

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



**CONSTRUCTION PERMIT**

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

David Byrd  
Mayor  
City of Wardell  
108 W. Broad Street  
Wardell, MO 63879

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 12, 2019  
Effective Date

April 11, 2021  
Expiration Date

  
Edward B. Galbraith, Director, Division of Environmental Quality

  
Chris Wieberg, Director, Water Protection Program

## CONSTRUCTION PERMIT

### **I. CONSTRUCTION DESCRIPTION**

The proposed project will add a Lemna Cover and Polishing Reactor System to an existing three cell aerated lagoon.

Construction will include replacing existing baffles between cells one and two, and between cells two and three with new floating baffles; addition of a floating cover over the entire lagoon, addition of a Lemna Polishing Reactor consisting of five fixed film biological treatment modules in an aerated cast-in place concrete chamber, addition of an ultraviolet disinfection system, upgrade of aeration blowers from 10 HP to 15 HP, a mobile emergency generator, relocation of outfall, and all necessary appurtenances to make a complete and usable wastewater treatment facility

This project will also include general site work appropriate to the scope and purpose of the project. Design flow of facility will remain at 130,000 GPD and the outfall will be changed to a location approximately 75 feet upstream. Discharge is to Old Channel Little River in the NW1/4, of the NW 1/4, of Section 25, T20N, R11E, Pemiscot County. UTM Coordinates: X=785090, Y=4027305 (Zone 15).

### **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 required to determine “findings of affordability” because the permit applies to a **combined or separate sanitary sewer system for a publically-owned treatment works.**

**Cost Analysis for Compliance** - The Department has made a reasonable search for empirical data indicating the permit is affordable. The search consisted of a review of Department records that might contain economic data on the community, a review of information provided by the applicant as part of the application, and public comments received in response to public notices of this draft permit. If the empirical cost data was used by the permit writer, this data may consist of median household income, any other ongoing projects that the Department has knowledge, and other demographic financial information that the community provided as contemplated by Section 644. 145.3. See **APPENDIX – COST ANALYSIS FOR COMPLIANCE**. This was presented in the Public Notice for Operating Permit Modification.

### **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 Smith and Co. Engineers on October 24, 2018 and March 19, 2019.
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(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 Southeast Regional Office per 10 CSR 20-7.015(9)(G).
5. The wastewater treatment facility shall be located at least fifty feet (50') from any dwelling or establishment.
6. The wastewater treatment facility shall be located above the twenty-five (25)-year flood level.
7. Wastewater treatment facility shall not be located within one hundred feet (100'), and preferably three hundred feet (300') of any water well or water supply structure.
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 [dnr.mo.gov/env/wpp/epermit/help.htm](http://dnr.mo.gov/env/wpp/epermit/help.htm). See [dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm](http://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 [dnr.mo.gov/env/wpp/401/](http://dnr.mo.gov/env/wpp/401/) for more information.
10. Upon completion of construction:
  - A. Submit an electronic copy of the as built's if the project was not constructed in accordance with previously submitted plans and specifications; and
  - B. Submit the enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(D) and request the operating permit modification be issued.

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

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

Current aerated lagoon discharge frequently exceeds ammonia limits and e-coli limits in operating permit. Proposed upgrade will provide additional treatment for reduction of Ammonia and will provide disinfection.

City of Wardell is under an Abatement Order on Consent to correct effluent limit violations of Missouri State Operating Permit MO-0052132.

##### **2. FACILITY DESCRIPTION**

The existing lagoon is a single earthen basin with an HDPE liner that has three cells created by two baffles. The lagoon is aerated. The total volume of all three cells is approximately 2.68 million gallons

The facility improvement will cover the lagoon with a modular floating cover; add a fixed film Lemna Polishing Reactor, and add Ultraviolet disinfection.

The Wardell WWTF is located near Broad Street and School Drive, City of Wardell, in Pemiscot County, Missouri. The facility has a design average flow of 130,000 gpd and serves an organic population equivalent of approximately 1300 people.

