MISSOURI PUBLIC SERVICE COMMISSION

STAFF INVESTIGATION REPORT

S. K. & M. Water and Sewer Company

CASE NO. WO-2026-0360

Attachment 1 through Attachment 12

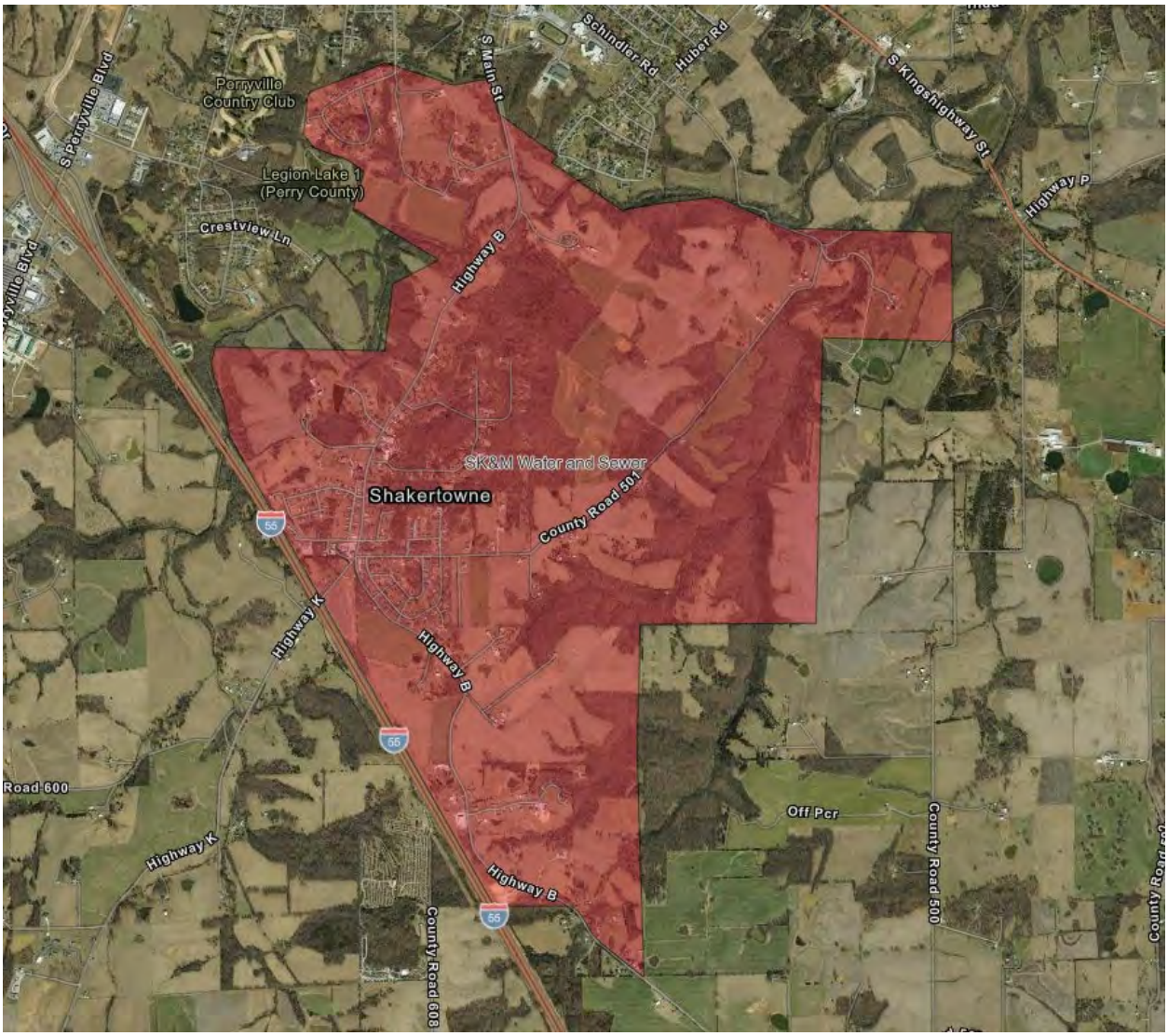
PREPARED BY

THE MISSOURI PUBLIC SERVICE COMMISSION STAFF

October 29th, 2026

****Denotes Confidential Information****

SK&M Service Territory



Case No. WO-2026-0360
Attachment 1

Case No. WO-2026-0360

ATTACHMENT 2

HAS BEEN DEEMED

CONFIDENTIAL

IN ITS ENTIRETY

Flooded meter pit (Adam Stamp, April 15, 2026, Parkwood Village, Perryville, MO)



Inspection Date: 7/20/26	**PSC Staff:** Stamp
System: S. K. & M.	**Company:** S. K. & M. Water and Sewer
Contacts: Rodney & Susan LaRose	Photos from: • April 15, 2026 visit • May14, 2026 visit • July 20, 2026 inspection visit

Staff Inspection

The purpose of this inspection was to meet with the company to discuss customer complaints, inspect the condition of company assets, and to gather information for PSC staff's ongoing investigation WO-2026-0360.

Miscellaneous Notes

- Rodney and Susan spoke about how the company has saved money by using a small, independent third-party billing contractor. SKM is currently working with the software company in an attempt to bring more organization to customer lists.
- The company claims that about 1/3 of customers are behind on bills, which currently amounts to about $7,000 in lost revenue.
- Typical shut-off procedure for the company involves either a phone call or visit, followed by a tag on the customer's door. The company claims that it almost always leaves service instated even after the shut-off date passes.
- Rodney and Susan's son is currently carrying out meter reading tasks. The company claims that to do this he must access about 300 pits, which usually takes two days.
- The company spoke about how difficult it has been for them to find an operator.
- The company told staff that the poor and dilapidated state of company assets was due to a lack of oversight toward the operator that the company had contracted
- The company mentioned that customers in the new, compact style housing where the neighborhood is expanding have been particularly difficult to deal with, and that it is difficult for the two parties to meet so that service can be established.

Site Visit Photos: April 15, 2026, May 14, 2026, July 20, 2026



Above: Wastewater treatment plant in April 2026



Wastewater Treatment plant in July 2026. Note that the company has cleared brush and various debris from around and inside the facility.



April 2026





July 2026: Note the corrosion to this chamber of the treatment train. The walls of the structure are starting to cave inward despite attempts by the company to provide shoring.



July 2026: Note the corrosion to this chamber of the treatment train. The walls of the structure are starting to cave inward despite attempts by the company to provide shoring.



July 2026: Unkept equipment around the clarifying section of the treatment train. Note the exposed machinery that operates the skimming mechanism. Rodney mentioned that he has ordered new blades for the skimmer and will be replacing some of the lines that move air throughout the plant.



July 2026: Conditions inside of the wastewater control room.



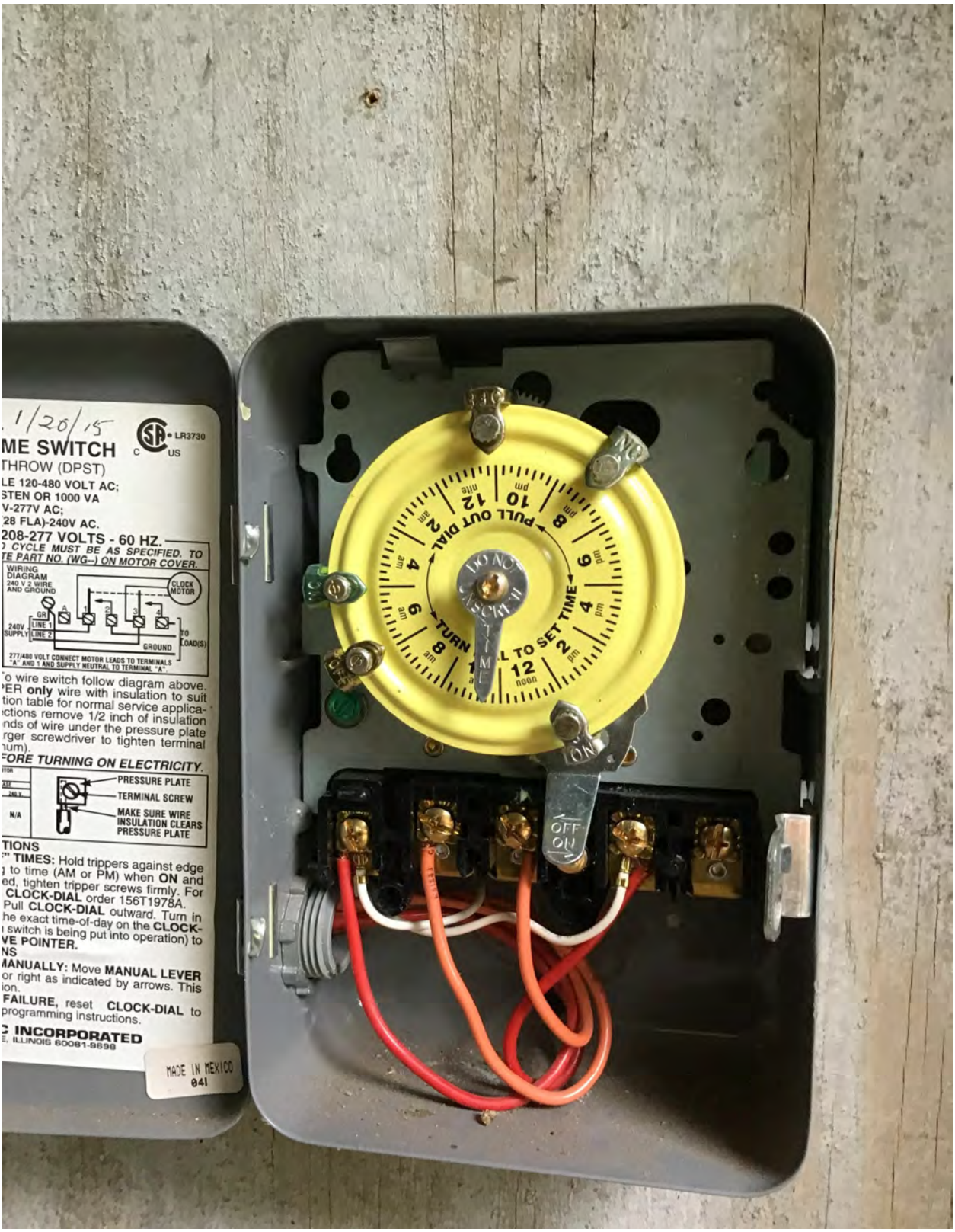
Jully 2026: Inside of the control room at the main drinking water well. There is a large underground storage tank behind the wall on the left. The pressurized tank in the photo is no longer in use.



