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 Jackson
Jackson WWTP
2230 Lee Avenue
Jackson, MO 63755

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.

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.

November 21, 2025
Effective Date

November 20, 2027
Expiration Date

Heather Peters, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

This construction project includes the following:

- Installation of a membrane sludge thickening system to provide improved sludge treatment for the plant
- Updates to the existing influent screens building
- Construction of a new administration building at the plant site
- Installation of plant SCADA for data acquisition purposes
- Renovation of the existing treatment units to ensure all plant structures are up to code
- Upgrading the existing aeration system to an Orbal disk aeration system
- Replacement of the worn flights at the existing screw pumps
- Installation of an influent monitoring system
- Construction of approximately 1,800 linear feet of 8-inch water main from a hydrant on Lee Avenue, running adjacent to the road to the plant

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 a 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 Horner & Shifrin, Inc. on August 7, 2025, and signed and sealed by James E. McCleish, P.E, Gilbert E. Sewing, P.E., Matthew R. Castro, P.E., David E. Lauver, P.E., Todd L. Kuno, P.E., and Roy A. Mangan, R.A., on June 27, 2025, and approved by the department on November 21, 2025.

3. Regulation 10 CSR 20-4.040(18)(B)1 requires that projects be publicly advertised, allowing sufficient time for bids to be prepared and submitted. Projects should be advertised at least 30 days prior to bid opening.

4. 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).

5. As per 10 CSR 20-4.040, all changes in contract price or time within the approved scope of work must be by change order in accordance with Section 19 of this rule.

6. 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 electronic Sanitary Sewer Overflow/Bypass Reporting system at https://dnr.mo.gov/mogem/ or Southeast Regional Office per 10 CSR 20-7.015(9)(G).

7. 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 https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem. See https://dnr.mo.gov/data-e-services/water/electronic-permitting-epermitting for more information.

8. A United States Army Corps of Engineers (USACE) Section 404 Department of Army permit (§404) along with the department's Section 401 Water Quality Certification or waiver (§401) 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 likely be required. Since the USACE makes determinations on what is jurisdictional, you must contact the USACE to determine permitting requirements. See https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality for more informationor or you may contact the department's Water Protection Program at 573-522-4502 or wpsc401cert@dnr.mo.gov.

9. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements.

10. Upon completion of construction:
    A. The city of Jackson 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;
    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 proposed construction will help improve general operability for the existing plant, replacing and updating equipment that is beyond the useful life of the facility, while also bringing existing structures up to code. The proposed work will provide new SCADA systems and a new administration building, which will help operators keep the facility operating properly, while also installing new aeration equipment in the oxidation ditches and sludge thickening equipment that will improve facility processes.

2. FACILITY DESCRIPTION
The Jackson WWTF is located at 2230 Lee Avenue, Jackson, Missouri, in Cape Girardeau County. The facility has a design average flow of 2.4 MGD and serves a hydraulic population equivalent of approximately 17,900 people.

3. COMPLIANCE PARAMETERS
The proposed project is required to meet final effluent limits as established in the most recent operating permit renewal. The limits that will be applicable to the facility following the completion of construction:

Parameter	Units	Daily Maximum	Monthly Average Limit
Total Flow (Monthly Total)	MG		*
Ammonia as N-January	mg/L	12.1	3.1
Ammonia as N-February	mg/L	12.1	3.1
Ammonia as N-March	mg/L	10.1	2.7
Ammonia as N-April	mg/L	8.4	2.1
Ammonia as N-May	mg/L	12.1	2.1
Ammonia as N-June	mg/L	10.1	1.3
Ammonia as N-July	mg/L	8.4	0.9
Ammonia as N-August	mg/L	8.4	0.9
Ammonia as N-September	mg/L	8.4	1.2
Ammonia as N-October	mg/L	8.4	1.8
Ammonia as N-November	mg/L	8.4	2.4
Ammonia as N-December	mg/L	12.1	2.7
Total Nitrogen	mg/L	*	*
Nickel, Total Recoverable	µg/L	204.8	80.8

4. REVIEW OF MAJOR TREATMENT DESIGN CRITERIA

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

- Headworks – The headworks for the facility consists of a ¼ inch bar screen, four screw pumps, a grit removal chamber, and a comminutor. Each screw pump was designed with a design flow of 3,000 gpm, for a combined design flow of 12,000 gpm. The screw size for each pump is 48 inches, with an incline of 38°. The grit removal chamber is a 16-foot diameter concrete basin with a ¾ horsepower scraper system and a 12-inch diameter 1 ½ horsepower grit auger. However, the grit removal system is intentionally not in operation due to a lack of grit identified in the influent flow.