### **3. COMPLIANCE PARAMETERS**

The existing facility cannot consistently meet effluent ammonia limits of 1.1 mg/l.(April – September), and 2.7 mg/l (October – March) and e-Coli limits of 206 colonies/100ml. These limits are established in Operating Permit MO-0052132, effective January 1, 2017. The proposed project is intended to meet all final effluent limits.

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

The current design guides, 10 CSR 20-8, do not contain design parameters for the nitrification technology, Lemna Polishing Reactor.

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

- The existing lagoon is a single earthen basin with an HDPE liner that has three cells created by two baffles. The lagoon is aerated. The total volume of all three cells is approximately 2.68 million gallons.

- Lagoon Cell No. 1 – The influent is pumped into Lagoon Cell No. 1 by three separate force mains from existing pump stations located off the treatment plant site. Lagoon Cell No. 1 is a complete-mix aerated cell using 19 aeration diffusers. It has a surface area of approximately 28,224 sq. ft. (165 ft. X 165 ft.) At normal operating depth (10.1 ft.) the volume is approximately 1,190,000 gallons. This provides approximately 9.1 days of retention at the design flow of 130,000 GPD.
- Cell No. 2 has a surface area of approximately 18,150 sq. ft. and a wastewater volume of 725,600 gallons. Volume assumes 2 feet of sludge storage on bottom. This provides approximately 5.6 days of retention at the design flow. Cell 2 is a partial aerated cell with 11 diffusers.
- Cell No. 3 has a surface area of approximately 18,975 sq. ft. and a wastewater volume of 767,800 gallons. Volume assumes 2 feet of sludge storage on bottom. This provides approximately 5.9 days of retention at the design flow. Cell 2 is a partial aerated cell with 3 diffusers.

**Construction will cover the following items:**

- Design flow will remain at 130,000 GPD with a Population Equivalent of 1300 based on organic loading to the system.
- A Lemna Polishing Reactor System and Ultraviolet Disinfection will be installed to supplement the existing 3 cell aerated lagoon. System design based on an influent ammonia level of 25 mg/l.
- Aeration – Current 10 HP blowers will be upgraded with two 15 HP blowers. Additional capacity is primarily to provide oxygen to the Polishing Reactor. Proposed Sutorbuilt Model Legend 4 L DSL; with a required minimum capacity of 324 scfm; discharge pressure 5.63 psig, 3 phase.
- Baffle system – Two floating curtain baffles to replace the two existing baffles. Minimum thickness of 30 mil, constructed of industrial grade XR-5 geomembrane; baffle to have water tight seal against the lagoon berms and lagoon bottom. Baffles to be integral to the insulated floating cover. Flow through windows will be 26 inches by 26 inches, one in each baffle.
- Insulated floating lagoon cover – Modular insulated pond cover to completely cover all three lagoon cells. Floating expanded polystyrene foam panels encased in HDPE geomembrane. Constructed generally in 7.5 ft. X 49.5 ft. panels covered in HDPE with a minimum thickness of 40 mil.
- Polishing Reactor. Five fixed film biological treatment modules with a dimension of 6 ft. x 6 ft. x 8 ft. each with manufactured PVC media having an approximate density of 68 sf of surface area/cf. Pods to be placed in cast-in-place concrete

chamber 37.5 ft. X 7.5 ft. X 13.5 ft.; liquid depth of 10 feet. A floating insulating cover will be installed in the tank.

- Disinfection - Open Channel Ultraviolet (UV) – An open channel, gravity flow, low pressure high intensity UV disinfection system capable of treating a peak flow of 400,000 gpd while delivering a minimum UV intensity of 30 mJ/cm<sup>2</sup> with an expected ultraviolet transmissivity of 65% or greater. The single open channel UV system consists of two banks in series with 4 modules per bank and 2 lamps per module. The disinfected effluent will flow by gravity through flow measurement equipment and to Outfall No. 001.
- Relocated Outfall – The new outfall location is approximately 75 ft. southwest and upstream from the current outfall location. The outfall consists of an 8 inch discharge pipe with flap valve. A drop of approximately 6 inches allows for discrete effluent samples.
- Emergency Power – A 48 kW emergency standby diesel mobile generator and quick connect transfer switch will be provided to operate the treatment facility in event of power failure.