July 2026: Main drinking water well control room.



July 2026: Since the beginning of the investigation, PSC staff have received consistent complaints about water pressure. Rodney contends that he never sees the system deviate from 74 lbs. and has never received any customer complaints regarding pressure.



July 2026: The timer that activates power to the second well. Customers have claimed that SKM does not utilize this well.



May 2026 - The lift station that services the trailer park in disrepair.



July 2026 Lift Station Repairs



July 2026 - Visible, exposed breaks in wastewater main lines.



July 2026 - Visible, exposed breaks in wastewater main lines.

Case No. WO-2026-0360

ATTACHMENT 5

HAS BEEN DEEMED

CONFIDENTIAL

IN ITS ENTIRETY

FACILITY PLAN

JULY 14, 2022

SK&M WATER AND SEWER COMPANY
PERRY COUNTY, MISSOURI

WASTEWATER IMPROVEMENTS

FOR

RODNEY LAROSE II & SUSAN HALL



STRICKLAND ENGINEERING

113 West Main Street, Suite 1
Jackson, MO 63755
(573) 243-4080
(573) 243-2191 FAX

FACILITY PLAN
SK&M WATER AND SEWER COMPANY
PERRY COUNTY, MISSOURI

1. Introduction

The SK&M Water & Sewer Company wastewater system was originally constructed in 1970s and consists of extended aeration for secondary treatment, tablet chlorination and dechlorination for disinfection, and aerobic sludge retention. Treated wastewater is discharged into an unnamed tributary to Cinque Hommes Creek. This facility is privately owned and is regulated under the Missouri Public Service Commission (PSC). On March 1, 2019, the Missouri State Operating Permit, MO-0098680, for this facility was renewed. A copy of the permit is provided in *Appendix A*. A review of the facility's Discharge Monitoring Reports (DMRs) from 2019 to 2021 shows exceedances of *E. coli* and ammonia.

In 2018, the collection system and wastewater treatment facility were purchased by Rodney LaRose II and Susan Hall. They wish to improve SK&M Water and Sewer Company wastewater system and bring it into compliance.

The purpose of this facility plan is to address the current wastewater issues facing the SK&M Water and Sewer Company and provide recommendations to resolve the deficiencies discussed herein. Specifically, the facility has reached the end of its useful life and the steel structures are experiencing severe corrosion.

2. Planning and Service Area

The SK&M Water and Sewer Co. Wastewater Treatment Facility (WWTF) is located at the north terminus of Cardinal Lane in unincorporated Perry County. Cardinal Lane is off Highway B and south of the city of Perryville, Missouri. A location map can be found in *Appendix B*.

The SK&M Water Co., Inc, MO-4036226, Well #1 and #2 serves community potable water to the same service area. It is located approximately 0.3 miles southeast of the SK&M Water and Sewer Co. WWTF.

The site is not located in a flood zone according to FEMA. See *Appendix C* for the FEMA map.

The depth to bedrock is estimated to be 25 to 50 feet. No known sinkholes or karst features are in the project vicinity.

3. Population Projection and Planning Period

The wastewater system currently serves a total of 156 connections comprised of single-family homes.

PE total = 156 lots x 3.7 capita/lot = 577.2 capita

The existing wastewater treatment facility is permitted for a design population equivalent of 1,200. Previously, the facility requested an adjusted design flow of 72,000 gallons per day (gpd). For the 20-year planning period, the new facility owners are anticipating minimal growth in the service area. At this time, the permitted design average flow of 120,000 gpd will remain and provide for future capacity.

4. Wastewater Treatment Facility Design Capacity

4.1. Flow

The existing wastewater treatment facility is permitted for a design flow of 120,000 gpd. The effluent flow measurements averaged 18,563 gpd from 2019 through 2021, 12 samples in total. See *Figure 1* below. Also, see *Appendix D* for the complete DMR analysis.

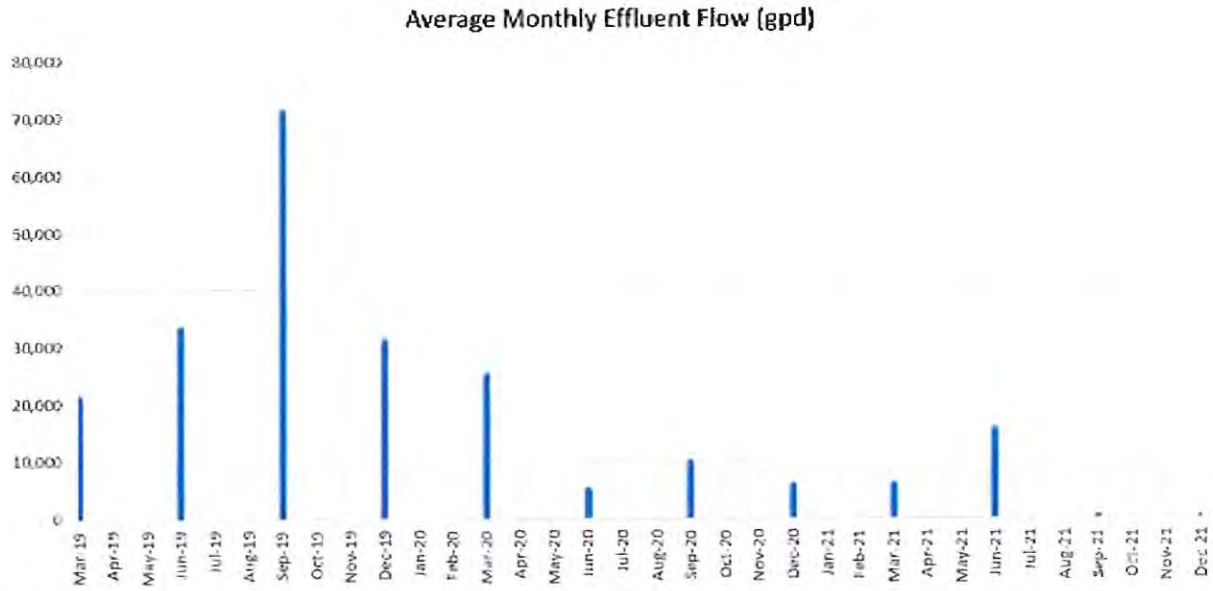


Figure 1. Recorded Effluent Flows.

The 2019 through 2021 average effluent flow of 18,563 gpd is 32% of the calculated design flow using Missouri's minimum design loadings below.

577.2 capita x 100 gpd/capita = 57,720 gpd

The design peak hourly flow is estimated to be 240,000 gpd based upon a peaking factor of 2.

2 x 120,000 gpd/capita = 240,000 gpd

4.2. Inflow & Infiltration

Inflow and infiltration (I&I) appear to be an issue within the collection system. High rainfall has resulted in excessive I&I and bypasses at the wastewater treatment facility. A correlation between the peak flows and rain events is shown in *Figure 2* below. This data helps explain the potential reason for the observed excessive flows.

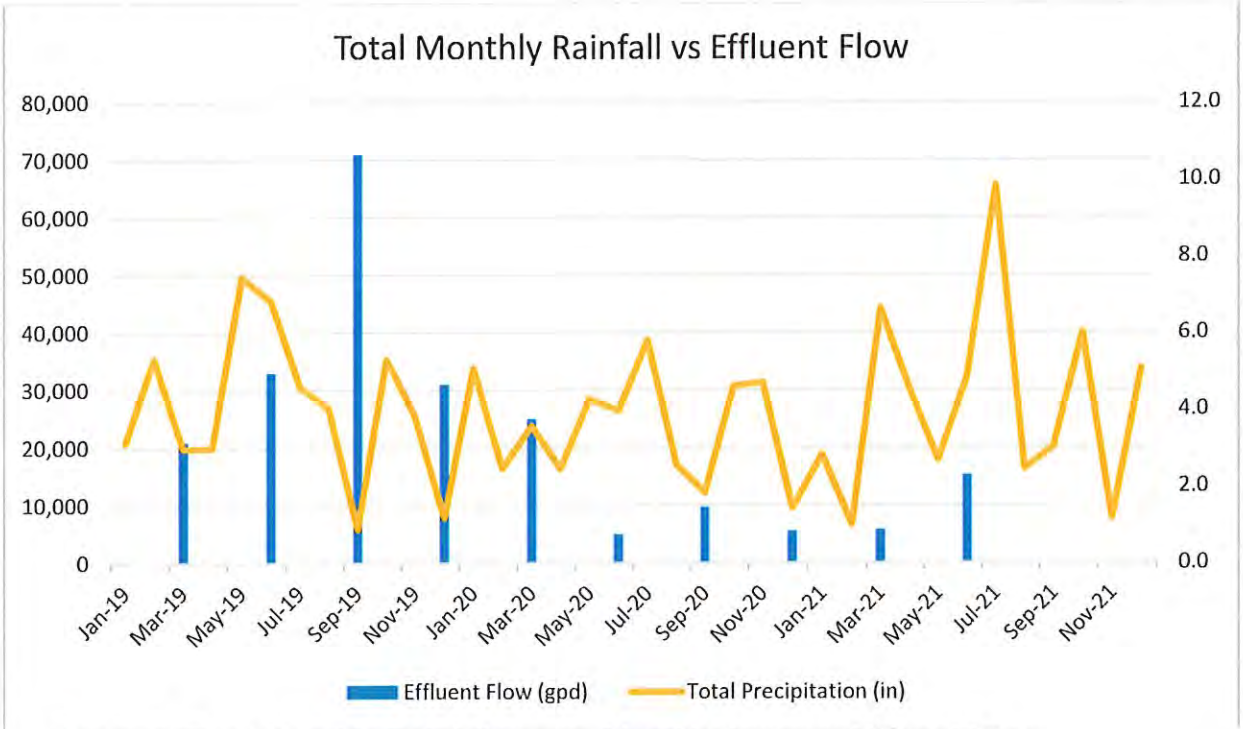


Figure 2. Total Monthly Rainfall versus Monthly Average Effluent Flow.

