

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 St. Joseph
St. Joseph Rosecrans Memorial Airport
0.3 miles SE of Logan Rd and NW Airport Rd Intersection
St. Joseph, MO 64501

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.

March 5, 2019
Effective Date


Edward B. Galbraith, Director, Division of Environmental Quality

March 4, 2021
Expiration Date


Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The proposed project is required to meet final effluent limits for BOD, TSS, and ammonia as established in Operating Permit MO-0023051 issued December 1, 2018. As part of construction, the facility's design average flow has been reduced to 13,500 gpd with flow equalization. The new treatment plant will be a flow pacing tank to the equalization lagoons or to the screening and settling tank. From screening tank to the anoxic tank and membrane bioreactor aeration tank. The MBR system will be 2 treatment trains with each train having 2 sets of 8 membrane modules for a total of 32 double stack membrane modules.

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

II. COST ANALYSIS FOR COMPLIANCE

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

The Department is not required to 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 consistent with plans and specifications signed and sealed by Burns and McDonnell and as described in this permit.
3. The Department must be contacted in writing prior to making any changes to the plans and specifications that would directly or indirectly have an impact on the capacity, flow, system layout, or reliability of the proposed wastewater treatment facilities or any design parameter that is addressed by 10 CSR 20-8, in accordance with 10 CSR 20-8.110(11).

4. State and federal law does not permit bypassing of raw wastewater, therefore steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the Department's Kansas City Regional Office per 10 CSR 20-7.015(9)(G).
5. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the one hundred- (100-) year flood elevation per 10 CSR 20-8.140(2)(B). The minimum distance between wastewater treatment facilities and all potable water sources shall be at least three hundred feet (300') per 10 CSR 20-8.140(2)(C)1.
6. 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. See dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm for more information.
7. 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/ for more information.
8. Upon completion of construction:
 - A. The City of St. Joseph will become the continuing authority for operation and maintenance of these facilities;
 - B. Submit an electronic copy of the as builts if the project was not constructed in accordance with previously submitted plans and specifications; and
 - C. Submit the enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N) and request the operating permit modification be issued.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The purpose of construction is to meet the final effluent limits for BOD, TSS, and ammonia, which become effective on June 1, 2021.

2. FACILITY DESCRIPTION

The St. Joseph Rosecrans Memorial Airport WWTF is located at 0.3 miles SE of Logan Rd and NW Airport Rd Intersection, St. Joseph, in Buchanan County, Missouri. The existing facility is an influent pump station and two cell lagoon that is being pumped and hauled to the St. Joseph Wastewater Treatment Facility. As part of construction, the facility's design average flow has been reduced to 13,500 gpd with flow equalization. The treatment facility is designed to treat an organic PE of 610. The new treatment plant will be influent pump station/flow equalization/screening/settling tank/anoxic tank/membrane bioreactor/chemical feed/ chlorination/dechlorination and sludge removed by the city.

3. COMPLIANCE PARAMETERS

The proposed project is required to meet final effluent limits for BOD, TSS, and ammonia as established in Operating Permit MO-0023051 issued December 1, 2018. The limits following the completion of construction will be applicable to the facility:

PARAMETER	Unit	Daily Maximum	Weekly Average	Monthly Average
BOD ₅	mg/L		30	20
TSS	mg/L		30	20
Ammonia as N (Apr 1 – Sep 30)	mg/L	5.3		1.3
Ammonia as N (Oct 1 – Mar 31)	mg/L	10.0		2.7
PARAMETER	Unit	Daily Minimum		Monthly Avg Min
BOD ₅ Percent Removal	%			85
TSS Percent Removal	%			85

4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

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

- The existing lagoon cells will operate as flow equalization into the treatment plant.
 - EQ Lagoon #1(existing Clarifier Pond) has a surface area of 0.62 acres and a wastewater volume of 1.01 MG. These two cells have 2 ft of freeboard, 4 ft of operating depth, and 3 ft of cell protection, and a clay liner. This provides approximately 75 total days of retention at the proposed design flow.
 - EQ Lagoon #2 (existing secondary pond) has a surface area of 1.09 acres and a wastewater volume of 2.01 million gallons (MG). This cell has 2 ft of freeboard, 4 ft of operating depth, and 3 ft of cell protection, and a clay liner. This provides approximately 148 days of retention at the proposed design flow.
 - St. Joseph plans to have the liquid level maintained at approximately half full to prevent the liners from drying and cracking, providing an equalization amount of 1.26 MG between the half full location and the max water level, which is 93.33 days of retention.