## **5. OPERATING PERMIT**

Operating permit MO-0052132 will require a modification to reflect the construction activities. The modified Wardell WWTF, MO-0052132, was successfully public noticed from March 8, 2019 to April 8, 2019 with no comments received. Submit the Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(D) and request the operating permit modification be issued.

Andrew Appelbaum, P.E.  
Engineering Section  
[andy.appelbaum@dnr.mo.gov](mailto:andy.appelbaum@dnr.mo.gov)

## **APPENDIX – Cost Analysis for Compliance:**

**Missouri Department of Natural Resources  
Water Protection Program  
Cost Analysis for Compliance  
(In accordance with RSMo 644.145)**

**Wardell WWTF, Permit Modification  
City of Wardell  
Missouri State Operating Permit #MO-0052132**

Section 644.145 RSMo requires the Department of Natural Resources (Department) to make a “finding of affordability” when “issuing permits under” or “enforcing provisions of” state or federal clean water laws “pertaining to any portion of a combined or separate sanitary sewer system for publicly-owned treatment works.” This cost analysis does not dictate how the permittee will comply with new permit requirements.

### **New Permit Requirements**

The permit also requires compliance with new influent monitoring requirements for total nitrogen and total phosphorus.

### **Connections**

The number of connections was reported by the permittee on the permit modification application.

<b>Connection Type</b>	<b>Number</b>
Residential	237
Commercial	22
Industrial	
<b>Total</b>	<b>259</b>

### **Data Collection for this Analysis**

This cost analysis is based on data available to the Department as provided by the permittee and data obtained from readily available sources. The financial questionnaire available to permittees on the Department’s website (<http://dnr.mo.gov/forms/780-2511-f.pdf>) is a required attachment to the permit renewal application. As a permit modification the financial questionnaire submitted with the renewal application in June 2016 was used for some of the information.

### **Eight Criteria of 644.145 RSMo**

The Department must consider the eight (8) criteria presented in subsection 644.145 RSMo to evaluate the cost associated with new permit requirements.

#### **(1) A community’s financial capability and ability to raise or secure necessary funding;**

<b>Criterion 1 Table. Current Financial Information for the City of Wardell</b>	
Current Monthly User Rates per 5,000 gallons*	\$32.00
Median Household Income (MHI) <sup>1</sup>	\$31,076



Current Annual Operating Costs (excludes depreciation)	\$80,000.00
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\*User Rates were reported by the permittee on the Financial Questionnaire submitted with renewal application June 2016.

**(2) Affordability of pollution control options for the individuals or households at or below the median household income level of the community;**

The following tables outline the estimated costs of the new permit requirements:

Criterion 2A Table. Estimated Cost Breakdown of New Permit Requirements			
New Requirement	Frequency	Estimated Cost	Estimated Annual Cost
Total Phosphorus sampling	Quarterly	\$24	\$96
Total Nitrogen sampling	Quarterly	\$73	\$292
Total Estimated Annual Cost of New Permit Requirements			\$388

Criterion 2B Table. Estimated Costs for New Permit Requirements		
(1)	Estimated Annual Cost	\$388
(2)	Estimated Monthly User Cost for New Requirements <sup>2</sup>	\$0.12
	Estimated Monthly User Cost for New Requirements as a Percent of MHI <sup>3</sup>	0.005%
(3)	Total Monthly User Cost*	\$32.12
	Total Monthly User Cost as a Percent of MHI <sup>4</sup>	1.240%

\* Current User Rate + Estimated Monthly Costs of New Sampling Requirements

Due to the minimal cost associated with new permit requirements, the Department anticipates an extremely low to no rate increase will be necessary, which could impact individuals or households of this community.