4.3. Biochemical Oxygen Demand

The permitted 5-day biochemical oxygen demand (BOD_5) average monthly limit (AML) is 30 mg/L. *Figure 3* below depicts the effluent measurements from 2019 to 2021 for BOD_5. The facility did not exceed the monthly average BOD_5 limit during this period.

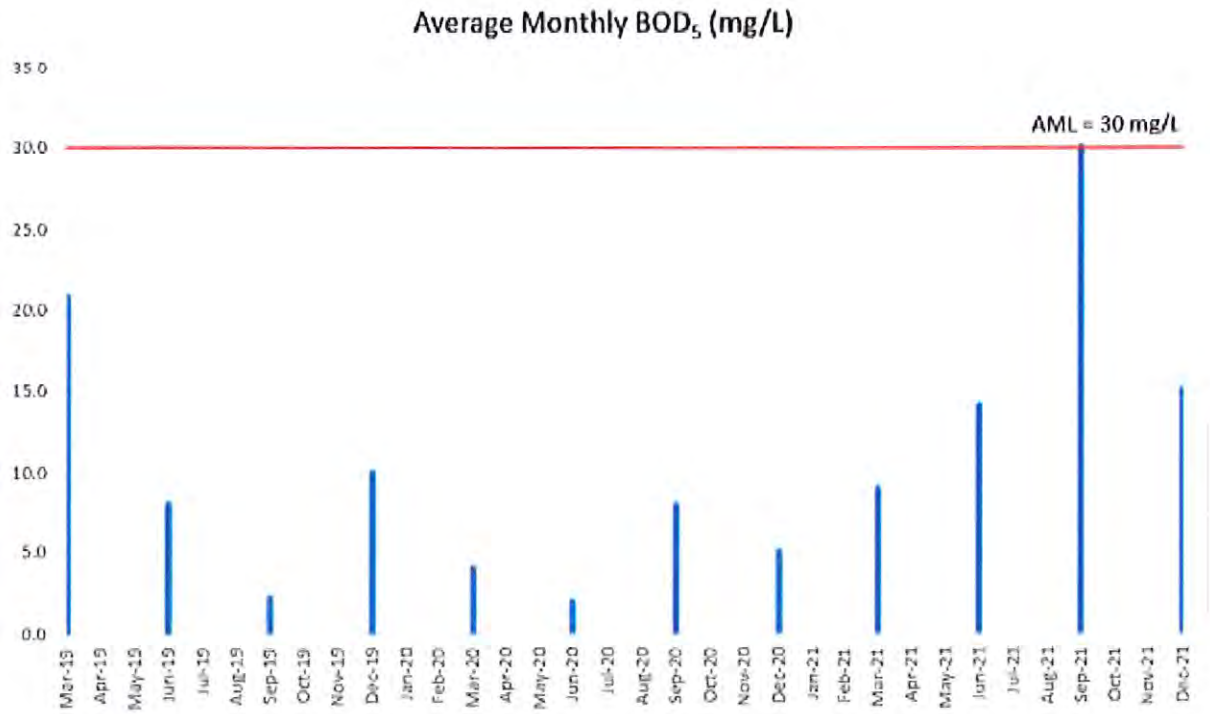


Figure 3. Average Monthly BOD_5.

4.4. Ammonia

The permitted monthly average limits for ammonia are 1.3 mg/L in summer and 2.7 mg/L in winter. These values were based on MDNR's previous 2007 Ammonia Guidance. MDNR updated their ammonia implementation in 2020 based upon ecoregions. This facility is in the Ozark Highlands ecoregion. *Table 1* below shows the estimated future monthly ammonia effluent limits.

Table 1. Future Ammonia Effluent Limits.

Pollutant of Concern	Month	Daily Maximum	Monthly Average
Ammonia as N (mg/L)	January	12.1	3.1
	February	12.1	3.1
	March	10.1	2.7
	April	8.4	2.1
	May	12.1	2.1
	June	10.1	1.3
	July	8.4	0.9
	August	8.4	0.9
	September	8.4	1.2
	October	8.4	1.8
	November	8.4	2.4
	December	10.1	2.7

Figure 4 below depicts the current and future monthly average limits for ammonia and the effluent measurements from 2019 to 2021. Two samples from 2019 and 2020, respectively, resulted in ammonia exceedances.

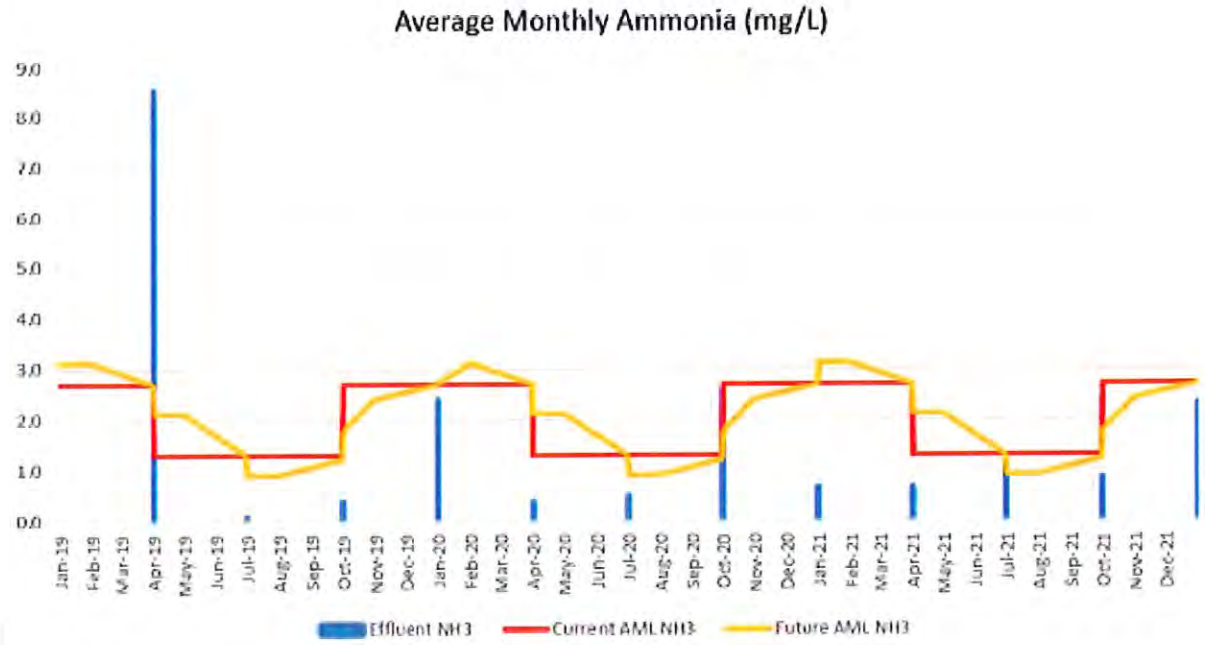


Figure 4. Average Monthly Ammonia.

4.5. Dissolved Oxygen

The current operating permit requires monitoring only for Dissolved Oxygen (DO). Dissolved Oxygen was added as a pollutant of concern because the treatment facility utilizes chlorination and dechlorination for disinfection. Dechlorination minimizes the toxic effects of residual chlorine in the effluent but decreases the dissolved oxygen level. The water quality standard for dissolved oxygen is a minimum of 5.0 mg/L. A daily minimum limit and monthly average minimum limit of 5.0 mg/L DO can be assumed in the next operating permit renewal based upon past facility performance. *Figure 5* below depicts the future minimum DO limit and the effluent measurements from 2019 to 2021. Only one sample out of nine met the future minimum DO limit.

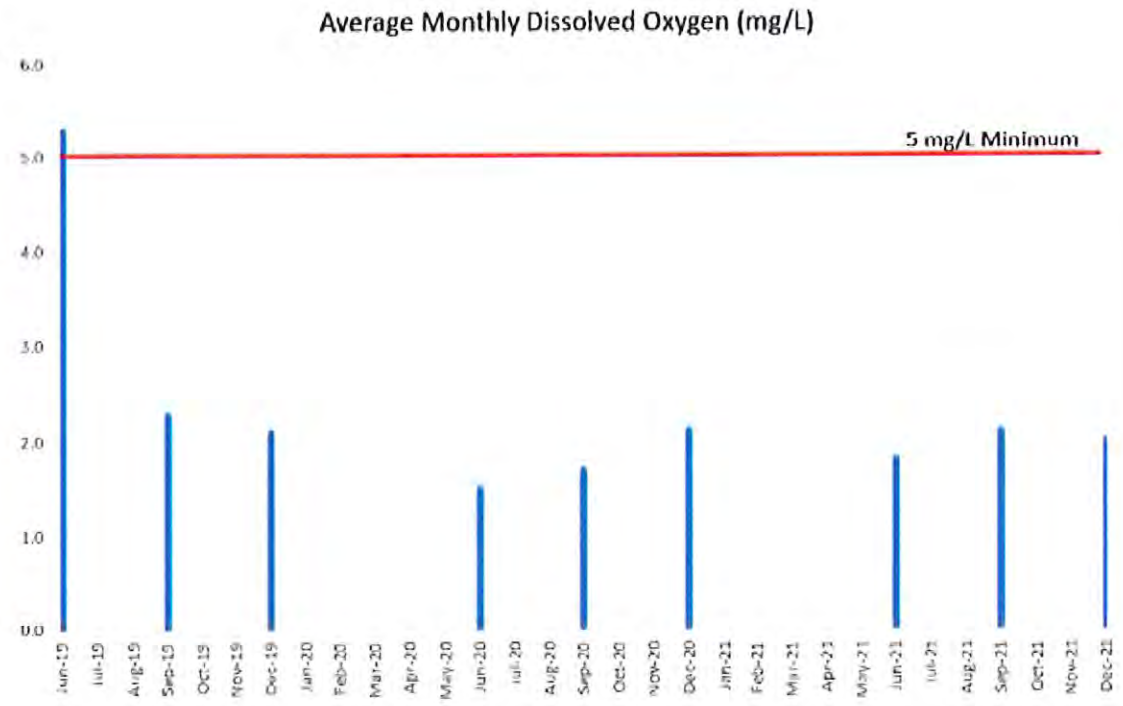


Figure 5. Average Monthly Dissolved Oxygen.

