STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

CONSTRUCTION PERMIT

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

Ozark Correctional Center WWTF
929 Honor Camp Lane
Fordland, MO 65652

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 4, 2020
Effective Date

Edward B. Galbraith, Director, Division of Environmental Quality

June 3, 2022
Expiration Date

Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

This project will replace the existing waste sludge dewatering system with a new system that does not require physical handling of bagged waste sludge. It utilizes geotextile bags that are specifically designed and manufactured to fit into a standard 20 or 30 yard land fill roll-off container. The complete dewatering package includes a flocculant (polymer) mixing and injection system, a sludge mixing manifold, and a geotextile bag and drainage mat that fits into the roll-off container. Waste sludge is pumped through the mixing manifold where the sludge and flocculant are mixed together prior to entering the geotextile bag. Inside the bag, the sludge dewaters rapidly through the geotextile fabric. Clear liquid drains out the bottom of the container, is collected and piped back to the treatment plant headworks. Dewatering times should generally be 2-3 days.

In addition, a second metal salt dosing point will be added to increase efficiency of phosphorus removal. The outfall will be moved to a new stream segment closer to the facility to avoid damage from livestock.

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 Richard McMillian, P.E. 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 Southwest 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. 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.

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 dnr.mo.gov/env/wpp/epermit/help.htm. See 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/ for more information.

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

    10 CSR 20-8.140 Wastewater Treatment Facilities

    - Unless another distance is determined by the Missouri Geological Survey or by the department's Public Drinking Water Branch, the minimum distance between

wastewater treatment facilities and all potable water sources shall be at least three hundred feet (300'). 10 CSR 20-8.140 (2) (C) 1.

- Facilities shall be readily accessible by authorized personnel from a public right-of-way at all times. 10 CSR 20-8.140 (2) (D)

- The outfall shall be so constructed and protected against the effects of flood water, ice, or other hazards as to reasonably ensure its structural stability and freedom from stoppage. 10 CSR 20-8.140 (6) (A)

- All sampling points shall be designed so that a representative and discrete twenty-four (24) hour automatic composite sample or grab sample of the effluent discharge can be obtained at a point after the final treatment process and before discharge to or mixing with the receiving waters. 10 CSR 20-8.140 (6) (B)

- All outfalls shall be posted with a permanent sign indicating the outfall number (i.e., Outfall #001). 10 CSR 20-8.140 (6) (C)

- All wastewater treatment facilities shall be provided with an alternate source of electric power or pumping capability to allow continuity of operation during power failures. 10 CSR 20-8.140 (7) (A) 1.

- An audiovisual alarm or a more advanced alert system, with a self-contained power supply, capable of monitoring the condition of equipment whose failure could result in a violation of the operating permit, shall be provided for all wastewater treatment facilities. 10 CSR 20-8.140 (7) (C)

- A means of flow measurement shall be provided at all wastewater treatment facilities. 10 CSR 20-8.140 (7) (E)

- For solids pumping systems, audio-visual alarms shall be provided in accordance with 10 CSR 20-8.140(7)(C) for:
  - Pump failure; 10 CSR 20-8.170 (6) (A)
  - Pressure loss; 10 CSR 20-8.170 (6) (B) and
  - High pressure. 10 CSR 20-8.170 (6) (C)

11. Upon completion of construction:

A. The Missouri Department of Corrections 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)

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The Ozark Correctional Center (Ozark CC) WWTF has a history of exceeding its phosphorus limit and damage to its outfall pipe from livestock. The proposed improvements will address the phosphorus exceedances by adding a second metal salt dosing point and moving the outfall closer to the facility and away from livestock.

2. FACILITY DESCRIPTION

Ozark CC is a medium security prison operated by the Missouri Department of Corrections. It is located at 929 Honor Camp Lane, Fordland, MO, in Webster County, Missouri. The facility has a design average flow of 92,000 gpd and serves a population equivalent of approximately 650 inmates and 200 staff.

3. COMPLIANCE PARAMETERS

The proposed project is required to meet final effluent limits of 0.5 mg/L total phosphorus as established in the Antidegradation review dated October 2019.

The limits following the completion of construction will be applicable to the facility:

Parameter	Units	Daily Maximum	Weekly Average	Monthly Average
Ammonia as N (Apr 1-Sep 30)/(Oct 1-Mar 31)	mg/L	5.7/11.0		1.1/2.1
Phosphorus, Total	mg/L	*		0.5
Aluminum, Total Recoverable	µg/l	750		368.1
Iron, Total Recoverable	µg/l	1579.4		839.7

4. ANTIDEGRADATION

The Department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated October 2019, due to moving of outfall to a new stream segment. See **APPENDIX – ANTIDEGRADATION**.

5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

The project will not change the design or average daily flow.

Construction will cover the following items:

The project consists of construction of outfall sewer improvements, waste sludge dewatering system improvements, and chemical phosphorus removal improvements.

- Relocated Outfall – The project includes replacement of approximately 1,250 feet of existing outfall sewer with 6-inch PVC pipe. The new outfall location is approximately 1 mile upstream from the current outfall location. The outfall consists of a discharge pipe with a drop of approximately six inches to allow for discrete effluent samples.

- Geotextile sludge dewatering system - including 2 custom modified 30 cubic yard roll-off containers, flocculant mixing/injection system and mixing manifold; a peristaltic chemical metering pump to facilitate phosphorus removal; precast and cast-in-place concrete structures, PVC and ductile iron piping systems, electrical systems, and related appurtenances.

6. OPERATING PERMIT

Operating permit MO-0093556 will require a modification to reflect the construction activities. The modified Ozark CC WWTF was public noticed from April 26, 2020 to May 25, 2020 to add new limits for winter ammonia, aluminum, and iron. 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.

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Construction Permitting Supervisor
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Water Quality and Antidegradation Review

For the Protection of Water Quality and Determination of Effluent Limits for Discharge to Tributary to Davis Branch by Ozark Correctional Center Wastewater Treatment Facility

October 2019

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1. Purpose of Antidegradation Review Report

On August 13, 2019, the Water Protection Program of the Missouri Department of Natural Resources (Department) received an antidegradation review report from the Ozark Correctional Center (Ozark CC), a 650 bed prison facility operated by the Missouri Department of Corrections. The report proposed improvements to Ozark CC's wastewater treatment facility to upgrade the waste sludge de-watering system and relocate the outfall closer to the treatment works (see Appendix A: Map). The design flow will not change from the previously permitted 92,000 gallons per day (gpd). The proposed relocation of the outfall to a new water body triggers the Antidegradation Review.

Ozark CC identified two issues this report hoped to address: difficulty in maintaining the outfall pipes and persistent exceedances of the phosphorus and aluminum permit limits. The proposal included moving the outfall location closer to the treatment works, thereby eliminating the damage caused to the outfall pipe by livestock, and adding a second dosing point for the addition of metal salts to increase efficiency of phosphorus removal. The new receiving segment currently receives no point source discharges.

Richard McMillian, P.E. prepared, on behalf of the Department of Corrections, the Wastewater Treatment Facility Antidegradation Review Report for Ozark Correctional Center dated August 2019. The applicant elected to assume that all pollutants of concern (POC), except Total Nitrogen and Total Phosphorus, significantly degrade the receiving stream in the absence of existing water quality. An alternatives analysis was conducted to fulfill the requirements of the Antidegradation Implementation Policy (AIP).