**(3) An evaluation of the overall costs and environmental benefits of the nutrient monitoring;**

**Nutrient Monitoring**

Nutrients are mineral compounds that are required for organisms to grow and thrive. Of the six (6) elemental macronutrients, nitrogen and phosphorus are generally not readily available and limit growth of organisms. Excess nitrogen and phosphorus will cause a shift in the ecosystem's food web. Once excess nitrogen and phosphorus are introduced into a waterbody, some species' populations will dramatically increase, while other populations will not be able to sustain life. Competition and productivity are two factors in which nutrients can alter aquatic ecosystems and the designated uses of a waterbody. For example, designated uses, such as drinking water sources and recreational uses, become impaired when algal blooms take over a waterbody. These blooms can cause foul tastes and odors in the drinking water, unsightly appearance, and fish mortality in the waterbody. Some algae also produce toxins that may cause serious adverse health conditions such as liver damage, tumor promotion, paralysis, and kidney damage. The monitoring requirements for nitrogen and phosphorus have been added to the permit to provide data regarding the health of the receiving stream's aquatic life. A healthy ecosystem is beneficial as it provides reduced impacts on human and aquatic health as well as recreational opportunities.

**(4) Inclusion of ongoing costs of operating and maintaining the existing wastewater collection and treatment system, including payments on outstanding debts for wastewater collection and treatment systems when calculating projected rates:**

The community reported that their outstanding debt for their current wastewater collection and treatment systems is \$340,544.91. The community reported that each user pays \$32.00 monthly, of which, \$9.60 is used toward payments on the current outstanding debt.

**(5) An inclusion of ways to reduce economic impacts on distressed populations in the community, including but not limited to low and fixed income populations. This requirement includes but is not limited to:**

- (a) Allowing adequate time in implementation schedules to mitigate potential adverse impacts on distressed populations resulting from the costs of the improvements and taking into consideration local community economic considerations.
- (b) Allowing for reasonable accommodations for regulated entities when inflexible standards and fines would impose a disproportionate financial hardship in light of the environmental benefits to be gained.

The following table characterizes the current overall socioeconomic condition of the community as compared to the overall socioeconomic condition of Missouri. The following information was compiled using the latest U.S. Census data.

**Criterion 5 Table. Socioeconomic Data <sup>1, 5-9</sup> for the City of Wardell**

No.	Administrative Unit	Wardell Town	Missouri State
1	Population (2016)	309	6,059,651
2	Percent Change in Population (2000-2016)	11.2%	8.3%
3	2016 Median Household Income (in 2017 Dollars)	\$31,076	\$50,417
4	Percent Change in Median Household Income (2000-2016)	8.8%	-5.9%
5	Median Age (2016)	42.9	38.3
6	Change in Median Age in Years (2000-2016)	5.6	2.2
7	Unemployment Rate (2016)	6.9%	6.6%
8	Percent of Population Below Poverty Level (2016)	17.8%	15.3%
9	Percent of Household Received Food Stamps (2016)	27.7%	13.0%
10	(Primary) County Where the Community Is Located	Pemiscot County	

**(6) An assessment of other community investments and operating costs relating to environmental improvements and public health protection;**

From the 2016 Financial Questionnaire the City reported that they have a combined water and sewer project in process. The estimated amount is \$1,656,000. The water project is planned to be completed at the end of 2016 when they will begin to work on the sewer project which includes the installation of UV disinfection. The current user rate per 5,000 gallons per month is \$32.00.

**(7) An assessment of factors set forth in the United States Environmental Protection Agency's guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial Capability Assessment and Schedule Development" that may ease the cost burdens of implementing wet weather**

**control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards;**

The new requirements associated with this permit will not impose a financial burden on the community, nor will they require the City of Wardell to seek funding from an outside source.

**(8) An assessment of any other relevant local community economic conditions.**

The City reported that they are a small community with a decreasing population. They report that most of the citizens are unemployed or live on a fixed income. The City's lagoon was built in 2005 so there is still outstanding debt of \$340,000.