- The existing disinfection system of 2 Norweco Bio-Dynamic Model IT 4000 Tablet Feeders with chlorine contact tank will remain in use, if necessary. The design was based on an average flow of 20,000 gpd and a peak flow of 50,000 gpd. It was installed under CP0000848 in 2010.

Construction will cover the following items:

- Lagoon Aeration System- 6 fine bubble Aerohub Lagoon Aerators will be provided, 4 for Cell #1 and 2 for Cell #2. 2 blowers will be installed, each with the capacity of supplying 60 scfm.
- Flow pacing tank is designed to limit flow to the MBR treatment system to 20,000 gpd as the existing influent pump station has the pumping capacity of at least 100,000 gpd.
 - The flow pacing tank has a capacity of 4,000 gallons to equalize flow.
 - The tank includes 2 grinder pumps (1 duty, 1 standby) with each having a capacity of 20,000 gallons. The grinder pumps with a firm minimum capacity of 13.9 gpm at 10 ft head.
 - Flows in excess of 20,000 gpd will overflow the flow pacing tank and be diverted to the existing lagoons for flow equalization.
 - In case of power outage, the flow pacing tank will overflow to the equalization lagoons, allowing for storage.
- Settling/Screening Tank-Designed to settle large particulate and screen finers particulates prior to the biological treatment process.
 - 17ft x 10 ft with a typical depth of 7.75 ft for a total tank volume of 9,850 gallons.
 - Screens are provided by the manufacturer (Biomicrobics or equivalent) and have a 1/8 inch opening to protect the membranes.
 - 8 screen units along the perimeter of the tank that are passive.
- Anoxic Tank-screened wastewater will enter the 2 anoxic tanks operated in parallel, which also receives recycled MLSS from the membrane tanks
 - 12 ft x 11.5 ft with a depth of 6.91 ft to provide a total operating volume of 14,200 gallons
 - 2 small submersible pumps per tank (1 duty, 1 standby) with mixing nozzles that run continuously to keep the MLSS in suspension without entraining oxygen.
- Membrane Bioreactor (MBR) — The MBR system is by BioMicrobics. The system will be 2 treatment trains with each train having 2 sets of 8 membrane modules for a total of 32 double stack membrane modules.
 - 15 ft x 11.5 ft with a max operating depth of 6.66 ft for a total operating volume of 17,200 gallons
 - The membrane is a flat plate type membrane with a maximum mean pore diameter of 0.4 micron.
 - The operational flux rate through each double stack membrane unit is 20 l/m²/hr.
 - The operational filtration rate through the membranes is 27.5 gpm with all trains in service. Design peak flow for the plant is 17 gpm.

- The design SRT is variable with the intent to operate the MLSS between 1,5000 mg/L and 10,000 mg/L, which provides a range from 10 to 60 days.
- The maximum MLSS is 10,000 mg/L
- The F/M ratio at a MLSS of 10,000 mg/L is 0.03 and at a MLSS of 1,500 mg/L, it is 0.15 lbs
- If the facility can meet their *E. Coli* effluent limits without disinfection, the effluent will bypass the existing disinfection system and be discharged through Outfall #001.
- Recycle pumps-1 duty and 1 standby for each aeration tank. Capacity of 67,500 gpd with 2 pumps in service
- Permeate Pumps-4 pumps, each with design flow of 8.5 gpm (12,240 gpd) and 35 ft discharge head
- 2 Chemical feed peristaltic metering pumps for carbon supplement and sodium bicarbonate solution feed that have the discharge capacity of upto 1 gph and a discharge pressure of less than 10 psig.