2. General Assumptions of the Water Quality and Antidegradation Review

A. A Water Quality and Antidegradation Review (WQAR) assumes that [10 CSR 20-6.010(3) Continuing Authorities and 10 CSR 20-6.010(4) (D), consideration for no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
B. A WQAR does not indicate approval or disapproval of alternative analysis as per [10 CSR 20-7.015(4) Losing Streams], and/or any section of the effluent regulations.
C. Changes to Federal and State Regulations (FSR) made after the drafting of this WQAR may alter Water Quality Based Effluent Limits (WQBEL).
D. Effluent limitations derived from FSR may be WQBEL or Effluent Limit Guidelines (ELG).
E. WQBEL supersede ELG only when they are more stringent. Mass limits derived from technology based limits are still appropriate.
F. A WQAR does not allow discharges to waters of the State, and shall not be construed as a National Pollution Discharge Elimination System (NPDES) or Missouri State Operating Permit to discharge or a permit to construct, modify, or upgrade.
G. Limitations and other requirements in a WQAR may change as Water Quality Standards (WQS), Methodology, and Implementation procedures change.
H. Nothing in this WQAR removes any obligations to comply with county or other local ordinances or restrictions.
I. If the proposed treatment technology is not covered in 10 CSR 20-8 Design Guides, the treatment process may be considered a new technology. As a new technology, the permittee will need to work with the review engineer to ensure equipment is sized properly. The operating permit may contain additional requirements to evaluate the effectiveness of the technology once the facility is in operation. This Antidegradation Review is based on the information provided by the facility and is not a comprehensive review of the proposed treatment technology. If the review engineer determines the proposed technology will not consistently meet proposed effluent limits, the permittee will be required to revise their Antidegradation Report.

3. Facility Information

Facility Name: Ozark Correctional Center WWTF

NPDES#: MO-0093556

County: Webster

Facility Type: POTW – Prison

Facility Description: Treatment processes include coarse & fine screening, extended aeration biological treatment, clarification, chemical addition for phosphorus removal, and ultraviolet disinfection.

UTM Coordinates: X=510637, Y=4110818

12- Digit HUC: 11010002-0203

Legal Description: SE ¼, NW ¼, Sec 2, T 28N, R, 18W

Ecological Drainage Unit: Ozark White

Ecoregion: Springfield Plain

4. Facility History

In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(3)] and federal antidegradation policy at Title 40 Code of Federal Regulation (CFR) Section 131.12 (a), the department developed a statewide antidegradation policy and corresponding procedures to implement the policy. A proposed discharge to a water body will be required to undergo a level of Antidegradation Review, which documents that the use of a water body's available assimilative capacity is justified. Effective August 30, 2008, and revised July 13, 2016, a facility is required to use Missouri's AIP for new and expanded wastewater discharges.

A. Facility performance History:

Before 2016, the facility's limit for aluminum was routinely exceeded, due to the addition of aluminum sulfate to control phosphorus. The facility began using ferric chloride in 2017, which resulted in no further exceedances of the aluminum limit, but also more frequent exceedances of the phosphorus limit.

B. Receiving Waterbody Information

Outfall	Design Flow (cfs)	Treatment Level	Receiving Waterbody	Distance to Classified Segment (mi)
1	0.14	Secondary	Tributary to Davis Branch	0

Waterbody Name	Class	WBID	Low-Flow Values (cfs)			Designated Uses**
			1Q10	7Q10	30Q10	
Tributary to Davis Branch (100K Extent-Remaining Stream)	C	3960	-	-	-	AQL, IRR, LWP, SCR, WBC(B), HHP

** Irrigation (IRR), Livestock & Wildlife Protection (LWP), Protection of Warm Water Aquatic Life (AQL), Human Health Protection (HHP), Cool Water Fishery (CLF), Cold Water Fishery (CDF), Whole Body Contact Recreation – Category A (WBC-A), Whole Body Contact Recreation – Category B (WBC-B), Secondary Contact Recreation (SCR), Drinking Water Supply (DWS), Industrial (IND), Groundwater (GRW).

Receiving Water Body Segment #1: Tributary to Davis Branch
Upper end segment* UTM coordinates: X= 510757,Y= 4110953 (discharge location)
Lower end segment* UTM coordinates: X= 510497, Y= 4109343 (confluence with Davis Branch)
*Segment is the portion of the stream where discharge occurs. Segment is used to track changes in assimilative capacity and is bound at a minimum by existing sources and confluences with other significant water bodies.

Geohydrologic Evaluation was submitted with the request and the receiving stream is losing for discharge purposes (see Appendix B).

5. Antidegradation Review Information

The AIP specifies that if the proposed activity results in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required.

The following is a review of the Wastewater Treatment Facility Antidegradation Review Report for Ozark Correctional Center dated August 13, 2019.

A. Tier Determination

Waterbodies are assigned Tier 1, 2, or 3 protection levels.

Tier 1 protection is applied to a waterbody on a pollutant by pollutant basis for pollutants at or exceeding the water quality standards. Waterbodies with an impairment are identified on the 303(d) list or have a TMDL.

Tier 2 level protection is assigned to the waterbody on a pollutant by pollutant basis where existing water quality is better than the water quality standards. Waterbodies with a Tier 2 protection level have an assimilative capacity for the pollutants being evaluated. A Tier 2 pollutant can be evaluated as minimally degrading, consumes less than 10% of the assimilative capacity, or significantly degrading, greater than 10 % consumption of assimilative capacity.

Waterbodies receiving Tier 3 protection are those listed as Outstanding National Resource Waters or Outstanding State Resource Waters to which discharge is not allowed.

Below is a list of POCs reasonably expected to be in the discharge. Pollutants of concern are defined as those pollutants "proposed for discharge that affects beneficial use(s) in waters of the state. They include pollutants that create conditions unfavorable to beneficial uses in the water body receiving the discharge or proposed to receive the discharge" (AIP, Page 7). Tier 2 was assumed for all POCs, except Total Phosphorus and Total Nitrogen.

Table 1. Pollutants of Concern and Tier Determination

Pollutants of Concern	Tier	Degradation**	Comment
Biological Oxygen Demand (BOD5)	2*	Significant	
Total Suspended Solids (TSS)	2*	Significant	
Ammonia as N	2*	Significant	
Escherichia coli (E. coli)	2*	Significant	
Phosphorus, Total	1		James River TMDL
Nitrogen, Total	1		James River TMDL
Aluminum, Total Recoverable	2*	Significant	
Iron, Total Recoverable	2*	Significant	

* - assumed to be Tier 2

B. Existing Water Quality

No existing water quality data was submitted. All POCs were considered to be Tier 2 and significantly degraded in the absence of existing water quality except for Total Nitrogen and Total Phosphorus. The facility discharges to a tributary of Davis Branch of Finley Creek, which drains to the James River, approximately 40 miles away. Three segments of the James River located in Webster, Greene, Christian and Stone counties are impaired for nutrients. To

address the impairment, the U.S. EPA approved a Total Maximum Daily Load (TMDL) for the James River on May 7, 2001.

Additionally, the James River is a tributary to Table Rock Lake, which is listed on the 2018 303(d) List for Total Nitrogen, Chlorophyll-a, and Nutrient/Eutrophication Biological Indicators. No TMDL has been developed for Table Rock Lake at this time.