5. Existing Wastewater System

The following is an evaluation of the existing wastewater collection system and treatment facility.

5.1. Collection System

The collection system is primarily a conventional gravity sewer system with various sizes of vitrified clay pipe and PVC pipe with manholes. The collection system has one duplex pump station with force mains. Raw wastewater is received by gravity at the wastewater treatment facility.

The new owners plan to use closed-circuit television (CCTV) video inspection of the sewer lines and manholes. CCTV inspection allows for the identification of pipe defects, structural issues, and I&I issues. These discovered issues can then be prioritized for repairs or replacement as needed. Jet cleaning of the sewer lines is often done concurrently to allow for camera mobility. The new owners have purchased a jet cleaning truck and will rent the necessary CCTV camera equipment.

Assessment of the sewer lines also enables a Geographic Information System (GIS) based collection map to be established. The new facility owners were not provided with drawings of the existing collection system which hinders current and future maintenance.

5.2. Wastewater Treatment Facility

Raw wastewater flows by gravity into the treatment facility and through an influent manhole which splits the flow to the two extended aeration basins operating in parallel. At present, only one blower is operational and supplies air to the aeration basins and aerobic sludge digester holding tank. The wastewater then flows into one clarifier followed by disinfection. The original treatment facility basins are comprised of steel. Disinfection was installed in 2012 and is accomplished by tablet chlorination and dechlorination. Chlorine contact time is achieved by four 6-foot diameter 10 feet deep baffled concrete tanks. The treated wastewater is discharged into the unnamed tributary to Cinque Hommes Creek. Settled sludge from the clarifier is either sent to the extended aeration basins as return activated sludge or sent to the aerobic sludge digester as waste activated sludge. Sludge is pumped and hauled by a licensed contract hauler for disposal. Currently, the treatment facility does not have a flow totalizer to accurately measure the influent or effluent flow.

Although the facility continues to consistently meet effluent limits, it has met the end of its useful life. This facility is over fifty years old apart from the newer disinfection structures. There is broken and missing aeration equipment and piping. The two aeration basins, clarifier, and aerobic sludge holding tank are experiencing severe corrosion to the point of collapse concerns. The original supports for the basin walls were steel but have since rusted away and were replaced with wooden 4x4s and 2x8s. Some of these wooden supports have collapsed into the basins.

In 2018, MDNR conducted an inspection of the wastewater treatment facility and found a couple unsatisfactory findings. See *Appendix E* for a copy of the report. MDNR also noted the corrosion issues in the aeration basins, aerobic digester, and clarifier weir. MDNR found the following unsatisfactory features:

1. The potable water hydrant at the treatment facility needs a reduced pressure zone device to prevent backflow and protect its potable water supply.
2. The clarifier weir needs to be leveled and a moderate hole from corrosion needs to be patched. The clarifier basin also needs to be cleaned.

The MDNR inspector also recommended the corroded catwalks and supports to be replaced for safety concerns.

6. Wastewater Treatment Facility Alternative Evaluation

The following alternatives have been considered for the SK&M Water and Sewer Co. WWTF improvements.

6.1. Regionalization

The nearest connection to the City of Perryville's collection system is approximately 1.4 miles north of the SK&M Water and Sewer Co. WWTF. The

SK&M Water and Sewer Co. service area is not continuous to the Perryville city limits. Also, the unincorporated area of Perry County does not have a planning and zoning commission. For these stated reasons, regionalization is not a practicable alternative.

6.2. No-Discharge Land Application

A no-discharge land application alternative was considered but deemed impractical. This alternative would eliminate a discharge to Cinque Hommes Creek and provide an added nutrient benefit to the land application site. However, due to the existing wastewater treatment type of activated sludge and the lack of available land in the area for a no-discharge lagoon and land application sites this alternative is not feasible.

6.3. Headworks

A means to screen and remove debris and nuisance materials from the raw influent wastewater is necessary. A single-channel manual coarse bar screen is the most cost-effective solution where the operator rakes the accumulated screenings and deposits them into a nearby dumpster for ultimate landfill disposal.

Following the manual bar screen, a parshall flume with an ultrasonic flow measurement device is recommended. The parshall flume allows for a wide range of flows with accurate measurements and a small head loss. The ultrasonic flow meter will allow for accurate flow measurements and enable a data driven I&I evaluation.

The capital cost estimate for the headworks structures is provided in *Appendix F*.

6.4. Aeration Industries ARGOS® SBR

A sequencing batch reactor (SBR) is an activated sludge treatment system. One of the benefits of a SBR system is a smaller footprint and the ability to use common walls, which reduces construction cost. With the equipment accessible from the surface, maintenance is simplified and the need to dewater a basin becomes a rare occasion. The operation and maintenance are less than a traditional activated sludge system, due to the programmable logic controller. A SBR system can also be easily upgraded to meet future limits by changing the programming to allow for anaerobic and anoxic mixing phases.

The Aeration Industries ARGOS® SBR design includes two ARGOS SBR tanks, post equalization, and an aerobic sludge digester. The ARGOS SBR tanks will have a time managed operation and control system to anoxic-fill, aerobic-fill, settle, and decant-waste sludge. Each ARGOS SBR system will include a surface aerator/mixer with an onboard regenerative blower, float mounted

decanter, dissolved oxygen probe, oxygen reduction potential probe, and a submersible WAS pump. A process diagram for the Aeration Industries ARGOS SBR alternative and the full equipment proposal and calculations can be found in *Appendix G.*

One advantage of the ARGOS SBR system is the reduction in noise from blowers. In addition, this system does not utilize diffusers which require regular cleaning and maintenance.

The Aeration Industries ARGOS SBR system is expected to treat an average daily flow of 120,000 gpd and maximum design flow of 413,000 gpd. It is expected to be capable of handling an influent Total Kjeldahl Nitrogen (TKN) of 40 mg/L and BOD_5 of 250 mg/L. It is expected to produce 20 mg/L BOD_5 and Total Suspended Solids effluent.

The capital cost estimate is provided in *Appendix G.*

6.5. Schreiber Continuously Sequencing Reactor

The Schreiber Continuously Sequencing Reactor (CSR) is an activated sludge treatment process which utilizes countercurrent aeration. This treatment system is capable of biological nutrient removal in one basin with the use of a rotating bridge of suspended fine bubble diffusers. The bridge rotation provides complete mix within the basin without the use of aeration. This independent complete mix allows for cycling of the blowers to achieve oxic, anoxic, and anaerobic phases. The membranes diffusers are retrievable from the top of the basin for ease of operation and maintenance. The proposed configuration of the Schreiber CSR is the GR which is an aeration and clarifier in a single basin. A Schreiber combined aerobic digester and clarifier is also proposed. The multi-use basins take advantage of common wall design. The design basis for the Schreiber CSR alternative and the full equipment proposal and calculations can be found in *Appendix H.*

The Schreiber CSR system is expected to treat an average daily flow of 120,000 gpd and a peak flow of 240,000 gpd. It is expected to be capable of handling an influent ammonia of up to 44 mg/L and BOD_5 of 225 mg/L. It is expected to produce the following effluent limits: 30 mg/L BOD_5 and 0.6 mg/L ammonia.

The capital cost estimate is provided in *Appendix H.*

6.6. Triplepoint Environmental NitrOx®

The Triplepoint Environmental NitrOx alternative includes a Moving Bed Biofilm Reactor (MBBR), clarifiers, and aerobic sludge holding. The MBBR system consists of three structures filled with high surface area media that stimulates nitrifier growth, a heating element to maintain temperature, removable diffuser

system, two blowers to maintain appropriate levels of dissolved oxygen, and an insulated floating cover. The MBBR achieves a robust complete-mix aeration system. The design basis for the Triplepoint Environmental NitrOx alternative and the full equipment proposal and calculations can be found in *Appendix I.*

The Triplepoint Environmental NitrOx system is expected to treat an average daily flow of 120,000 gpd and peak flow of 240,000 gpd. It is expected to be capable of handling an influent ammonia of up to 81 mg/L and BOD_5 of 408 mg/L. It is expected to produce the following effluent limits: 10 mg/L BOD_5 and 0.6 mg/L ammonia in summer and 2.1 mg/L ammonia in winter.

The capital cost estimate is provided in *Appendix I.*

6.7. Disinfection – Chlorination / Dechlorination

For whole body contact and human health protection, the secondary treated wastewater requires disinfection prior to discharge.

The current facility installed tablet chlorination and dechlorination in 2012 to meet new disinfection requirements. Chlorine contact time is achieved by four 6-foot diameter and 10 feet deep baffled concrete chambers. The concrete is in good condition and could be reused. However, a means of re-aeration is required. The current facility has demonstrated it cannot meet a minimum dissolved oxygen limit of 5.0 mg/L. While the operator is familiar with this method of disinfection, the storage and hazards of chemical use remain a safety concern.

6.8. Disinfection – Ultraviolet

Ultraviolet (UV) disinfection is effective at inactivating *E. coli* and other chlorine resistant viruses. It is a user-friendly physical process, with a short contact time, and leaves no residuals in the effluent. This disinfection method would eliminate the need for a DO effluent limit.

The proposed UV system is a non-contact UV with two reactors with 8 non-amalgam low pressure high output lamps each. The proposed UV transmittance (UVT) is 65% and UV dosage is 30,000 $\mu W \cdot x/cm^2$ capable of treating the design peak flow of 340,000 gpd. A spare UV lamp rack will be available to provide continuous disinfection during maintenance. The non-contact UV system is considered low maintenance with minimal cleaning. A process diagram for the UV alternative and a capital cost estimate can be found in *Appendix J.*

6.9. Resiliency

The existing treatment facility does not have emergency backup power readily available. The new owners would like to address this concern with an onsite emergency generator with an automatic transfer switch. During power outages,

the emergency generator will allow for continuous aeration for secondary treatment and full disinfection of the effluent. The addition of an emergency generator increases the resiliency of the SK&M Water and Sewer Company WWTF.