- Oxidation Ditch – Two oxidation ditches provide secondary treatment for the Jackson WWTP, each with a straight side length of 265 feet, a channel width of 23 feet, and a sidewater depth of 10 feet. The hydraulic retention time of each oxidation ditch is 5 hours, with a solids retention time of 14 days and a design MLSS of 3,000 mg/L. The oxidation ditches utilize brush surface aerators, but these will be replaced with the proposed construction for the facility.

- Final Clarifiers – Three concrete clarifiers receive flow from the oxidation ditches for further treatment, although the third clarifier is only utilized in peak flow conditions for managing wet weather flows. Each clarifier has a diameter of 65 feet and a sidewater depth of 12 feet, resulting in a volume for each clarifier of approximately 297,872 gallons. The clarifiers are equipped with a rake mechanism for scum removal.

- Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms. An ultraviolet (UV) disinfection system provides disinfection treatment for the treatment facility. The UV structure is a flow-through concrete structure, with effluent lift pumps for managing wet weather flow. The UV disinfection system is designed for a peak flow of 10 MGD.

- Sludge Management – Two aerobic digesters are used for sludge handling for the facility, with each digester tank having a diameter of 40 feet and a sidewall depth of 22 feet. The facility also has two sludge holding tanks, repurposed from trickling filter basins previously utilized by the facility, which are equipped with coarse bubble aeration for sludge mixing.

Construction will include the following items:

- Membrane sludge thickening (SilC-TAD™) – The membrane sludge thickening system will consist of two membrane thickening tanks (MBT) and two aerobic digesters. MBT-1 will have dimensions of 28.5 feet by 6 feet, with a sidewater depth of 22 feet, while MBT-2 will have dimensions of 28.5 feet by 6 feet, with a sidewater

depth of 21.5 feet. MBT-1 will be designed for a thickened sludge flow of 18,117 gpd and a permeate flow of 38,097 gpd, producing a thickened sludge at a 2 percent solids concentration, while MBT-2 will be designed with a thickened sludge flow of 8,650 gpd and a permeate flow of 9,467 gpd, producing a thickened sludge at a 3.5 percent solids concentration. Digester 1 will have a diameter of 40 feet, with a 22 foot sidewater depth and a 1.65 foot conical depth, while digester 2 will have a diameter of 40 feet, with a 21.5 foot sidewater depth and a 1.65 foot conical depth. Aeration for mixing will be utilized for all the MBTs and digester tanks, with a design maximum mixing airflow of 30 scfm per 1,000 cubic feet, factoring in each tank's estimated viscosity correction factor.

- Orbal Oxidation Ditch Aeration System – The Orbal aeration system is being used to replace the brush aeration system in the existing oxidation ditches. The estimated conditions for the oxidation ditch places a SRT of 14 days for nitrification, with a design MLSS of 3,000 mg/L. The hydraulic retention time of each ditch is 10.47 hours, with the design flow of 2.4 MGD being split between the two oxidation ditches. Sidewater depth of the treatment train is 10 feet, allowing 1.5 feet of freeboard. The carbonaceous oxygen demand for treating the daily design flow is 4,682 lb/day, with a nitrification oxygen demand of 2,875 lb/day. To achieve the needed aeration, each oxidation ditch will be supplied with two Orbal Disc aeration systems (four total), with each aeration system consisting of a 50 HP drive shaft supplying to 29 discs. The peak SOR for each disc is 158.73 lb/hp-hr, which results in a ratio between AOR/SOR of 0.9 for the first channel in each oxidation ditch (with an AOR of 143.46 lb/hp-hr) and a ratio of 0.71 for the second channel in each oxidation ditch (with an AOR of 111.95 lb/hp-hr).

5. OPERATING PERMIT

Operating permit MO-0022853 will require a modification to reflect the construction activities. The modification was combined with the standard operating permit renewal process, as the operating permit expired December 31, 2024, and the city of Jackson had submitted their renewal application on time. The modified Jackson WWTF, MO-0022853, was successfully public noticed from June 13 to July 14, 2025, 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.

Joshua Brown, P.E.
Financial Assistance Center
Joshua.brown@dnr.mo.gov

AP47315 CP0002549

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

APPLICATION FOR CONSTRUCTION PERMIT – WASTEWATER TREATMENT FACILITY

FOR DEPARTMENT USE ONLY	
APP NO.	CP NO.
FEE RECEIVED	CHECK NO.
DATE RECEIVED	

APPLICATION OVERVIEW

The Application for Construction Permit – Wastewater Treatment Facility form has been developed in a modular format and consists of Part A and B. **All applicants must complete Part A.** Part B should be completed for applicants who currently land-apply wastewater or propose land application for wastewater treatment. **Please read the accompanying instructions before completing this form. Submittal of an incomplete application may result in the application being returned.**

PART A – BASIC INFORMATION

1.0 APPLICATION INFORMATION (Note – If any of the questions in this section are answered NO, this application may be considered incomplete and returned.)