Tier 1 Review

Due to the impairment caused by nutrients in the James River and Table Rock Lake, Total Phosphorus (TP) and Total Nitrogen (TN) are considered Tier 1 POCs. As Tier 1 POCs, the discharge cannot cause or contribute to further degradation of TN or TP in James River or Table Rock Lake. This Tier 1 Review will review applicable criteria, identify the impairment, summarize any monitoring data, and determine the appropriate method for addressing the impairment.

In accordance with the Effluent Regulations for the State of Missouri [10 CSR 20-7.015(3)(F)], all permitted point sources in the Table Rock Lake basin with a discharge of greater than or equal to 22,500 gpd are required to meet a phosphorus limit of 0.5 mg/L. The TMDL for James River references this regulation and lists Ozark CC as a facility that discharges to an impaired segment of the James River and shall have a phosphorus limit included in its permit. The 0.5 mg/L phosphorus limit went into effect for the Ozark CC on December 1, 2007. The TMDL for James River does not include an effluent limitation for nitrogen. As the facility's discharge load is not expanding and the facility's outfall is moving farther upstream from the James River and Table Rock Lake, the Department has determined that the proposed project will not cause or contribute to the impairment. The technology-based secondary limitation of 0.5 mg/L for TP will continue to be applied to this facility, and a monitoring only requirement for TN will be applied.

According to the AIP, the waters may receive the POCs that are causing impairments if 1) the discharge would not cause or contribute to a violation of the WQS, 2) all other conditions of the state permitting requirements are met (i.e., no discharge options are explored and technology based requirements (including ELGs) are met); and 3) the permit is issued with the highest statutory and regulatory requirements.

C. Necessity of Degradation

The AIP specifies that if the proposed activity does result in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required. Part of that analysis as shown below is the evaluation of non-degrading alternatives, such as regionalization or no discharge systems.
The applicant has the option of assuming discharge will be significant and proceeding directly to the alternatives analysis, thereby avoiding the determination of the assimilative capacity of the receiving water. Ozark CC has elected this option.

i. Regionalization

The nearby cities of Fordham and Diggins operate wastewater treatment facilities, but lack the capacity to accept discharge from Ozark CC regardless of cost. Fordham WWTF is currently at 70% of it's 100,000 gpd capacity and Diggins WWTF has a capacity of 45,000 gpd.

ii. No Discharge Evaluation

The applicant evaluated no discharge alternatives of land application and subsurface irrigation. The applicant determined that these two alternatives were not practical because of the cost of acquiring land, 75+ and 30+ acres respectively.

iii. Alternatives to No discharge

The applicant evaluated two discharging alternatives. Alternative 1 is to relocate the outfall and install a second metal salt dosing point. These changes will address the pipe maintenance issue and the phosphorus & aluminum exceedances. Alternative 2 included installing "a process control system that incorporates instrumentation and mixing equipment in the aeration basin to achieve biological [ammonia] removal" in addition to the improvements proposed in Alternative 1.

As previously discussed, the no discharge alternatives of regionalization, land application, and subsurface irrigation were eliminated as impracticable. Only those alternatives that were considered practicable were included in the economic efficiency analysis. Alternative 1 is considered the "base case" option due to the overall lowest present worth cost while being protective of the receiving stream's water quality standards. The economic efficiency analysis showed that the return on environmental benefits with increasing cost of treatment did not justify more expenditure beyond the base case treatment alternative (see Table 2). Alternative 1 was the preferred alternative based on this analysis.

Table 2: Alternatives Analysis Comparison

	Alternative 1 (Base Case) Relocate outfall + 2nd dose point	Alternative 2 Relocate outfall + 2nd dose point+enhanced nutrient removal
BOD5	≤ 10 mg/l	≤ 10 mg/l
TSS	≤ 15 mg/l	≤ 15 mg/l
Ammonia as N (Apr 1-Sep 30)	≤ 1.1 mg/l	≤ 0.8 mg/l
Ammonia as N (Oct 1-Mar 31)	≤ 2.0 mg/l	≤ 0.8 mg/l
Escherichia coli (E. coli)	≤ 126 CFU/100ml	≤ 126 CFU/100ml
Phosphorus, Total	≤ 0.5 mg/l	≤ 0.5 mg/l
Nitrogen, Total	*	*
Aluminum, Total Recoverable	≤ 373.8 µg/l	≤ 373.8 µg/l
Iron, Total Recoverable	≤ 839.7 µg/l	≤ 839.7 µg/l
Life Cycle Cost**	$931,633	$1,286,875
Ratio	100%	138%

* monitoring requirement
**Life cycle cost at 20 year design life and 2.2% interest

D. Losing Stream Alterative Discharge Location

Under 10 CSR 20-7.015(4) (A), discharges to losing stream shall be permitted only after other alternatives including land application, discharge to gaining stream and connection to a regional facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

The current outfall discharges to Davis Branch, which is a gaining segment at the outfall, but approximately 1.75 miles downstream becomes losing and is therefore considered losing according to state effluent regulations. The new outfall will also discharge to a losing stream. There are no other gaining water bodies closer than Davis Branch. As discussed in C. above, land application and regionalization are not practical alternatives.

E. Social and Economic Importance

The affected community consists of the inmate population and staff of Ozark CC. Ozark CC is a major employer in south central Webster County, therefore the nearby communities of Fordland and Diggins are also affected communities. Proper and cost-effective operation of the facility serves the environmental and economic interests of both the State of Missouri and the local communities.

F. natural Heritage Review

A Missouri Department of Conservation Natural Heritage Review was obtained by the applicant. Two species of bats, Indiana and Northern Long-Eared, may be present in the project area. The following recommendations were made for construction activities:

- Manage construction to minimize sedimentation and run-off to nearby streams.

- At stream and drainage crossings, avoid erosion, silt introduction, petroleum or chemical pollution, and disruption or realignment of stream banks and beds.
- If any trees need to be removed for the project, contact the U.S. Fish and Wildlife Service for coordination under the Endangered Species Act.

6. Mixing Considerations

Mixing Zone (MZ): Not Allowed [10 CSR 20-7.031(5)(A)4.B.(I)(a)]
Zone of Initial Dilution (ZID): Not Allowed [10 CSR 20-7.031(5)(A)4.B.(I)(b)]

7. Permit Limits and Monitoring Information

Table 3. Proposed Monitoring Parameters and Effluent Limits

Parameter	Units	Daily Maximum	Weekly Average	Monthly Average	Basis for Limit (note 1)	Monitoring Frequency
Flow	MGD	*		*	FSR	Monthly
BOD5	mg/L		15	10	FSR	Monthly
TSS	mg/L		20	15	FSR	Monthly
Ammonia as N (Apr 1-Sep 30)/(Oct 1-Mar 31)	mg/L	5.7/11.0		1.1/2.1	WQBEL	Monthly
Escherichia coli (E. coli)	CFU/100ml	126		*	FSR	Monthly
Phosphorus, Total	mg/L	*		0.5	FSR	Monthly
Nitrogen, Total	mg/L	*		*	FSR	Monthly
Aluminum, Total Recoverable	µg/l	750		368.1	WQBEL	Monthly
Iron, Total Recoverable	µg/l	1579.4		839.7	WQBEL	Monthly
Oil & Grease	mg/L	15		10	FSR	Monthly
pH	SU	6.5-9.0		6.5-9.0	FSR	Monthly

Note 1 – Water Quality-based Effluent Limitation – WQBEL; or Minimally Degrading Effluent Limit –MDEL; or Preferred Alternative Effluent Limit – PEL; or Technology-based Effluent Limit – TBEL; or No Degradation effluent Limit – NDEL; or Federal/State Regulation – FSR; or Not Applicable – N/A. Also, please see the General Assumptions of the WQAR D & E. * - Monitoring requirements only.