6.10. Treatment During Construction & Closure

The current wastewater treatment facility will remain in operation and continue to discharge during construction. The lot the current treatment facility is on extends to the south and has ample space for the construction of a new facility. Once the new treatment facility is operational, the influent manhole piping will be redirected and the piping to the old facility capped.

The existing treatment facility will continue to discharge until the water level is pumped down. Sludge will be removed by contract hauler. The remaining components will be dismantled, removed, and disposed of by the Contractor. The steel tanks will be removed or filled with rock and left in place.

7. Recommendations

It is the determination of Strickland Engineering that the following recommendations are optimal for the SK&M Water and Sewer Company.

The recommended wastewater treatment facility improvements include a single-channel manual coarse bar screen, influent parshall flume with ultrasonic flow measurement, two basin Aeration Industries ARGOS® SBR, post equalization, aerobic sludge digester, ultraviolet disinfection, and generator. A process flow diagram and total capital cost estimate of the recommended treatment facility can be found in *Appendix K*. This recommendation also includes the appropriate closure of the existing treatment facility.

Strickland Engineering also recommends continuation of the cleaning, inspecting, and recording by CCTV and GIS mapping of the collection system.

8. Financing

The current SK&M Water and Sewer Company sewer user rate was agreed upon with the PSC in 2019. It is a flat fee of $42.76 per month per customer plus an additional flat fee of $5.11 for the environmental improvement contingency fund. This is total flat monthly fee of $47.87. See *Appendix L* for a copy of the PSC rate increase agreement. The new owners are committed to maintaining user rates that assure the wastewater system is self-sustaining.

For Perry County, the 2016 – 2020 American Community Survey median household income (MHI) was $56,861 (in 2020 dollars). The State of Missouri MHI for 2016 –

2020 (in 2020 dollars) was $57,290. Perry County is 0.7% below the State of Missouri MHI. The user rate as a percentage of MHI is 1.0%.

The SK&M Water and Sewer Company is pursuing state funding from the American Rescue Plan Act 2021 (ARPA) administered through the Missouri Department of Natural Resources. This funding source is available for wastewater infrastructure projects and are rated on a points system and ranked to compete with other communities seeking financial assistance. ARPA provides grant funds with a local cash match from the community. The ARPA schedule has a compressed timeframe so communities must move quickly to ensure a funding award.

9. Project Schedule

Below is the anticipated project implementation schedule.

Facility Plan Submittal	*June 2022*
ARPA Application Submittal	*June 2022*
Facility Plan Approval	*September 2022*
ARPA Funding Status Announced	*October 2022*
Plans & Specifications Submittal	*November 2022*
Operating Permit Public Notice	*December 2022*
Construction Permit Issued	*February 2023*
Construction Bid	*March 2023*
Construction Bid Award	*April 2023*
Construction Begins	*June 2023*
Construction Completion	*December 2024*

Appendix A. Missouri State Operating Permit MO-0098680.

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

In compliance with the Missouri Clean Water Law, (Chapter 644 R.S. Mo. as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No.	MO-0098680
Owner:	Rodney LaRose II and Susan Hall
Address:	636 PCR 917 Perryville, MO 63775
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	SK&M Water and Sewer Company
Facility Address:	North terminus of Cardinal Lane, Perryville, MO 63775
Legal Description:	Sec. 31, T35N, R11E, Perry County
UTM Coordinates:	X= 776008 , Y= 4176396
Receiving Stream:	Tributary to Cinque Hommes Creek
First Classified Stream and ID:	Cinque Hommes Creek (C) (1781)
USGS Basin & Sub-watershed No.:	(07140105-0305)

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein:

FACILITY DESCRIPTION

Outfall #001 – PSC Regulated Subdivision – SIC #4952
The use or operation of this facility shall be by or under the supervision of a Certified "C" Operator
Extended aeration/ One (1) clarifier/ Chlorination/ Dechlorination/ Aerobic sludge digester/ Sludge removed by contract hauler
Design population equivalent is 1,200.
Design flow is 120,000 gallons per day. Adjusted Design flow is 72,000 gallons per day.
Actual flow is 33,500 gallons per day.
Design sludge production is 25 dry tons/year.

This permit authorizes only wastewater discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System; it does not apply to other regulated areas. This permit may be appealed in accordance with Section 621.250 RSMo, Section 640.013 RSMo and Section 644.051.6 of the Law.

March 1, 2019
Effective Date

Edward B. Galbraith, Director, Division of Environmental Quality

September 30, 2023
Expiration Date

Chris Wieberg, Director, Water Protection Program

OUTFALL #001	TABLE A. FINAL EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

The permittee is authorized to discharge from outfall(s) with serial number(s) as specified in the application for this permit. The final effluent limitations shall become effective on March 1, 2019 and remain in effect until expiration of the permit. Such discharges shall be controlled, limited and monitored by the permittee as specified below:

EFFLUENT PARAMETER(S)	UNITS	FINAL EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Flow	MGD	*		*	once/quarter***	24 hr. total
Biochemical Oxygen Demand$_5$	mg/L		45	30	once/quarter***	composite**
Total Suspended Solids	mg/L		45	30	once/quarter***	composite**
Ammonia as N (Apr 1 – Sep 30) (Oct 1 – Mar 31)	mg/L	5.7 10.1		1.3 2.7	once/quarter***	grab
Total Residual Chlorine (Note 2, Page 3)	µg/L	< 130		< 130	once/quarter***	grab
Total Phosphorus	mg/L	*		*	once/quarter***	grab
Total Nitrogen	mg/L	*		*	once/quarter***	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE JULY 28, 2019. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

EFFLUENT PARAMETER(S)	UNITS	DAILY MAXIMUM		MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
E. coli (Note 1, Page 3)	#/100mL	1,030		206	once/week	grab

MONITORING REPORTS SHALL BE SUBMITTED MONTHLY; THE FIRST REPORT IS DUE APRIL 28, 2019. THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.

EFFLUENT PARAMETER(S)	UNITS	MINIMUM		MAXIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
pH – Units****	SU	6.5		9.0	once/quarter***	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE JULY 28, 2019.

EFFLUENT PARAMETER(S)	UNITS	DAILY MINIMUM		MONTHLY AVERAGE MINIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
Dissolved Oxygen	mg/L	*		*	once/quarter***	grab

MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY; THE FIRST REPORT IS DUE JULY 28, 2019.

* Monitoring requirement only.
** A 24-hour composite sample is composed of 48 aliquots (subsamples) collected at 30 minute intervals by an automatic sampling device.
*** See table on Page 3 for quarterly sampling requirements.
**** pH is measured in pH units and is not to be averaged.

Quarterly Minimum Sampling Requirements				
Quarter	**Months**	**Total Residual Chlorine (TRC) and Dissolved Oxygen**	**All Other Parameters**	**Report is Due**
First	January, February, March	Not required to sample.	Sample at least once during any month of the quarter	April 28th
Second	April, May, June	Sample at least once during any month of the quarter	Sample at least once during any month of the quarter	July 28th
Third	July, August, September	Sample at least once during any month of the quarter	Sample at least once during any month of the quarter	October 28th
Fourth	October	**Sample once during October**	Sample at least once during any month of the quarter	January 28th
	November & December	Not required to sample.		

Note 1 - Effluent limitations and monitoring requirements for *E. coli* are applicable only during the recreational season from April 1 through October 31. The Monthly Average Limit for *E. coli* is expressed as a geometric mean.

Note 2 - This permit contains a Total Residual Chlorine (TRC) limit.

(a) The Water Quality Based Effluent Limit for Total Residual Chlorine was calculated to be 17 µg/L (daily maximum limit) and 8 µg/L (monthly average limit). These limits are below the minimum quantification level (ML) of the most common and practical EPA approved CLTRC methods. The Department has determined the current acceptable ML for total residual chlorine to be 130 µg/L when using the DPD Colorimetric Method #4500 – CL G. from Standard Methods for the Examination of Waters and Wastewater. The permittee will conduct analyses in accordance with this method, or equivalent, and report actual analytical values. The minimum quantification level does not authorize the discharge of chlorine in excess of the effluent limits stated in the permit. Measured values greater than or equal to the minimum quantification level of 130 µg/L will be considered violations of the permit and values less than the minimum quantification level of 130 µg/L will be considered to be in compliance with the permit limitation.

(b) Disinfection is required during the recreational season from April 1 through October 31. Do not chlorinate during the non-recreational months and an actual analysis for TRC and Dissolved Oxygen (DO) is not necessary.

(c) Do not chemically de-chlorinate **if it is not needed to meet the limits in your permit.**

(d) If no chlorine was used in a given sampling period, an actual analysis for TRC and Dissolved Oxygen (DO) is not necessary. Simply report as "0 µg/L" for TRC and "NA" for DO.

B. STANDARD CONDITIONS

In addition to specified conditions stated herein, this permit is subject to the attached Parts I & III standard conditions dated August 1, 2014 and March 1, 2015, and hereby incorporated as though fully set forth herein.

C. SPECIAL CONDITIONS

1. Electronic Discharge Monitoring Report (eDMR) Submission System.

(a) Discharge Monitoring Reporting Requirements. The permittee must electronically submit compliance monitoring data via the eDMR system. In regards to Standard Conditions Part I, Section B, #7, the eDMR system is currently the only Department approved reporting method for this permit.

(b) Programmatic Reporting Requirements. The following reports (if required by this permit) must be electronically submitted as an attachment to the eDMR system until such a time when the current or a new system is available to allow direct input of the data:

(1) Sludge/Biosolids Annual Reports;

(2) Any additional report required by the permit excluding bypass reporting.

After such a system has been made available by the Department, required data shall be directly input into the system by the next report due date.

C. SPECIAL CONDITIONS (continued)

(c) Other actions. The following shall be submitted electronically after such a system has been made available by the Department:
  (1) General Permit Applications/Notices of Intent to discharge (NOIs);
  (2) Notices of Termination (NOTs);
  (3) Bypass reporting, See Special Condition #10 for 24-hr. bypass reporting requirements.

(d) Electronic Submissions. To access the eDMR system, use the following link in your web browser: https://ednr.dnr.mo.gov/edmr/E2/Shared/Pages/Main/Login.aspx.