5. OPERATING PERMIT

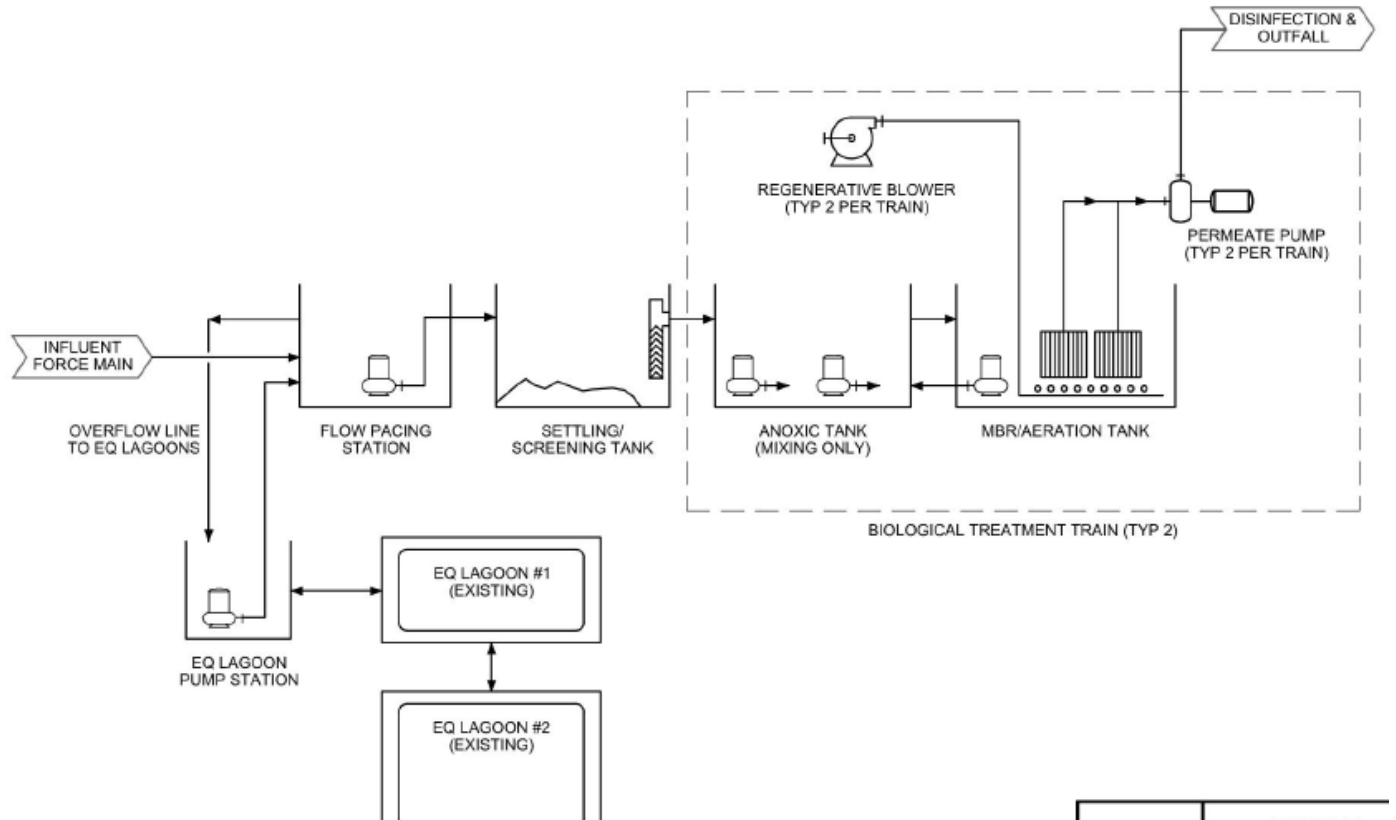
Operating permit MO-0023051 will require a modification to reflect the construction activities. The modified St. Joseph Rosecrans Memorial Airport WWTF, was successfully public noticed from January 25, 2019 to February 25, 2019 **with no comments received**. Submit the Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N) and request the operating permit modification be issued.