8. Receiving Water Monitoring Requirements

No receiving water monitoring requirements recommended at this time.

9. Derivation and Discussion of Parameters and Limits

Wasteload allocations and limits were calculated using two methods:

1) Water quality-based – Using water quality criteria or water quality model results and the dilution equation below:

$$C = \frac{(C_s \times Q_s) + (C_e \times Q_e)}{(Q_e + Q_s)}$$ (EPA/505/2-90-001, Section 4.5.5)

Where C = downstream concentration

C_s = upstream concentration
Q_s = upstream flow
C_e = effluent concentration
Q_e = effluent flow

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ). Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow at the edge of the zone of initial dilution (ZID).

Water quality-based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

2) Alternative Analysis-based – Using the preferred alternative's treatment capacity for conventional pollutants such as BOD_5 and TSS that are provided by the consultant as the WLA, the significantly-degrading effluent average monthly and average weekly limits are determined by applying the WLA as the average monthly (AML) and multiplying the AML by 1.5 to derive the average weekly limit (AWL). For toxic and nonconventional pollutant such as ammonia, the treatment capacity is applied as the significantly-degrading effluent monthly average (AML). A maximum daily can be derived by dividing the AML by 1.19 to determine the long-term average (LTA). The LTA is then multiplied by 3.11 to obtain the maximum daily limitation. This is an accepted procedure that is defined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

Note: Significantly-degrading effluent limits have been based on the authority included in Section III. Permit Consideration of the AIP. Also under 40 CFR 133.105, permitting authorities shall require more stringent limitations than equivalent to secondary treatment limitations for 1) existing facilities if the permitting authority determines that the 30-day average and 7-day average BOD_5 and TSS effluent values could be achievable through proper operation and maintenance of the treatment works, and 2) new facilities if the permitting authority determines that the 30-day average and 7-day average BOD_5 and TSS effluent values could be achievable through proper operation and maintenance of the treatment works, considering the design capability of the treatment process.

Outfall #001 **– Main Facility Outfall**

- **Flow.** Though not limited itself, the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations [40 CFR Part 122.44(i)(1)(ii)]. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the department, which may require the submittal of an operating permit modification. Influent monitoring has been and will be required for this facility in its Missouri State Operating Permit.

- **Biochemical Oxygen Demand (BOD_5).** BOD_5 limits of 10 mg/L monthly average, 15 mg/L average weekly limits were proposed.

  The Dissolved Oxygen (DO) Modeling & BOD Effluent Limit Development Administrative Guidance for the Purpose of Conducting Water Quality Assistance Reviews states that facilities less than 100,000 gallons per day and proposing BOD treatment less than or equal to an average monthly of 10 mg/L and average weekly of 15 mg/L as demonstrated by performance specifications from a manufacturer or effluent sampling of and existing facility with the same treatment facility are exempt from the DO modeling requirement.

- **Total Suspended Solids (TSS).** 15 mg/L monthly average, 20 mg/L average weekly limits were proposed.

- **Total Ammonia Nitrogen.** Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(5)(B)7.C. & Table B3]. Background total ammonia nitrogen = 0.01 mg/L

Season	Temp (°C)	pH (SU)	Total Ammonia Nitrogen CCC (mg N/L)	Total Ammonia Nitrogen CMC (mg N/L)
Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

Summer: April 1 – September 30, Winter: October 1 – March 31.

WBQEL equation
$C_e = (((Q_e+Q_s)*C) - (Q_s*C_s))/Q_e$

Summer
Chronic WLA: $C_e = ((0.143 + 0.0)1.5 – (0.0 * 0.01))/0.143$
$C_e = 1.5$ mg/L

Acute WLA: $C_e = ((0.143 + 0.0)12.1 – (0.0 * 0.01))/0.143$
$C_e = 12.1$ mg/L

$LTA_c = 1.5$ mg/L (0.364) = 0.55 mg/L [CV = 2.82, 99th Percentile, 30 day avg.]
$LTA_a = 12.1$ mg/L (0.096) = 1.16 mg/L [CV = 2.82, 99th Percentile]

MDL = 0.55 mg/L (10.46) = 5.7 mg/L [CV = 2.82, 99th Percentile]
AML = 0.55 mg/L (1.97) = 1.1 mg/L [CV = 2.82, 95th Percentile, n = 30]

Winter
Chronic WLA: $C_e = ((0.143 + 0.0)3.1 – (0.0 * 0.01))/0.143$
$C_e = 3.1$ mg/L

Acute WLA: $C_e = ((0.143 + 0.0)12.1 – (0.0025 * 0.01))/0.143$
$C_e = 12.1$ mg/L

$LTA_c = 3.1$ mg/L (0.311) = 0.96 mg/L [CV = 0.6, 99th Percentile, 30 day avg.]
$LTA_a = 12.1$ mg/L (0.087) = 1.06 mg/L [CV = 0.6, 99th Percentile]

MDL = 0.96 mg/L (11.43) = 11.0 mg/L [CV = 0.6, 99th Percentile]
AML = 0.96 mg/L (2.18) = 2.1 mg/L [CV = 0.6, 95th Percentile, n = 30]

Season	Maximum Daily Limit (mg/l)	Average Monthly Limit (mg/l)
Summer	5.7	1.1
Winter	11.0	2.1

- ***E. coli*.** Discharges to losing streams shall not exceed 126 per 100 mL as a Daily Maximum and Monthly Average at any time [10 CSR 20-7.031(5)(C)]. No more than 10% of samples (collected over long series of sampling events) shall exceed 126 cfu per 100 mL daily maximum [10 CSR 20-7.015(9)(B)1.G].

For facilities less than 100,000 gpd: Per the effluent regulations the *E. coli* sampling/monitoring frequency shall be set to match the monitoring frequency of wastewater and sludge sampling program for the receiving water category in 10 CSR 20-7.015(1)(B)3. during the recreational season (April 1 – October 31), with compliance to be determined by calculating the geometric mean of all samples collected during the reporting period (samples collected during the calendar week for the weekly average, and samples collected during the calendar month for the monthly average). The weekly average requirement is consistent with EPA federal regulation 40 CFR 122.45(d). (Please see General Assumptions of the WQAR #7)

- **Total Phosphorus.** The facility is located in the watershed of Table Rock Lake and must therefore meet the lake's phosphorus limit of 0.5 mg/L [10 CSR 20-7.015(3)].

- **Total Nitrogen.** Monitoring requirement only, as noted in Table 3.

- **Aluminum, Total Recoverable.** Protection of Aquatic Life Chronic Criteria = N/A, Acute Criteria = 750 µg/L. This facility uses chemicals for phosphorous removal that may contain aluminum. A reasonable potential analysis was conducted and it has been determined that the facility has reasonable potential to exceed water quality standards for Aluminum (Total Recoverable). If no Aluminum was used in a given sampling period, an actual analysis is not necessary. Simply report as "0 µg/L".

