' X 40'). All components are contained inside an 82' X 100'6" rectangular cast in place concrete tank. This modular self-contained process has the aeration, clarifiers, and sludge digestion. Aero-MOD utilizes diffusers for aeration. Two 75 BHP positive displacement blowers are used to maintain the aeration. Each air blower has a capable of 1,640 scfm at discharge pressure of 6.7 psig.
- Clarification – Following the aeration tank is the two column-supported spiral scraper type clarifiers. The clarifiers are the center-feed circular tanks with 25.5 feet radius and 16.2 feet in depth. Each clarifier provides a volume of 33,093 cubic feet (247,574 gallons). Both of clarifiers provide a total of 66, 186 cubic feet (495,148 gallons) volume or almost 24 hours of detention time at the design flow. The surface settling rate of each clarifier is 124 gallons per day per square foot, which is less than the maximum surface settling rate in 10 CSR 20-8 of 1,000 gallons per day per square foot. There will be installed within each clarifier chamber a positive scum and skimming recirculation system.
- RAS/WAS Pump Station – a submersible lift station for RAS (return activated sludge) and WAS (waste activated sludge) will be constructed on-site to transfer sludge. The proposed pump station will consist of a cast-in-place concrete wetwell containing two submersible non-clog pumps and a separate concrete vault containing pump control valves. Each sludge pump has a capable of operating at 350 gpm at 7.5 feet of total dynamic head.
- UV-Disinfection – Furnish and install a complete and operational open channel, gravity flow, UV disinfection system. The system will have two banks placed within a single concrete channel, each bank with three modules. The design is based on a peak flow of 2,016,000 GPD.
- Bio-Solid Management – The digested sludge from the aerobic digestion process will be dewatered before disposal. Provisions will be made to dispose of the sludge in cake. The dewatering process to produce sludge cake will be by use of a belt style press. The sludge drying bed (110 feet X 80 feet) is divided into three sections; each has area of 37 feet by 80 feet.
- Emergency Power – Emergency generators and automatic transfer switches will be provided to operate the treatment units and facilities in event of power loss at the treatment plant.

**6. OPERATING PERMIT MODIFICATION**

It is expected that the facility owner will include a new facility description in their next operating permit renewal application to reflect the construction of the new wastewater treatment plant.

Lei Hou, PE  
Engineering Section  
[lei.hou@dnr.mo.gov](mailto:lei.hou@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 \$300.00	CHECK NO. 82710
DATE RECEIVED 2/15/15	

1040-0012 C14440  
 APPROVED PRO001733

**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: USDA/CDBG Project #: \_\_\_\_\_
- 1.2 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?  
 YES Date of Approval: 06-14
- 1.3 Has the department approved the proposed project's facility plan\*?  
 YES Date of Approval: 12-12  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  
 Bethany WWTP

2.2 PROJECT DESCRIPTION  
 Construction of an extended aeration treatment plant consisting of an influent pump station, headworks building with screening and grit removal, four aeration basins, final clarification, UV disinfection, aerobic sludge digesters, and sludge drying beds.

2.3 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION  
 Aerobic digestion of sludge thickened with sludge drying beds and land applied

2.4 DESIGN INFORMATION  
 A. Current population: 3203; Design population: 3460  
 B. Actual Flow: 442,000 gpd; Design Average Flow: 500,000 gpd;  
 Actual Peak Daily Flow: 1,479,000 gpd; Design Maximum Daily Flow: 2,000,000 gpd; Design Wet Weather Event: N/A

\*Flows are limited by downstream pump station capacities.

2.5 ADDITIONAL INFORMATION  
 A. Is a topographic map attached?  YES  NO  
 B. Is a process flow diagram attached?  YES  NO

<b>3.0 WASTEWATER TREATMENT FACILITY</b>				
NAME Betany WWTP		TELEPHONE NUMBER WITH AREA CODE		E-MAIL ADDRESS wwtp@grm.net
ADDRESS (PHYSICAL) 31771 West 192nd Avenue	CITY Bethany	STATE MO	ZIP CODE 64424	COUNTY Harrison
Wastewater Treatment Facility: Mo- 0033502 (Outfall 1 Of 1 )				
3.1 Legal Description: _____ ¼, SW _____ ¼, SW _____ ¼, Sec. 16, T 63N, R 28W (Use additional pages if construction of more than one outfall is proposed.)				
3.2 UTM Coordinates Easting (X): 409718 Northing (Y): 4456579 For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)				
3.3 Name of receiving streams: <u>Big Creek</u>				
<b>4.0 PROJECT OWNER</b>				
NAME City of Bethany		TELEPHONE NUMBER WITH AREA CODE (660) 425-3511		E-MAIL ADDRESS bethadm@grm.net
ADDRESS 206 North 16th Street	CITY Bethany	STATE MO	ZIP CODE 64424	
<b>5.0 CONTINUING AUTHORITY: Permanent organization that will serve as the continuing authority for the operation, maintenance and modernization of the wastewater collection system.</b>				
NAME Same as Project 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. <input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> 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? <input type="checkbox"/> YES <input type="checkbox"/> 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? <input type="checkbox"/> YES <input type="checkbox"/> 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? <input type="checkbox"/> YES <input type="checkbox"/> 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? <input type="checkbox"/> YES <input type="checkbox"/> NO				
D. Is a copy of the Missouri Secretary of State's nonprofit corporation certificate included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO				
<b>6.0 ENGINEER</b>				
ENGINEER NAME / COMPANY NAME Snyder & Associates, Inc.		TELEPHONE NUMBER WITH AREA CODE (816) 364-5222		E-MAIL ADDRESS aemacias@snyder-associates.com
ADDRESS 802 Francis	CITY St. Joseph	STATE MO	ZIP CODE 66501	
<b>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.</b>				
PROJECT OWNER SIGNATURE 				
PRINTED NAME Jan Hagler			DATE 1/30/15	
TITLE OR CORPORATE POSITION City Administrator		TELEPHONE NUMBER WITH AREA CODE (660) 425-3511		E-MAIL ADDRESS bethadm@grm.net
Mail completed copy to: MISSOURI DEPARTMENT OF NATURAL RESOURCES WATER PROTECTION PROGRAM P.O. BOX 176 JEFFERSON CITY, MO 65102-0176				
<b>END OF PART A.</b>				
<b>REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHETHER PART B NEEDS TO BE COMPLETE.</b>				