(e) Waivers from Electronic Reporting. The permittee must electronically submit compliance monitoring data and reports unless a waiver is granted by the Department in compliance with 40 CFR Part 127. The permittee may obtain an electronic reporting waiver by first submitting an eDMR Waiver Request Form: http://dnr.mo.gov/forms/780-2692-f.pdf. The Department will either approve or deny this electronic reporting waiver request within 120 calendar days. Only permittees with an approved waiver request may submit monitoring data and reports on paper to the Department for the period that the approved electronic reporting waiver is effective.

2. The full implementation of this operating permit, which includes implementation of any applicable schedules of compliance, shall constitute compliance with all applicable federal and state statutes and regulations in accordance with §644.051.16, RSMo, and the Clean Water Act (CWA) section 402(k); however, this permit may be reopened and modified, or alternatively revoked and reissued:
   (a) To comply with any applicable effluent standard or limitation issued or approved under Sections 301(b)(2)(C) and (D), 304(b)(2), and 307(a)(2) of the CWA, if the effluent standard or limitation so issued or approved:
     (1) contains different conditions or is otherwise more stringent than any effluent limitation in the permit; or
     (2) controls any pollutant not limited in the permit.

3. All outfalls must be clearly marked in the field.

4. Permittee will cease discharge by connection to a facility with an area-wide management plan per 10 CSR 20-6.010(3)(B) within 90 days of notice of its availability.

5. Changes in Discharges of Toxic Substances
   The permittee shall notify the Director as soon as it knows or has reason to believe:
   (a) That any activity has occurred or will occur which would result in the discharge of any toxic pollutant which is not limited in the permit, if that discharge will exceed the highest of the following "notification levels:"
     (1) One hundred micrograms per liter (100 µg/L);
     (2) Two hundred micrograms per liter (200 µg/L) for acrolein and acrylonitrile; five hundred micrograms per liter (500 µg/L) for 2,5 dinitrophenol and for 2-methyl-4, 6-dinitrophenol; and one milligram per liter (1 mg/L) for antimony;
     (3) Five (5) times the maximum concentration value reported for the pollutant in the permit application;
     (4) The level established by the Director in accordance with 40 CFR 122.44(f).

6. Report as No Discharge when a discharge does not occur during the report period.

7. Reporting of Non-Detects:
   (a) An analysis conducted by the permittee or their contracted laboratory shall be conducted in such a way that the precision and accuracy of the analyzed result can be enumerated.
   (b) The permittee shall not report a sample result as "Non-Detect" without also reporting the detection limit of the test. Reporting as "Non Detect" without also including the detection limit will be considered failure to report, which is a violation of this permit.
   (c) The permittee shall provide the "Non-Detect" sample result using the less than sign and the minimum detection limit (e.g. <10).
   (d) Where the permit contains a Minimum Level (ML) and the permittee is granted authority in the permit to report zero in lieu of the < ML for a specified parameter (conventional, priority pollutants, metals, etc.), then zero (0) is to be reported for that parameter.
   (e) See Standard Conditions Part I, Section A, #4 regarding proper detection limits used for sample analysis.
   (f) When calculating monthly averages, one-half of the method detection limit (MDL) should be used instead of a zero. Where all data are below the MDL, the "<MDL" shall be reported as indicated in item (c).

8. It is a violation of the Missouri Clean Water Law to fail to pay fees associated with this permit (644.055 RSMo).

C. SPECIAL CONDITIONS (continued)

9. The permittee shall comply with any applicable requirements listed in 10 CSR 20-9, unless the facility has received written notification that the Department has approved a modification to the requirements. The monitoring frequencies contained in this permit shall not be construed by the permittee as a modification of the monitoring frequencies listed in 10 CSR 20-9. To request a modification of the operational control testing requirements listed in 10 CSR 20-9, the permittee shall submit a permit modification application and fee to the Department requesting a deviation from the operational control monitoring requirements. If the request is approved, the Department will modify the permit.

10. Bypasses are not authorized at this facility unless they meet the criteria in 40 CFR 122.41(m). If a bypass occurs, the permittee shall report in accordance to 40 CFR 122.41(m)(3), and with Standard Condition Part I, Section B, subsection 2. Bypasses are to be reported to the Southeast Regional Office during normal business hours or by using the online Sanitary Sewer Overflow/Facility Bypass Application located at: http://dnr.mo.gov/mogem/ or the Environmental Emergency Response spill-line at 573-634-2436 outside of normal business hours. Once an electronic reporting system compliant with 40 CFR Part 127, the National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule, is available all bypasses must be reported electronically via the new system. Blending, which is the practice of combining a partially-treated wastewater process stream with a fully-treated wastewater process stream prior to discharge, is not considered a form of bypass. If the permittee wishes to utilize blending, the permittee shall file an application to modify this permit to facilitate the inclusion of appropriate monitoring conditions.

11. The facility must be sufficiently secured to restrict entry by children, livestock and unauthorized persons as well as to protect the facility from vandalism.

12. At least one gate must be provided to access the wastewater treatment facility and provide for maintenance and mowing. The gate shall remain closed except when temporarily opened by the permittee to access the facility to perform operational monitoring, sampling, maintenance, or mowing. The gates shall also be temporarily opened for inspections by the Department. The gate shall be closed and locked when the facility is not staffed.

13. At least one (1) warning sign shall be placed on each side of the facility enclosure in such positions as to be clearly visible from all directions of approach. There shall also be one (1) sign placed for every five hundred feet (500') (150 m) of the perimeter fence. A sign shall also be placed on each gate. Minimum wording shall be SEWAGE TREATMENT FACILITY—KEEP OUT. Signs shall be made of durable materials with characters at least two inches (2") high and shall be securely fastened to the fence, equipment or other suitable locations.

14. An Operation and Maintenance (O & M) manual shall be maintained by the permittee and made available to the operator. The O & M manual shall include key operating procedures and a brief summary of the operation of the facility.

15. An all-weather access road shall be provided to the treatment facility.

16. The discharge from the wastewater treatment facility shall be conveyed to the receiving stream via a closed pipe or a paved or rip-rapped open channel. Sheet or meandering drainage is not acceptable. The outfall sewer shall be protected against the effects of floodwater, ice or other hazards as to reasonably insure its structural stability and freedom from stoppage. The outfall shall be maintained so that a sample of the effluent can be obtained at a point after the final treatment process and before the discharge mixes with the receiving waters.

17. The permit holder shall maintain the discharges from this facility such that the annual average flow does not exceed the "Adjusted Design Flow" indicated on the front page of this permit. An annual average flow in excess of the adjusted design flow is a permit violation. The annual average flow shall be determined by multiplying the daily average water usage from the previous year by 1.15. The resulting annual average flow for each year shall be submitted to the Department upon permit renewal for reevaluation of the Adjusted Design Flow.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
FACT SHEET
FOR THE PURPOSE OF RENEWAL
OF
MO-0098680
SK&M WATER AND SEWER COMPANY

The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollutant Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of stormwater from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.

As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)(A)2.] a Factsheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

A Factsheet is not an enforceable part of an operating permit.

This Factsheet is for a Minor.

Part I – Facility Information

Facility Type: NON-POTW – PSC Regulated Subdivision – SIC #4952

Facility Description:
Extended aeration/ One (1) clarifier/ Chlorination/ Dechlorination/ Aerobic sludge digester/ Sludge removed by contract hauler

Application Date: 10/18/2018
Expiration Date: 09/30/2018

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE
#001	0.186	Secondary	Domestic

Facility Performance History:
This facility was last inspected on August 8, 2012. The inspection showed the following unsatisfactory features: facility operator not certified, potable water at this location not being protected, and no visible outfall sign at the outfall location. The facility has since returned to compliance. The facility exceeded its effluent limits for *E. coli* in October 2017. The facility failed to report concentrations for Ammonia and Dissolved Oxygen on the December 31, 2017 discharge monitoring report (DMR) and for TRC and *E. coli* on the September 30, 2014 DMR. DMRs were not received for flow from April to June 2018 and April to May 2017.

Comments:
Changes in this permit include a transfer of ownership from Richard L. Besand to Rodney LaRose II and Susan Hall. Ammonia limits were updated based on a reasonable potential analysis of information derived from the facility's discharge monitoring reports. Sampling frequency for *E. coli* was changed from quarterly to weekly.

Part II – Operator Certification Requirements

As per [10 CSR 20-6.010(8) Terms and Conditions of a Permit], permittees shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions and regulations. Operators or supervisors of operations at regulated wastewater treatment facilities shall be certified in accordance with [10 CSR 20-9.020(2)] and any other applicable state law or regulation. As per [10 CSR 20-9.020(2)(A)], requirements for operation by certified personnel shall apply to all wastewater treatment systems, if applicable, as listed below:

☒ - This facility is required to have a certified operator. This facility is a private sewer company regulated by the Public Service Commission

Each of the above entities are only applicable if they have a Population Equivalent greater than two hundred (200) or fifty (50) or more service connections.

This facility currently requires an operator with a C Certification Level. Please see **Appendix - Classification Worksheet.** Modifications made to the wastewater treatment facility may cause the classification to be modified.

Operator's Name: Natalie Lafata
Certification Number: 5908
Certification Level: A

The listing of the operator above only signifies that staff drafting this operating permit have reviewed appropriate Department records and determined that the name listed on the operating permit application has the correct and applicable Certification Level.

Part III– Operational Monitoring

☒ - As per [10 CSR 20-9.010(4))], the facility is required to conduct operational monitoring.

Part IV – Receiving Stream Information

RECEIVING STREAM(S) TABLE: OUTFALL #001

WATER-BODY NAME	CLASS	WBID	DESIGNATED USES*	12-DIGIT HUC	DISTANCE TO CLASSIFIED SEGMENT (MI)
Tributary to Cinque Hommes Creek	---	---	General Criteria	07140105-0305	1.43
Cinque Hommes Creek	C	1787	AQL, IRR, LWW, SCR, WBC-B, HHP		

*As per 10 CSR 20-7.031 Missouri Water Quality Standards, the Department defines the Clean Water Commission's water quality objectives in terms of "water uses to be maintained and the criteria to protect those uses." The receiving stream and 1st classified receiving stream's beneficial water uses to be maintained are in the receiving stream table in accordance with [10 CSR 20-7.031(1)(C)].