  Acute WLA: $C_e = ((0.143+ 0.0)750 – (0.0 * 0.0))/ 0.143$
  $C_e = 750$ µg/L

  $LTA_a = 750 (0.312) = 234.065$ µg/L [CV = 0.62, 99th Percentile]

  MDL = 234.065 (3.204) = 750.0 µg/L [CV = 0.62, 99th Percentile]
  AML = 234.065 (1.572) = 368.1 µg/L [CV = 0.62, 95th Percentile, n = 4]

- **Iron, Total Recoverable.** Protection of Aquatic Life Chronic Criteria = 1,000 µg/L, Acute Criteria = N/A. This facility uses chemicals for phosphorous removal that may contain iron. A reasonable potential analysis was conducted and it has been determined that the facility has reasonable potential to exceed water quality standards for Iron (Total Recoverable). If no iron was used in a given sampling period, an actual analysis is not necessary. Simply report as "0 µg/L".

  Chronic WLA: $C_e = ((0.143+ 0.0)1{,}000 – (0.0 * 0.0))/ 0.143$
  $C_e = 1{,}000$ µg/L

  $LTA_C = 1{,}000 (0.569) = 568.955$ µg/L [CV = 0.522, 99th Percentile]

  MDL = 568.955 (2.776) = 1,579.4 µg/L [CV = 0.522, 99th Percentile]
  AML = 568.955 (1.476) = 839.7 µg/L [CV = 0.522, 95th Percentile, n = 4]

- **Oil & Grease.** Conventional pollutant, [10 CSR 20-7.031, Table A]. Effluent limitation is for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.

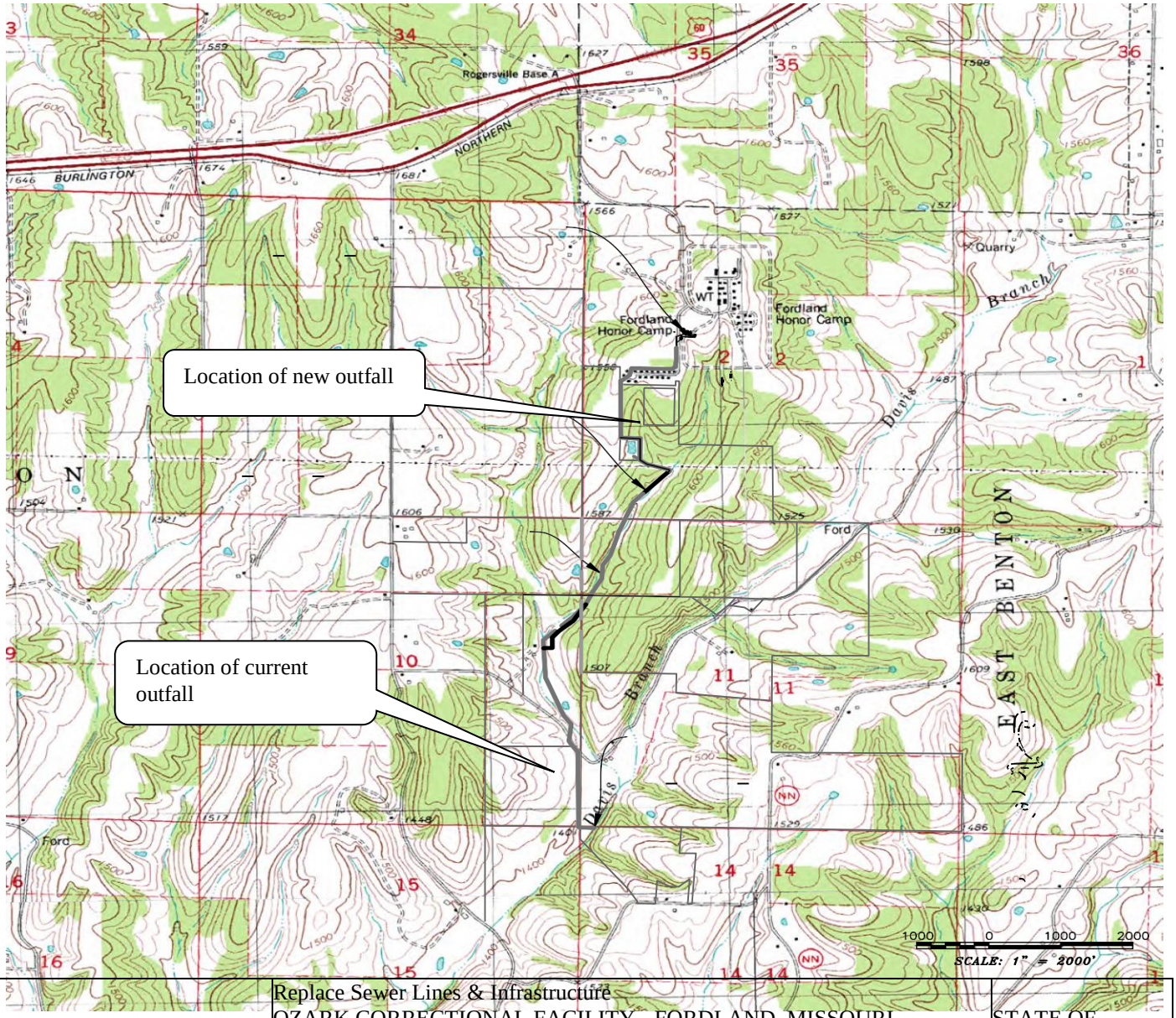
- **pH.** – 6.5-9.0 SU. Proposed limit is protective of the water quality standard [10 CSR 20-7.031(5)(E)].

10. Antidegradation Review Preliminary Determination

The proposed new facility discharge location will result in significant degradation of the unnamed tributary to Davis Branch. Relocation and addition of a second dose point for metal salts was determined to be the base case technology (lowest cost alternative that meets technology and water quality based effluent limitations). The cost effectiveness of the other technology evaluated, enhanced nutrient removal, was not found to be cost effective and was not selected.

Per the requirements of the AIP, the effluent limits in this review were developed to be protective of beneficial uses and to attain the highest statutory and regulatory requirements. The Department has determined that the submitted review is sufficient and meets the requirements of the AIP. No further analysis is needed for this discharge.

Reviewer: Bern Johnson
Date: October 2019
Unit Chief: John Rustige, P.E.



WHITE RIVER ENGINEERING INC. 600 W. College Street, Suite 104 • Springfield, Missouri 65806 (417) 862-3355 • Fax: (417) 862-7711 • www.whiterivereng.com Missouri State Certificate of Authority No. 2004012957	Replace Sewer Lines & Infrastructure OZARK CORRECTIONAL FACILITY - FORDLAND, MISSOURI PROJECT NO. C1907-01 SITE NO. 2303 FACILITY NO. 26850, 26851 & 26852	STATE OF MISSOURI MICHAEL L. PARSON, GOVERNOR
	OFFICE OF ADMINISTRATION DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION	X-001 SHEET 1 of 1 08/07/2019

Appendix B: Geohydrologic Evaluation

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Carol S. Comer, Director

LWE19082
Webster County

June 11, 2019

Richard McMillian, P.E.
White River Engineering, Inc.
600 W. College Street
Springfield, MO 65806

RE: Ozark Correctional Facility

Dear Richard McMillian, P.E.:

On April 19, 2019, the Missouri Geological Survey received a request to perform a geohydrologic evaluation for the above referenced project located in Webster County. Included with this letter is a report that details the geologic and hydrologic conditions at the site and the potential for groundwater contamination in the event of wastewater treatment failure.

Thank you for the evaluation request. If you are in need of further assistance or have questions regarding the report, please contact our office at P.O Box 250, Rolla, Mo 65402-0250, by telephone at 573-368-2100 or gspgeol@dnr.mo.gov.