The Department contracted with Wichita State University to complete an assessment tool that would allow for predictions on rural Missouri community populations and future sustainability. The purpose of the study is to use a statistical modeling analysis in order to determine factors associated with each rural Missouri community that would predict the future population changes that could occur in each community. A stepwise regression model was applied to 19 factors which were determined as predictors of rural population change in Missouri. The model established a hierarchy of the predicting factors which allowed the model to place a weighted value on each of the factors. A total of 745 rural towns and villages in Missouri received a weighted value for each of the predicting factors. The weighted values for each town / village were then added together to determine an overall decision score. The overall decision scores were then divided into five categories and each town was assigned to a different categorical group based on the overall decision score. The categorical groups were developed from the range of overall scores across all rural towns and villages within Missouri.

Based on the assessment tool, the City of Wardell has been determined to be a category 5 community. This means that the City of Wardell is predicted to be stable over time.

**Conclusion and Finding**

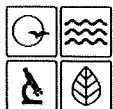
As a result of new regulations, the Department is proposing modifications to the current operating permit that may require the permittee to increase monitoring. The Department has considered the eight (8) criteria presented in subsection 644.145 RSMo to evaluate the cost associated with the new permit requirements.

This analysis examined whether the new sampling requirements affect the ability of an individual customer or household to pay a utility bill without undue hardship or unreasonable sacrifice in the essential lifestyle or spending patterns of the individual or household. After reviewing the above criteria, the Department finds that the new sampling requirements may result in a low burden with regard to the community's overall financial capability and a low financial impact for most individual customers/households; therefore, the new permit requirements are affordable.

**References**

1. (A) 2016 MHI in 2016 Dollar: United States Census Bureau. 2012-2016 American Community Survey 5-Year Estimates, Table B19013: Median Household Income in the Past 12 Months (in 2016 Inflation-Adjusted Dollars).  
[http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_5YR\\_B19013&prodType=table](http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_B19013&prodType=table).  
(B) 2000 MHI in 1999 Dollar: U.S. Census Bureau (2002) 2000 Census of Population and Housing, Summary Population and Housing Characteristics, PHC-1-27, Missouri, Table 2. Age and Sex: 2000, Washington, DC.  
<http://www.census.gov/prod/cen2000/phc-2-27-pt1.pdf>.  
(C) 2017 CPI, 2016 CPI and 1999 CPI: For United States, United States Bureau of Labor Statistics (2017) Consumer Price Index - All Urban Consumers, United States City Average. All Items. 1982-84=100.  
[http://data.bls.gov/timeseries/CUUR0000SA0?data\\_tool=Xgtable](http://data.bls.gov/timeseries/CUUR0000SA0?data_tool=Xgtable). For Missouri State: United States Bureau of Labor Statistics (2017) Consumer Price Index - All Urban Consumers, Midwest Urban Areas, All Items. 1982-84=100.  
[http://data.bls.gov/timeseries/CUUR0200SA0?data\\_tool=Xgtable](http://data.bls.gov/timeseries/CUUR0200SA0?data_tool=Xgtable).  
(D) 2016 MHI in 2017 Dollar: 2016 MHI in 2016 Dollar x 2017 CPI / 2016 CPI; 2000 MHI in 2017 Dollar: 2000 MHI in 1999 Dollar x 2017 CPI / 1999 CPI.  
(E) Percent Change in Median Household Income (2000-2016) = (2016 MHI in 2017 Dollar - 2000 MHI in 2017 Dollar) / (2000 MHI in 2017 Dollars).
2.  $(\$388.00/259)/12 = \$0.12$  (Estimated Monthly User Cost for New Requirements)
3.  $(0.12/(31,076/12))100\% = 0.005\%$  (New Sampling Only)