Uses which may be found in the receiving streams table, above:
10 CSR 20-7.031(1)(C)1.:
AQL = Protection of aquatic life (Current narrative use(s) are defined to ensure the protection and propagation of fish shellfish and wildlife, which is further subcategorized as: WWH = Warm Water Habitat; **CDF** = Cold-water fishery (Current narrative use is cold-water habitat.); **CLF** = Cool-water fishery (Current narrative use is cool-water habitat); EAH = Ephemeral Aquatic Habitat; MAH = Modified Aquatic Habitat; LAH = Limited Aquatic Habitat. This permit uses AQL effluent limitations in 10 CSR 20-7.031 Table A for all habitat designations unless otherwise specified.)
10 CSR 20-7.031(1)(C)2.: Recreation in and on the water
WBC = Whole Body Contact recreation where the entire body is capable of being submerged;
WBC-A = Whole body contact recreation that supports swimming uses and has public access;
WBC-B = Whole body contact recreation that supports swimming;
SCR = Secondary Contact Recreation (like fishing, wading, and boating).
10 CSR 20-7.031(1)(C)3. to 7.:
HHP (formerly HHF) = Human Health Protection as it relates to the consumption of fish;
IRR = Irrigation for use on crops utilized for human or livestock consumption;
LWW = Livestock and wildlife watering (Current narrative use is defined as LWP = Livestock and Wildlife Protection);
DWS = Drinking Water Supply;
IND = Industrial water supply

RECEIVING STREAM(S) LOW-FLOW VALUES:

RECEIVING STREAM	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Tributary to Cinque Hommes Creek	0.0	0.0	0.0

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

RECEIVING STREAM MONITORING REQUIREMENTS:
No receiving water monitoring requirements recommended at this time.

Part V – Rationale and Derivation of Effluent Limitations & Permit Conditions

ADJUSTED DESIGN FLOW:
10 CSR 20-6.011(1)(B)1 provides for an Adjusted Design Flow when calculating permit fees for wastewater treatment facilities. If the average flow is sixty percent (60%) or less than the system's design flow, the average flow may be substituted for the design flow when calculating the annual operating fee.

If the facility's actual average flow is consistently 60 percent or less than the permitted design flow, the facility may qualify for a reduction in your fee when:

- The facility has a valid permit, or has applied for re-issuance, is in compliance with the terms, conditions and effluent limitations of the permit, and the facility has a good compliance history; and
- Flow is not expected to exceed 60% of design flow for the remaining term of the existing operating permit.

☒ - Based on the facility's compliance status and/or the information provided, the facility is approved for an Adjusted Design Flow.

ALTERNATIVE EVALUATIONS FOR NEW FACILITIES:
As per [10 CSR 20-7.015(4)(A)], discharges to losing streams shall be permitted only after other alternatives including land application, discharges to a gaining stream and connection to a regional wastewater treatment facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

☒ - The facility does not discharge to a Losing Stream as defined by [10 CSR 20-2.010(36)] & [10 CSR 20-7.031(1)(N)], or is an existing facility.

ANTI-BACKSLIDING:
A provision in the Federal Regulations [CWA §303(d)(4); CWA §402(o); 40 CFR Part 122.44(l)] that requires a reissued permit to be as stringent as the previous permit with some exceptions.

☒ - Limitations in this operating permit for the reissuance of this permit conform to the anti-backsliding provisions of Section 402(o) of the Clean Water Act, and 40 CFR Part 122.44.

☒ - Information is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance.

- Effluent limitations were re-calculated for Ammonia based on new information derived from discharge monitoring reports and on the current Missouri Water Quality Standards for Ammonia. The newly established limitations are still protective of water quality.

☒ - The Department determines that technical mistakes or mistaken interpretations of law were made in issuing the permit under section 402(a)(1)(b).

- General Criteria. The previous permit contained a special condition which described a specific set of prohibitions related to general criteria found in 10 CSR 20-7.031(4). In order to comply with 40 CFR 122.44(d)(1), the permit writer has conducted reasonable potential determinations for each general criterion and established numeric effluent limitations where reasonable potential exists. While the removal of the previous permit special condition creates the appearance of backsliding, since this permit establishes numeric limitations where reasonable potential to cause or contribute to an excursion of the general criteria exists the permit maintains sufficient effluent limitations and monitoring requirements in order to protect water quality, this permit is equally protective as compared to the previous permit. Therefore, given this new information, and the fact that the previous permit special condition was

not consistent with 40 CFR 122.44(d)(1), an error occurred in the establishment of the general criteria as a special condition of the previous permit. Please see Part VI – Effluent Limits Determination for more information regarding the reasonable potential determinations for each general criterion related to this facility.

ANTIDEGRADATION:
In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(3)], the Department is to document by means of Antidegradation Review that the use of a water body's available assimilative capacity is justified. Degradation is justified by documenting the socio-economic importance of a discharging activity after determining the necessity of the discharge.

☒ - No degradation proposed and no further review necessary. Facility did not apply for authorization to increase pollutant loading or to add additional pollutants to their discharge.

AREA-WIDE WASTE TREATMENT MANAGEMENT & CONTINUING AUTHORITY:
As per [10 CSR 20-6.010(3)(B)], ...An applicant may utilize a lower preference continuing authority by submitting, as part of the application, a statement waiving preferential status from each existing higher preference authority, providing the waiver does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or any other regional sewage service and treatment plan approved for higher preference authority by the Department.

BIOSOLIDS & SEWAGE SLUDGE:
Biosolids are solid materials resulting from domestic wastewater treatment that meet federal and state criteria for beneficial uses (i.e. fertilizer). Sewage sludge is solids, semi-solids, or liquid residue generated during the treatment of domestic sewage in a treatment works; including but not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment process; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in a treatment works. Additional information regarding biosolids and sludge is located at the following web address: http://extension.missouri.edu/main/DisplayCategory.aspx?C=74, items WQ422 through WQ449.

☒ - Permittee is not authorized to land apply biosolids. Sludge/biosolids are removed by contract hauler.

COMPLIANCE AND ENFORCEMENT:
Enforcement is the action taken by the Water Protection Program (WPP) to bring an entity into compliance with the Missouri Clean Water Law, its implementing regulations, and/or any terms and conditions of an operating permit. The primary purpose of the enforcement activity in the WPP is to resolve violations and return the entity to compliance.

☒ - The facility is not currently under Water Protection Program enforcement action.

ELECTRONIC DISCHARGE MONITORING REPORT (EDMR) SUBMISSION SYSTEM:
The U.S. Environmental Protection Agency (EPA) promulgated a final rule on October 22, 2015, to modernize Clean Water Act reporting for municipalities, industries, and other facilities by converting to an electronic data reporting system. This final rule requires regulated entities and state and federal regulators to use information technology to electronically report data required by the National Pollutant Discharge Elimination System (NPDES) permit program instead of filing paper reports. To comply with the federal rule, the Department is requiring all permittees to begin submitting discharge monitoring data and reports online. In an effort to aid facilities in the reporting of applicable information electronically, the Department has created several new forms including operational control monitoring forms and an I&I location and reduction form. These forms are for optional use and can be found on the Department's website at the following locations:

Operational Monitoring Lagoon: http://dnr.mo.gov/forms/780-2801-f.pdf
Operational Monitoring Mechanical: http://dnr.mo.gov/forms/780-2800-f.pdf
I&I Report: http://dnr.mo.gov/forms/780-2690-f.pdf

Per 40 CFR 127.15 and 127.24, permitted facilities may request a temporary waiver for up to 5 years or a permanent waiver from electronic reporting from the Department. To obtain an electronic reporting waiver, a permittee must first submit an eDMR Waiver Request Form: http://dnr.mo.gov/forms/780-2692-f.pdf. A request must be made for each facility. If more than one facility is owned or operated by a single entity, then the entity must submit a separate request for each facility based on its specific circumstances. An approved waiver is non-transferable.

The Department must review and notify the facility within 120 calendar days of receipt if the waiver request has been approved or rejected [40 CFR 124.27(a)]. During the Department review period as well as after a waiver is granted, the facility must continue submitting a hard-copy of any reports required by their permit. The Department will enter data submitted in hard-copy from those facilities allowed to do so and electronically submit the data to the EPA on behalf of the facility.

☒ - The permittee/facility is currently using the eDMR data reporting system.

NUMERIC LAKE NUTRIENT CRITERIA

☒ - This facility does not discharge into a lake watershed where numeric lake nutrient criteria are applicable.

☐ - This facility discharges into a lake watershed where numeric lake nutrient criteria are applicable, per 10 CSR 20-7.031(5)(N), and has a design flow greater than 0.1 MGD. See **Part VI. Effluent Limits Determination**, below for more information.

☐ - This facility discharges into a lake watershed where numeric lake nutrient criteria are applicable. However, regulations established in 10 CSR 20-7.015as well as the department's lake nutrient criteria implementation plan do not require nutrient monitoring for facilities with design flows less than or equal to 0.1MGD. Should the lake within this watershed be identified as impaired due to nutrient loading, the department will conduct watershed modeling to determine if this facility has reasonable potential to cause or contribute to the impairment. Consequently, monitoring or effluent limitations may be established at a later date based on the modeling results. For more information, please see the department's Nutrient Criteria Implementation Plan at: https://dnr.mo.gov/env/wpp/rules/documents/nutrient-implementation-plan-final-072618.pdf

PRETREATMENT PROGRAM:
The reduction of the amount of pollutants, the elimination of pollutants, or the alteration of the nature of pollutant properties in wastewater prior to or in lieu of discharging or otherwise introducing such pollutants into a Publicly Owned Treatment Works [40 CFR Part 403.3(q)].

Pretreatment programs are required at any POTW (or combination of POTW operated by the same authority) and/or municipality with a total design flow greater than 5.0 MGD and receiving industrial wastes that interfere with or pass through the treatment works or are otherwise subject to the pretreatment standards. Pretreatment programs can also be required at POTWs/municipals with a design flow less than 5.0 MGD if needed to prevent interference with operations or pass through.

☒ - The permittee, at this time, is not required to have a Pretreatment Program or does not have an approved pretreatment program.