Sincerely,

MISSOURI GEOLOGICAL SURVEY

John Corley
Geologist
Environmental Geology Section

STATE OF MISSOURI
REGISTERED GEOLOGIST
2014001481

06/11/2019

c: Terry Bruns
WPP
Southwest Regional Office

Missouri Department Of Natural Resources
Missouri Geological Survey
Geological Survey Program
Environmental Geology Section

Project ID Number
LWE19082
County
Webster

Request Details

Project: Ozark Correctional Facility

Legal Description: 02 T28N R18W
Quadrangle: Fordland
Latitude: 37 9 1.72
Longitude: -92 52 38.25

Property Owner

Name: Terry Bruns
Address: PO Box 809
City: Jefferson City
State: MO Zip: 65102
Phone: 573-526-5184
Email: Terry.Bruns@oa.mo.gov

Requestor

Name: Richard McMillian, P.E.
Address: 600 W. College Street
City: Springfield
State: MO Zip: 65806
Phone: 417-862-3355
Email: richard@whiterivereng.com

Project Details

Report Date: 06/11/2019
Date of Field Visit: 06/05/2019

Previous Reports: Not Applicable

Facility Type
- [X] Mechanical treatment plant
- [ ] Recirculating filter bed
- [ ] Land application
- [ ] Lagoon or storage basin
- [ ] Subsurface soil absorption system
- [ ] Lagoon or storage basin W/Land App
- [ ] Lagoon or storage basin W/SSAS
- [ ] Other type of facility

Type of Waste
- [ ] Animal
- [X] Human
- [ ] Process or industrial
- [ ] Leachate
- [ ] Other waste type

Funding Source
- [X] IWT
- [ ] WWL-SRF

Additional Information
- [ ] Plans were submitted
- [ ] Site was investigated by NRCS
- [ ] Soil or geotechnical data were submitted

Geologic Stream Classification: [ ] Gaining [X] Losing [ ] No discharge

Overall Geologic Limitations
- [ ] Slight
- [ ] Moderate
- [X] Severe

Collapse Potential
- [X] Not applicable
- [ ] Slight
- [ ] Moderate
- [ ] Severe

Topography
- [X] <4%
- [ ] 4% to 8%
- [ ] 8% to 15%
- [ ] >15%

Landscape Position
- [ ] Broad uplands
- [ ] Floodplain
- [X] Ridgetop
- [ ] Alluvial plain
- [X] Hillslope
- [ ] Terrace
- [ ] Narrow ravine
- [ ] Sinkhole

Bedrock: Bedrock consists of Ordovician-age Jefferson City-Cotter Dolomite.

Surficial Materials: Surficial materials consist of gravelly residuum.

Missouri Department Of Natural Resources
Missouri Geological Survey
Geological Survey Program
Environmental Geology Section

Project ID Number
LWE19082
County
Webster

Recommended Construction Procedures for Earthen Facility	Determine Overburden Properties	Determine Hydrologic Conditions
	☐ Particle size analysis	☐ Groundwater elevation
☐ Installation of clay pad and Compaction	☐ Atterberg limits	☐ Direction of groundwater flow
☐ Diversion of subsurface flow	☐ 95% Max. dry density test method	☐ 25-Year flood level
☐ Artificial sealing	☐ Overburden thickness	☐ 100-Year flood level
☐ Rock excavation	☐ Permeability coefficient-undisturbed	
☐ Limit excavation depth	☐ Permeability coefficient-remolded	

Remarks:

On June 5, 2019, two geologists with the Geological Survey Program (GSP) verified the characteristics of the receiving stream for the discharging wastewater treatment plant that serves the Ozark Correctional Center, located approximately 1.9 miles southwest of Diggins, Missouri. It is proposed to move the current outfall closer to the facility. The present outfall is located approximately 1.88 miles downstream of the facility, and the proposed outfall will be located approximately 0.54 miles downstream of the facility.

At the location of the proposed outfall, Ordovician-age Jefferson City-Cotter Dolomite was observed to crop out. The stream channel consisted of exposed bedrock and poorly sorted chert gravels, cobbles, and boulders. Water was observed pooled up in crevices in the bedrock, but there was no water observed in the stream channel, and the potentiometric surface is likely to be greater than 20 feet below the stream channel at the location of the proposed outfall. The gravelly nature of the surficial materials and the fractured and faulted nature of the bedrock in the area promotes high groundwater velocity and rapid migration off-site.

Based on the stream characteristics observed, the GSP concurs with the stream's current classification of losing. In the event of wastewater treatment failure, regional groundwater resources and surface waters of Davis Branch may be adversely affected.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH
ANTIDEGRADATION REVIEW SUMMARY / REQUEST

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

1. FACILITY

NAME			COUNTY
Missouri Department of Corrections - Ozark Correctional Center WWTF (NPDES # MO-0093556)			Webster
ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE
929 Honor Camp Lane	Fordland	MO	65652
PERMIT NUMBER	PROPOSED DESIGN FLOW	SIC / NAICS CODE	
MO-0093556	92,000 gpd	4952 / 9223	

2. OWNER

NAME			
Missouri Department of Corrections			
ADDRESS	CITY	STATE	ZIP CODE
P.O. Box 236	Jefferson City	MO	65102
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE	
Greg.Wykes@doc.mo.gov		(573) 526-6512	

3. CONTINUING AUTHORITY The regulatory requirement regarding continuing authority is found in 10 CSR 20-6.010(2).

NAME	SECRETARY OF STATE CHARTER NUMBER		
Missouri Department of Corrections			
ADDRESS	CITY	STATE	ZIP CODE
P.O. Box 236	Jefferson City	MO	65102
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE	
Greg.Wykes@doc.mo.gov		(573) 5266512	

4. CONSULTANT

PREPARER NAME	COMPANY NAME		
Richard McMillian, PE	White River Engineering, Inc.		
ADDRESS	CITY	STATE	ZIP CODE
600 W College St Ste104	Springfield	MO	65806
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE	
richard@whiterivereng.com		(417) 862-3355	

5. RECEIVING WATER BODY SEGMENT #1

NAME: Unnamed Tributary to Davis Branch

5.1 Upper end of segment – Location of discharge
UTM: X= 510776.508, Y= 4110966.912 OR Lat _____, Long _____

5.2 Lower end of segment –
UTM: X= 510598.417, Y= 4109358.016 OR Lat _____, Long _____

Per the Missouri Antidegradation Implementation Procedure (AIP), the definition of a segment, "a segment is a section of water that is bound, at a minimum, by significant existing sources and confluences with other significant water bodies."

6. WATER BODY SEGMENT #2 (IF APPLICABLE, Use another form if a third segment is needed)

NAME:

6.1 Upper end of segment – End of Segment #1
UTM: X= _____, Y= _____ OR Lat _____, Long _____

6.2 Lower end of segment –
UTM: X= _____, Y= _____ OR Lat _____, Long _____

7. DECHLORINATION

If chlorination and dechlorination is the existing or proposed method of disinfection treatment, will the effluent discharged be equal to or less than the Water Quality Standards for Total Residual Chlorine stated in Table A1 of 10 CSR 20-7.031?

☐ Yes ☑ No – What is the proposed method of disinfection? Ultraviolet Light (UV) - Existing

Based on the disinfection treatment system being designed for total removal of Total Residual Chlorine, minimal degradation for Total Residual Chlorine is assumed and the facility will be required to meet the water quality based effluent limits. These compliance limits for Total Residual Chlorine are much less than the method detection limit of 0.13 mg/L.