4.  $(32.12/(31,076/12))100\% = 1.24\%$  (Total User Cost)
5. (A) Total Population in 2016: United States Census Bureau. 2012-2016 American Community Survey 5-Year Estimates, Table B01003: Total Population - Universe: Total Population.  
[http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_5YR\\_B01003&prodType=table](http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_B01003&prodType=table).  
(B) Total Population in 2000: U.S. Census Bureau (2002) 2000 Census of Population and Housing, Summary Population and Housing Characteristics, PHC-1-27, Missouri, Table 2. Age and Sex: 2000, Washington, DC.  
<http://www.census.gov/prod/cen2000/phc-2-27-pt1.pdf>.  
(C) Percent Change in Population (2000-2016) = (Total Population in 2016 - Total Population in 2000) / (Total Population in 2000).
6. (A) Median Age in 2016: United States Census Bureau. 2012-2016 American Community Survey 5-Year Estimates, Table B01002: Median Age by Sex - Universe: Total population.  
[http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_5YR\\_B01002&prodType=table](http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_B01002&prodType=table).  
(B) Median Age in 2000: For United States, United States Census Bureau (2002) 2000 Census of Population and Housing, Summary Social, Economic, and Housing Characteristics, PHC-1-1 Part 1. United States Summary, Table 1. Age and Sex: 2000, Washington, DC., Page 2. <https://www.census.gov/prod/cen2000/phc-1-1-pt1.pdf>. For Missouri State, United States Census Bureau (2002) 2000 Census of Population and Housing, Summary Population and Housing Characteristics, PHC-1-27, Missouri, Table 2. Age and Sex: 2000, Washington, DC., Pages 64-92. <http://www.census.gov/prod/cen2000/phc-2-27-pt1.pdf>.  
(C) Change in Median Age in Years (2000-2016) = (Median Age in 2016 - Median Age in 2000).
7. United States Census Bureau. 2012-2016 American Community Survey 5-Year Estimates, B23025: Employment Status for the Population 16 Years and Over - Universe: Population 16 years and Over.  
[http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_5YR\\_B23025&prodType=table](http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_B23025&prodType=table).
8. United States Census Bureau. 2012-2016 American Community Survey 5-Year Estimates, Table S1701: Poverty Status in the Past 12 Months.  
[http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_5YR\\_S1701&prodType=table](http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_S1701&prodType=table).
9. United States Census Bureau. 2012-2016 American Community Survey 5-Year Estimates, Table B22003: Receipt of Food Stamps/SNAP in the Past 12 Months by Poverty Status in the Past 12 Months for Households - Universe: Households.  
[http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS\\_16\\_5YR\\_B22003&prodType=table](http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_16_5YR_B22003&prodType=table).



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

RECEIVED

OCT 24 2018

Water Protection Program

AP 31079  
CP 0002042

**FOR DEPARTMENT USE ONLY**

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

**APPLICATION OVERVIEW**

The Application for Construction Permit – Wastewater Facility form is for construction pertaining to domestic wastewater treatment facilities, agrichemical facilities, and components thereof. This 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 Is this an application for an agrichemical? ☐ YES (See instructions.) ☐ N/A
- 1.3 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?  
☐ YES Date of Approval: \_\_\_\_\_
- 1.4 Has the department approved the proposed project's facility plan\*?  
☒ YES Date of Approval: June 2017 ☐ NO ☐ N/A (If Not Applicable, complete No. 1.5.)
- 1.5 [Complete only if answered Not Applicable on No. 1.4] 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
- 1.6 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
- 1.7 Is a summary of design\* included with this application? ☐ YES ☒ NO
- 1.8 Is a general operating permit applicable?  
☐ YES Submit the appropriate operating permit application to the Regional Office at least 60 days prior to operation.  
☒ NO Enclose the appropriate operating permit application and fee submittal. Denote which form: ☐ B ☒ B2
- 1.9 Is the facility currently under enforcement with the department or the Environmental Protection Agency? ☐ YES ☒ NO
- 1.10 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**

Wardell Wastewater Improvements

**2.2 PROJECT DESCRIPTION**

The proposed project consists of upgrading the existing cell to be covered. The existing aeration equipment will be utilized to the greatest extent possible. There will also be a nitrification reactor and a ultraviolet disinfection unit added. The existing blowers will be increased in size to accommodate the aeration requirements for the nitrification reactor.