1.1 Is this a Federal/State funded project? ☑ YES ☐ N/A Funding Agency: SRF Project #: _____

1.2 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?
☐ YES Date of Approval: _____ ☑ N/A

1.3 Has the department approved the proposed project's facility plan*?
☑ YES Date of Approval: 3/1/23 ☐ NO (If No, complete No. 1.4.)

1.4 [Complete only if answered No on No. 1.3.] Is a copy of the facility plan* for wastewater treatment facilities included with this application?
☐ YES ☐ NO ☐ Exempt because _____

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 and fee submittal. Denote which form: ☐ A ☐ B ☐ B2
☑ N/A: However, In the event the department believes that my operating permit requires revision to permit limitation such as changing equivalent to secondary limits to secondary limits or adding total residual chlorine limits, please share a draft copy prior to public notice? ☑ YES ☐ NO

1.8 Is the facility currently under enforcement with the department or the Environmental Protection Agency? ☐ YES ☑ NO

1.9 Is the appropriate fee or JetPay confirmation included with this application? ☑ YES ☐ NO
See Section 7.0

* Must be affixed with a Missouri registered professional engineer's seal, signature and date.

2.0 PROJECT INFORMATION

2.1 NAME OF PROJECT
Wastewater Treatment Plant Improvements

2.2 ESTIMATED PROJECT CONSTRUCTION COST
$ 10,066,474.00

2.3 PROJECT DESCRIPTION
Upgrades to oxidation ditch aeration system and solids handling; process to add membrane thickened aerobic digestion; plant SCADA; new control building; facility structural and concrete repairs; expansion/upgrades to the electrical and HVAC systems; screw pump and clarifier rehabilitation; digester blower replacement; building expansion for sludge processing equipment and miscellaneous

2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION
New membrane thickening aerobic digestion equipment.

2.5 DESIGN INFORMATION
A. Current population: 15481; Design population: _____
B. Actual Flow: _____ gpd; Design Average Flow: 2.4M gpd;
Actual Peak Daily Flow: _____ gpd; Design Maximum Daily Flow: 8.6M gpd; Design Wet Weather Event: _____

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

RECEIVED
APR 17 2025

3.0 WASTEWATER TREATMENT FACILITY

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
City of Jackson Wastewater Treatment Plant		

ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE	COUNTY
2230 Lee Avenue	Jackson	MO	63755	Cape Girardeau

Wastewater Treatment Facility: Mo- 0022853 (Outfall #001 Of 001)

3.1 Legal Description: _____ ¼, _____ ¼, _____ ¼, Sec. _____, T _____, R _____ Landgrant 00220, Cape Girardeau County
(Use additional pages if construction of more than one outfall is proposed.)

3.2 UTM Coordinates Easting (X): 794152 Northing (Y): 4140178
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

3.3 Name of receiving streams: Goose Creek

4.0 PROJECT OWNER

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
City of Jackson	573-243-2300	jsanders@jacksonmo.org

ADDRESS	CITY	STATE	ZIP CODE
101 Court Street	Jackson	MO	63755-1807

5.0 CONTINUING AUTHORITY: A continuing authority is a company, business, entity or person(s) that will be operating the facility and/or ensuring compliance with the permit requirements.

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
City of Jackson	573-243-2300	jsanders@jacksonmo.org

ADDRESS	CITY	STATE	ZIP CODE
101 Court Street	Jackson	MO	63755-1807

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

6.0 ENGINEER

ENGINEER NAME / COMPANY NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Gilbert E. Sewing, PE / Horner and Shifrin, Inc.	314-335-8693	gesewing@hornershifrin.com

ADDRESS	CITY	STATE	ZIP CODE
401 S. 18th St, Suite 400	St. Louis	MO	63109-2296

7.0 APPLICATION FEE

☑ CHECK NUMBER 133744 ☐ JETPAY CONFIRMATION NUMBER

8.0 PROJECT OWNER: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

PROJECT OWNER SIGNATURE Janet Sanders

PRINTED NAME	DATE
Janet Sanders	4-4-2025

TITLE OR CORPORATE POSITION	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Director of Public Works	573-243-2300 x 2031	jsanders@jacksonmo.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.
☐ 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 _____ Depth _____ Safety _____ % Slope _____
Basin #2: Length _____ Width _____ Depth _____ Freeboard _____ Depth _____ Safety _____ % Slope _____
Basin #3: 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
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