12. PROPOSED PROJECT SUMMARY

Improvements to the existing WWTF serving the Ozarks Correctional Center are needed to bring the plant into consistent compliance with Operating Permit effluent phosphorus and metals limits associated with chemical phosphorus removal.

Proposed improvements include relocating the WWTF outfall upstream closer to the treatment works to eliminate excessive costs associated with replacing the long outfall sewer and providing a second metal salt injection point prior to the secondary clarifiers to enhance chemical phosphorus removal efficiency.

Proposed WWTF improvements also include upgrading the waste sludge dewatering system to eliminate occupational health and safety concerns associated with manual handling of bagged waste sludge required with the dewatering system currently in use. The proposed system utilizes geotextile bags that are specifically designed and manufactured to fit into a standard 30 yard land fill roll-off container. The complete dewatering package includes a flocculant (polymer) mixing and injection system, a sludge mixing manifold, and the geotextile bag and drainage mat that fits into the roll-off container. Waste sludge is pumped through the mixing manifold where the sludge and flocculant are mixed together prior to entering the geotextile bag. Inside the bag, the sludge dewaters rapidly through the geotextile fabric. Clear liquid drains out the bottom of the container, is collected and piped back to the treatment plant headworks. Dewatering times will generally be 2-3 days to a week or more. The wasting operation can be repeated over and over until the bag is full and ready for dry hauling to a sanitary landfill for final disposal. The bag is capable of holding approximately 12-15 tons of dewatered solids that will meet the paint filter test used at landfills.

Applicants choosing to use a new wastewater technology that are considered an "unproven technology" in Missouri must comply with the requirements set forth in the *New Technology Definitions and Requirements fact sheet.*

13. CONTINUING AUTHORITY WAIVER (For New Discharges)

In accordance with 10 CSR 20-6.010(2)(C), applicants proposing use of a lower preference continuing authority, when the higher level authority is available, must submit a waiver from the existing higher authority one or other documentation for the department's review, provided it does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or by the Missouri Clean Water Commission. Is the waiver necessary? ☐ Yes ☑ No

If yes, provide a copy.

14. APPLICATION FEE

☑ CHECK NUMBER 20 years ☐ JETPAY CONFIRMATION NUMBER

15. SIGNATURE

I am authorized and hereby certify that I am familiar with the information contained in this document and to the best of my knowledge and belief such information is true, complete and accurate.

SIGNATURE	DATE
	8/14/19
PRINT NAME	TITLE
Richard McMillian, PE	Project Engineer

PLEASE IDENTIFY YOUR STATUS FOR THIS PROJECT: ☐ OWNER ☐ CONTINUING AUTHORITY ☑ CONSULTANT

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH

ANTIDEGRADATION REVIEW SUMMARY
PATH C: TIER 2 – SIGNIFICANT DEGRADATION

1. FACILITY

NAME	COUNTY
Missouri Department of Corrections - Ozark Correctional Center WWTF (NPDES # MO-0093556)	Webster

2. SUMMARY OF THE POLLUTANTS OF CONCERN

Pollutants of Concern to be considered include those pollutants reasonably expected to be present in the discharge per the Antidegradation Implementation Procedure Section II.A. and assumed or demonstrated to cause significant degradation. The tier protection levels are specified and defined in rule at 10 CSR 20-7.031(2).

What are the proposed pollutants of concern and their respective effluent limits that the selected treatment option will comply with:

Pollutants of Concern*	Concentration*		Base Case Limit	Basis (WQS, WLA, ELG, Other)**
	mg/L	µg/L		
BODs	X		10	Current Operating Permit
TSS	X		15	Current Operating Permit
Ammonia (Summer)	X		1.1	Current Operating Permit
Ammonia (Winter)	X		2.0	Current Operating Permit
Total Nitrogen	X		n/a	
Total Phosphorus	X		0.5	Current Operating Permit
Aluminum		X	373.8	Current Operating Permit
Iron		X	839.7	Analysis of DMR Data
E. coli			126 MPN/100 mL	Current Operating Permit

* Place an X in appropriate box for the concentration units for each Pollutant of Concern

** Provide the Basis for the Base Case Limit: WQS – Water Quality Standard, WLA – Wasteload Allocation, ELG – Effluent Limit Guideline, or describe other.

3. IDENTIFYING ALTERNATIVES

Supply a summary of the non-discharging alternatives considered. "For Discharges likely to cause significant degradation, an analysis of non-degrading and less-degrading alternatives must be provided," as stated in the Antidegradation Implementation Procedure Section II.B.1. These alternatives include no-discharge. Attach all supportive documentation in the Antidegradation Review report.

Feasibility of non-discharging alternatives (regionalization, land application, subsurface irrigation, and recycling or reuse):

Non-discharging alternatives considered included slow rate land application, subsurface irrigation & regionalization. Land application and subsurface irrigation were determined to be not practicable due to geologic limitations and poor soil conditions. It is estimated that 75 acres of land would be required for slow rate land application and 30 acres would be required for subsurface drip distribution. According to historical and current Geohydrologic Evaluations, the site has severe overall geologic limitations, moderate collapse potential for earthen basins, and slopes ranging from <4% up to 15%. According to the Natural Resources Conservation Service Soil Survey for Webster County, most soils in the vicinity of the facility are rated very limited for slow rate treatment of wastewater. Similarly, most soils are rated unsuitable for subsurface irrigation. With most soils being rated limited or unsuitable and the large amount of land that would be required, slow rate land application and subsurface irrigation were both determined not practicable nor economically efficient. Regionalization was also considered and determined not practicable. The nearby Cities of Fordland and Diggins wastewater treatment facilities have design capacities of 100,000 gpd and 45,000 gpd, respectively, meaning neither has the capacity to treat flows from Ozark Correctional Center. The closest facility with sufficient capacity is the City of Springfield, approximately 22 miles away. It is estimated that force main and pumping station construction cost alone would exceed $5,000,000. All three non-degrading alternatives considered are clearly not practicable or economically efficient.

Minimum of three (preferably five or more) discharging alternatives* ranging from less-degrading to degrading including Preferred Alternative (All treatment levels for POCs must at a minimum meet water quality standards):

Discharging Alternative #	Treatment Type	Description
1	Existing WWTF (Base Alternative)	Relocate Outfall Upstream + Install 2nd Metal Salt Dose Point
2	Existing WWTF	Retain Existing Outfall + Install 2nd Metal Salt Dose Point
3	Existing WWTF	Relocate Outfall + Install Tertiary Filters
4		
5		
6		

* Same technology may be multiple alternatives as you have the base unit and add to it with more capacity to provide additional treatment.

4. DETERMINATION OF THE REASONABLE ALTERNATIVE

Per the Antidegradation Implementation Procedure Section II.B.2, "a reasonable alternative is one that is practicable, economically efficient and affordable." Provide basis and supporting documentation in the Antidegradation Review report. **Please do not write "See Report" for any box below.**

Practicability Summary:

"The practicability of an alternative is considered by evaluating the effectiveness, reliability, and potential environmental impacts," according to the Antidegradation Implementation Procedure Section II.B.2.a. Examples of factors to consider, including secondary environmental impacts, are given in the Antidegradation Implementation Procedure Section II.B.2.a.