**2.3 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION**

Sludge is retained within the lagoon

**2.4 DESIGN INFORMATION**

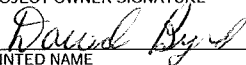
- A. Current population: 259; Design population: 1,026
- B. Actual Flow: 75,000 gpd; Design Average Flow: 130,000 gpd;  
Actual Peak Daily Flow: 400,000 gpd; Design Maximum Daily Flow: 400,000 gpd;  
Design Wet Weather Event: \_\_\_\_\_

**2.5 ADDITIONAL INFORMATION**

- A. Is a topographic map attached? ☒ YES ☐ NO
- B. Is a process flow diagram attached? ☒ YES ☐ NO

**2.6 ESTIMATED PROJECT CONSTRUCTION COST**

\$ 1,600,000.00

<b>3.0 WASTEWATER TREATMENT FACILITY</b>				
NAME Wardell Wastewater Treatment Facility		TELEPHONE NUMBER WITH AREA CODE (573) 628-3500		EMAIL ADDRESS
ADDRESS (PHYSICAL) S of intersection of Broad St. and School Dr.	CITY Wardell	STATE MO	ZIP CODE 63879	COUNTY Pemiscot
Wastewater Treatment Facility: Mo- 0052132 (Outfall 1 Of 1 )				
3.1 Legal Description: ¼, NW ¼, NW ¼, Sec. 25 , T 20N , R 11E (Use additional pages if construction of more than one outfall is proposed.)				
3.2 UTM Coordinates Easting (X): 785159 Northing (Y): 4027270 For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)				
3.3 Name of receiving streams: Old Channel Little River				
<b>4.0 PROJECT OWNER</b>				
NAME City of Wardell		TELEPHONE NUMBER WITH AREA CODE (573) 628-3500		EMAIL ADDRESS
ADDRESS 108 W Broad Street	CITY Wardell	STATE MO	ZIP CODE 63879	
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		TELEPHONE NUMBER WITH AREA CODE		EMAIL 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 Gregory Bell/S.H. Smith & Company		TELEPHONE NUMBER WITH AREA CODE (573) 785-9621		EMAIL ADDRESS gregb@shsmithco.com
ADDRESS 901 Vine Street	CITY Poplar Bluff	STATE MO	ZIP CODE 63901	
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 David Byrd			DATE	
TITLE OR CORPORATE POSITION Mayor		TELEPHONE NUMBER WITH AREA CODE (573) 628-3500		EMAIL 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 ☐ Subsurface  
☐ 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 two 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 \_\_\_\_\_ Depth \_\_\_\_\_ Safety \_\_\_\_\_ % Slope \_\_\_\_\_  
Basin #2: Length \_\_\_\_\_ Width \_\_\_\_\_ Depth \_\_\_\_\_ Freeboard \_\_\_\_\_ Depth \_\_\_\_\_ Safety \_\_\_\_\_ % 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

9.5 Design depth of sludge in storage basins.  
Basin #1: \_\_\_\_\_ ft Basin #2: \_\_\_\_\_ ft

9.6 Existing sludge depth, if the basins are currently in operation.  
Basin #1: \_\_\_\_\_ ft Basin #2: \_\_\_\_\_ ft

9.7 Total design sludge storage: \_\_\_\_\_ dry tons and \_\_\_\_\_ cubic feet

**10.0 LAND APPLICATION SYSTEM**

10.1 Type of land application: ☐ Fixed Head Sprinklers ☐ Center Pivot ☐ Traveling Gun ☐ Drip Dispersal  
☐ Subsurface Low Pressure Pipe ☐ Other (describe) \_\_\_\_\_

10.2 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.)

10.3 Type of vegetation: ☐ Grass hay ☐ Pasture ☐ Timber ☐ Row crops  
☐ Other (describe)

10.4 Wastewater flow (dry weather) gallons per day: Average annual \_\_\_\_\_  
Seasonal \_\_\_\_\_ Off-season \_\_\_\_\_

10.5 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

10.6 Total irrigation per year (gallons): Design: \_\_\_\_\_ gal Actual: \_\_\_\_\_ gal

10.7 Actual months used for irrigation (check all that apply):  
☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec

10.8 Land application rate is based on:  
☐ Hydraulic Loading ☐ Other (describe) \_\_\_\_\_  
☐ Nutrient Management Plan (N and P) If N and P is selected, is the plan included? ☐ YES ☐ NO