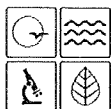
Leasue Meyers, EI
Engineering Section
[leasue.meyers @dnr.mo.gov](mailto:leasue.meyers@dnr.mo.gov)

Cindy LePage, P.E.
Engineering Section
cindy.lepage@dnr.mo.gov

APPENDIX

APPENDIX – PROCESS DIAGRAM





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

AP 30968
CP 000 2038

FOR DEPARTMENT USE ONLY	
APP NO.	CP NO.
FEE RECEIVED \$1000.00	CHECK NO. 323749
DATE RECEIVED 0-11-18	

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: 02/28/2018 ☐ 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

Rosecrans Memorial Airport Wastewater Treatment Plant Improvements

2.2 PROJECT DESCRIPTION

The facility will include a new influent pumping system, settling tank, passive screening, and activated sludge membrane bioreactor. The proposed system is designed for nitrification with accommodations for future chemical phosphorus removal and denitrification. Flows in excess of approximately 20,000 gpd will be diverted to two of the existing lagoons, which will serve as equalization volume. A lagoon transfer structure will allow dilute wet weather volume to be pumped back to the influent pumping system for processing through the mechanical WWTP. MBR effluent will be pumped into the existing effluent pipe be discharge through the existing outfall.

2.3 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION

The membrane bioreactor system will operate to allow accumulation of biomass within the reactor volume. The City will periodically remove sludge from the treatment system once mixed liquor suspended solids reaches approximately 10,000 mg/L, and transfer the sludge to the City's main wastewater treatment plant for processing.

2.4 DESIGN INFORMATION

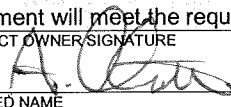
- A. Current population: n/a; Design population: n/a
- B. Actual Flow: 10,000 gpd; Design Average Flow: 13,500 gpd;
Actual Peak Daily Flow: 100,000 gpd; Design Maximum Daily Flow: 20,000 gpd;
Design Wet Weather Event: EQ to Lagoons

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

\$ 1,700,000.00

3.0 WASTEWATER TREATMENT FACILITY					
NAME Rosecrans Memorial Airport WWTP		TELEPHONE NUMBER WITH AREA CODE (816) 271-4653		EMAIL ADDRESS dgilpin@stjoemo.org	
ADDRESS (PHYSICAL) 0.3 miles SE of Logan Rd & NW Airport Rd		CITY St Joseph	STATE MO	ZIP CODE 64503	COUNTY Buchanan
Wastewater Treatment Facility: Mo- 0023051 (Outfall 001 Of 1)					
3.1 Legal Description: NW ¼, SW ¼, ¼, Sec. 12 , T 57N , R 36W (Use additional pages if construction of more than one outfall is proposed.)					
3.2 UTM Coordinates Easting (X): 337630 Northing (Y): 4403326 For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)					
3.3 Name of receiving streams: Browning Lake (L3)					
4.0 PROJECT OWNER					
NAME City of St Joseph		TELEPHONE NUMBER WITH AREA CODE (816) 271-4653		EMAIL ADDRESS dgilpin@stjoemo.org	
ADDRESS 1100 Frederick Avenue		CITY St Joseph	STATE MO	ZIP CODE 64501	
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 City of St Joseph, Missouri		TELEPHONE NUMBER WITH AREA CODE (816) 271-4653		EMAIL ADDRESS dgilpin@stjoemo.org	
ADDRESS 1100 Frederick Avenue		CITY St Joseph	STATE MO	ZIP CODE 64501	
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					
6.0 ENGINEER					
ENGINEER NAME / COMPANY NAME Paul E Ward / Burns & McDonnell Engineering		TELEPHONE NUMBER WITH AREA CODE (816) 447-9926		EMAIL ADDRESS peward@burnsmcd.com	
ADDRESS 9400 Ward Parkway		CITY Kansas City	STATE MO	ZIP CODE 64114	
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 Andy Clements				DATE 9/21/18	
TITLE OR CORPORATE POSITION Director of Public Works & Transportation		TELEPHONE NUMBER WITH AREA CODE (816) 271-4653		EMAIL ADDRESS aclements@stjoemo.org	
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