By Regulation, the discharge limits for POC contained in the current NPDES Permit are considered protective of losing streams. Implementation of any of the alternatives evaluated should result in compliance with the Permit limits. Less-degrading alternative #3 would be more reliable with respect to permit compliance due to the additional treatment provided by the tertiary filters. Less-degrading alternative #2 would likely have the greatest environmental impact due to land disturbance activities associated with replacing the entire 1.55 mile long outfall sewer. As mentioned in the Natural Heritage Review Level Two Report, construction, maintenance, and repair of cross-country lines affect both plants and wildlife with stream and drainage crossings being primary concerns. The Report also identified one federal- and state-listed endangered species, Indiana Bats, and one federal-listed threatened species, Northern Long-Eared Bats, that may occur in the project area. Due the potential presence of these species, U.S Fish and Wildlife would most likely require that any tree clearing be performed during the winter months when these species hibernate.

Economic Efficiency Basis:

What is the design life cycle for the comparison? 20 years

What interest rate was used in the present worth calculations? 2.2 % - OMB Circular A-94 Appendix C for 2018

Economic Efficiency Summary:

Alternatives that are deemed practicable must undergo a direct cost comparison in order to determine economic efficiency. Means to determine economic efficiency are provided in the Antidegradation Implementation Procedure Section II.B.2.b.

Non-degrading and alternatives considered in this review were determined to be non-practicable or not economically efficient. Less-degrading alternatives considered were more than 120% of the base-cost alternative and therefore deemed not economically efficient.

TABLE OF THE ALTERNATIVES EVALUATION (Attach additional page if necessary)

PARAMETERS	Alternatives #					
	1	2	3	4	5	6
BOD_5 – mg/L	<10	<10	<10			
TSS – mg/L	<15	<15	<15			
Ammonia (Summer) – mg/L	<1.1	<1.1	<1.1			
Ammonia (Winter) – mg/L	<2.0	<2.0	<2.0			
E. Coli – #/100 mL	<126	<126	<126			
Total Nitrogen – mg/L	n/a					
Total Phosphorus – mg/L	<0.5	<0.5	<0.5			
Aluminum - µg/l	<373.8	<373.8	<373.8			
Iron - µg/l	<839.7	<839.7	<839.7			
Construction Cost – $	97,200	386,900	691,850			
Operating Cost – $	52,238	52,238	55,822			
Present Worth – $	914,322	1,111,810	1,436,868			
Ratio present worth to base case	1	1.22	1.57			

Affordability Summary:

Alternatives identified as most practicable and economically efficient are considered affordable if the applicant does not supply an affordability analysis. An affordability analysis per the Antidegradation Implementation Procedure Section II.B.2.c, "may be used to determine if the alternative is too expensive to reasonably implement."

Less-degrading alternative #'s 2 & 3 are not considered economically efficient per Missouri's AIP. Base alternative #1 is the most affordable alternative at this time.

Justification for Preferred Alternative:

Base alternative #1, relocating the outfall upstream closer to the treatment works site and providing a 2nd metal salt injection point prior to the secondary clarifiers is deemed the most practical and affordable alternative. Base-cost alternative #1 is preferred by the Department of Corrections due to the high cost associated with replacing the entire length of the existing outfall sewer.

Reasons for Rejecting the other Evaluated Alternatives:

Non-degrading and less-degrading alternatives considered in this review were determined to be non-practicable or not economically efficient. Less-degrading alternative #2, replace existing outfall sewer, would be much more difficult to implement since the exact location of the long outfall sewer over its entire length is not known and would require acquisition of multiple construction easements from affected land owners. Less-degrading alternative #3 cannot be implemented within the available construction budget allocated by the State Office of Administration.

Comments/Discussion:

5. SOCIAL AND ECONOMIC IMPORTANCE OF THE PREFERRED ALTERNATIVE

If the preferred alternative will result in significant degradation, then it must be demonstrated that it will allow important economic and social development in accordance to the Antidegradation Implementation Procedure Section II.E. Social and Economic Importance is defined as the social and economic benefits to the community that will occur from any activity involving a new or expanding discharge.

Identify the affected community:

The affected community is defined in 10 CSR 20-7.031(2)(B) as the community "in the geographical area in which the waters are located. Per the Antidegradation Implementation Procedure Section II.E.1, "the affected community should include those living near the site of the proposed project as well as those in the community that are expected to directly or indirectly benefit from the project."

Davis Branch is located in a rural area of south central Webster County approximately 2½ miles east of Fordland, Missouri and south of U.S. Highway 60. Surrounding properties consist of farmland. Webster County covers approximately 593.32 square miles and has an average population density of 52.4 persons per square mile. The affected community also includes the State of Missouri since the facility is a state owned property being used by Department of Corrections staff and inmates.

Identify relevant factors that characterize the social and economic conditions of the affected community:

Examples of social and economic factors are provided in the Antidegradation Implementation Procedure Section II.E.1., but specific community examples are encouraged.

Societal conditions of the affected area are primarily based on agricultural activities. According to the 2017 Census of Agricultural Census published by USDA, farming is the principal occupation of 41.7% of all principal farm operators, with 58.3% having other primary occupations. Consequently, many farm operators seek primary employment opportunities in the Springfield metro area and other nearby communities. The Ozark Correctional Center employs about 200 people making it one of the largest employers in the south central portion of Webster County.

Describe the important social and economic development associated with the project:

Determining benefits for the community and the environment should be site specific and in accordance with the Antidegradation Implementation Procedure Section II.E.1.

Since the Ozark Correctional Center is a State owned facility and major employer in the affected community, it's social and economic importance is obvious. The proposed improvements to the WWTF should reduce periodic exceedences of effluent phosphorus limit contained in the State Operating Permit and result in improved water quality conditions in the receiving stream which lies within the Table Rock Lake watershed. Protection of the Lake's water quality is important to the area tourism industry.

PROPOSED PROJECT SUMMARY:

Improvements to the existing WWTF serving the Ozarks Correctional Center are needed to bring the plant into consistent compliance with Operating Permit effluent phosphorus and metals limits associated with chemical phosphorus removal.

Proposed improvements include relocating the WWTF outfall upstream closer to the treatment works to eliminate excessive costs associated with replacing the long outfall sewer and providing a second metal salt injection point prior to the secondary clarifiers to enhance chemical phosphorus removal efficiency.

Proposed WWTF improvements also include upgrading the waste sludge dewatering system to eliminate occupational health and safety concerns associated with manual handling of bagged waste sludge required with the dewatering system currently in use. The proposed system utilizes geotextile bags that are specifically designed and manufactured to fit into a standard 30 yard land fill roll-off container. The complete dewatering package includes a flocculant (polymer) mixing and injection system, a sludge mixing manifold, and the geotextile bag and drainage mat that fits into the roll-off container. Waste sludge is pumped through the mixing manifold where the sludge and flocculant are mixed together prior to entering the geotextile bag. Inside the bag, the sludge dewaters rapidly through the geotextile fabric. Clear liquid drains out the bottom of the container, is collected and piped back to the treatment plant headworks. Dewatering times will generally be 2-3 days to a week or more. The wasting operation can be repeated over and over until the bag is full and ready for dry hauling to a sanitary landfill for final disposal. The bag is capable of holding approximately 12-15 tons of dewatered solids that will meet the paint filter test used at landfills.

Attach the Antidegradation Review report and all supporting documentation. This is a technical document, which must be signed, sealed and dated by a registered professional engineer of Missouri.