REASONABLE POTENTIAL ANALYSIS (RPA):
Federal regulation [40 CFR Part 122.44(d)(1)(i)] requires effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above narrative or numeric water quality standard.

In accordance with [40 CFR Part 122.44(d)(1)(iii)] if the permit writer determines that any given pollutant has the reasonable potential to cause, or contribute to an in-stream excursion above the WQS, the permit must contain effluent limits for that pollutant.

☒ - A RPA was conducted on appropriate parameters. Please see **APPENDIX – RPA RESULTS.**

REMOVAL EFFICIENCY:
Removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to Biochemical Oxygen Demand 5-day (BOD_5) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals.

☒ - Influent monitoring is not being required to determine percent removal.

SANITARY SEWER OVERFLOWS (SSO) AND INFLOW AND INFILTRATION (I&I):
Sanitary Sewer Overflows (SSOs) are defined as untreated sewage releases and are considered bypassing under state regulation [10 CSR 20-2.010(11)] and should not be confused with the federal definition of bypass. SSOs result from a variety of causes including blockages, line breaks, and sewer defects that can either allow wastewater to backup within the collection system during dry weather conditions or allow excess stormwater and groundwater to enter and overload the collection system during wet weather conditions. SSOs can also result from lapses in sewer system operation and maintenance, inadequate sewer design and construction, power failures, and vandalism. SSOs include overflows out of manholes, cleanouts, broken pipes, and other into waters of the state and onto city streets, sidewalks, and other terrestrial locations.

Inflow and Infiltration (I&I) is defined as unwanted intrusion of stormwater or groundwater into a collection system. This can occur from points of direct connection such as sump pumps, roof drain downspouts, foundation drains, and storm drain cross-connections or through cracks, holes, joint failures, faulty line connections, damaged manholes, and other openings in the collection system itself. I&I results from a variety of causes including line breaks, improperly sealed connections, cracks caused by soil erosion/settling, penetration of vegetative roots, and other sewer defects. In addition, excess stormwater and groundwater entering the collection system from line breaks and sewer defects have the potential to negatively impact the treatment facility.

☒ - This facility is not required to develop or implement a program for maintenance and repair of the collection system; however, it is a violation of Missouri State Environmental Laws and Regulations to allow untreated wastewater to discharge to waters of the state.

SCHEDULE OF COMPLIANCE (SOC):
Per 644.051.4 RSMo, a permit may be issued with a Schedule of Compliance (SOC) to provide time for a facility to come into compliance with new state or federal effluent regulations, water quality standards, or other requirements. Such a schedule is not allowed if the facility is already in compliance with the new requirement, or if prohibited by other statute or regulation. A SOC includes an enforceable sequence of interim requirements (actions, operations, or milestone events) leading to compliance with the Missouri Clean Water Law, its implementing regulations, and/or the terms and conditions of an operating permit. *See also* Section 502(17) of the Clean Water Act, and 40 CFR §122.2. For new effluent limitations, the permit may include interim monitoring for the specific parameter to demonstrate the facility is not already in compliance with the new requirement. Per 40 CFR § 122.47(a)(1) and 10 CSR 20-7.031(11), compliance must occur as soon as possible. If the permit provides a schedule for meeting new water quality based effluent limits, a SOC must include an enforceable, final effluent limitation in the permit even if the SOC extends beyond the life of the permit.

A SOC is not allowed:

- For effluent limitations based on technology-based standards established in accordance with federal requirements, if the deadline for compliance established in federal regulations has passed. 40 CFR § 125.3.
- For a newly constructed facility in most cases. Newly constructed facilities must meet applicable effluent limitations when discharge begins, because the facility has installed the appropriate control technology as specified in a permit or antidegradation review. A SOC is allowed for a new water quality based effluent limit that was not included in a previously public noticed permit or antidegradation review, which may occur if a regulation changes during construction.
- To develop a TMDL, UAA, or other study associated with development of a site specific criterion. A facility is not prohibited from conducting these activities, but a SOC may not be granted for conducting these activities.

In order to provide guidance to Permit Writers in developing SOCs, and attain a greater level of consistency, on April 9, 2015 the Department issued an updated policy on development of SOCs. This policy provides guidance to Permit Writers on the standard time frames for schedules for common activities, and guidance on factors that may modify the length of the schedule such as a Cost Analysis for Compliance.

☒ - This permit does not contain a SOC.

STORMWATER POLLUTION PREVENTION PLAN (SWPPP):
In accordance with 40 CFR 122.44(k) *Best Management Practices (BMPs)* to control or abate the discharge of pollutants when: (1) Authorized under section 304(e) of the Clean Water Act (CWA) for the control of toxic pollutants and hazardous substances from ancillary industrial activities: (2) Authorized under section 402(p) of the CWA for the control of stormwater discharges; (3) Numeric effluent limitations are infeasible; or (4) the practices are reasonably necessary to achieve effluent limitations and standards or to carry out the purposes and intent of the CWA.

In accordance with the EPA's *Developing Your Stormwater Pollution Prevention Plan, A Guide for Industrial Operators*, (Document number EPA 833-B-09-002) [published by the United States Environmental Protection Agency (USEPA) in February 2009], BMPs are measures or practices used to reduce the amount of pollution entering (regarding this operating permit) waters of the state. BMPs may take the form of a process, activity, or physical structure.

Additionally in accordance with the Stormwater Management, a SWPPP is a series of steps and activities to (1) identify sources of pollution or contamination, and (2) select and carry out actions which prevent or control the pollution of stormwater discharges. The purpose of a SWPPP is to comply with all applicable stormwater regulations by creating an adaptive management plan to control and mitigate stream pollution from stormwater runoff.

☒ - At this time, the permittee is not required to develop and implement a SWPPP.

VARIANCE:
As per the Missouri Clean Water Law § 644.061.4, variances shall be granted for such period of time and under such terms and conditions as shall be specified by the commission in its order. The variance may be extended by affirmative action of the commission. In no event shall the variance be granted for a period of time greater than is reasonably necessary for complying with the Missouri Clean Water Law §§644.006 to 644.141 or any standard, rule or regulation promulgated pursuant to Missouri Clean Water Law §§644.006 to 644.141.

☒ - This operating permit is not drafted under premises of a petition for variance.

WASTELOAD ALLOCATIONS (WLA) FOR LIMITS:
As per [10 CSR 20-2.010(78)], the amount of pollutant each discharger is allowed by the Department to release into a given stream after the Department has determined total amount of pollutant that may be discharged into that stream without endangering its water quality.

☒ - Wasteload allocations were calculated where applicable using water quality criteria or water quality model results and the dilution equation below:

$$Ce = \frac{(Qe + Qs)C - (Qs \times Cs)}{(Qe)}$$ (EPA/505/2-90-001, Section 4.5.5)

Where C = downstream concentration
Cs = upstream concentration
Qs = upstream flow
Ce = effluent concentration
Qe = 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).

Number of Samples "n":
Additionally, in accordance with the TSD for water quality-based permitting, effluent quality is determined by the underlying distribution of daily values, which is determined by the Long Term Average (LTA) associated with a particular Wasteload Allocation (WLA) and by the Coefficient of Variation (CV) of the effluent concentrations. Increasing or decreasing the monitoring frequency does not affect this underlying distribution or treatment performance, which should be, at a minimum, be targeted to comply with the values dictated by the WLA. Therefore, it is recommended that the actual planned frequency of monitoring normally be used to determine the value of "n" for calculating the AML. However, in situations where monitoring frequency is once per month or less, a higher value for "n" must be assumed for AML derivation purposes. Thus, the statistical procedure being employed using an assumed number of samples is "n = 4" at a minimum. For Total Ammonia as Nitrogen, "n = 30" is used.

WLA MODELING:
There are two general types of effluent limitations, technology-based effluent limits (TBELs) and water quality based effluent limits (WQBELs). If TBELs do not provide adequate protection for the receiving waters, then WQBEL must be used.

☒ - A WLA study was either not submitted or determined not applicable by Department staff.

WATER QUALITY STANDARDS:
Per [10 CSR 20-7.031(4)], General Criteria shall be applicable to all waters of the state at all times including mixing zones. Additionally, [40 CFR 122.44(d)(1)] directs the Department to establish in each NPDES permit to include conditions to achieve water quality established under Section 303 of the Clean Water Act, including State narrative criteria for water quality.

WHOLE EFFLUENT TOXICITY (WET) TEST:
A WET test is a quantifiable method of determining if a discharge from a facility may be causing toxicity to aquatic life by itself, in combination with or through synergistic responses when mixed with receiving stream water.

☒ - At this time, the permittee is not required to conduct WET test for this facility.

40 CFR 122.41(M) - BYPASSES:
The federal Clean Water Act (CWA), Section 402 prohibits wastewater dischargers from "bypassing" untreated or partially treated sewage (wastewater) beyond the headworks. A bypass is defined as an intentional diversion of waste streams from any portion of a treatment facility, [40 CFR 122.41(m)(1)(i)]. Additionally, Missouri regulation 10 CSR 20-7.015(9)(G) states a bypass means the intentional diversion of waste streams from any portion of a treatment facility, except in the case of blending, to waters of the state. Only under exceptional and specified limitations do the federal regulations allow for a facility to bypass some or all of the flow from its treatment process. Bypasses are prohibited by the CWA unless a permittee can meet all of the criteria listed in 40 CFR 122.41(m)(4)(i)(A), (B), & (C). Any bypasses from this facility are subject to the reporting required in 40 CFR 122.41(l)(6) and per Missouri's Standard Conditions I, Section B, part 2.b. Additionally, Anticipated Bypasses include bypasses from peak flow basins or similar devices designed for peak wet weather flows.

☒ - This facility does not anticipate bypassing.

303(d) LIST & TOTAL MAXIMUM DAILY LOAD (TMDL):
Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs.

A TMDL is a calculation of the maximum amount of a given pollutant that a body of water can absorb before its water quality is affected. If a water body is determined to be impaired as listed on the 303(d) list, then a watershed management plan will be developed that shall include the TMDL calculation

☒ - This facility discharges to a 303(d) listed stream.

☒ - Cinque Hommes Creek (1781) located 3.55 miles downstream of the facility's outfall is listed on the 2018 Missouri 303(d) List for *E. coli.*

☒ - This facility is not considered to be a source of the above listed pollutant(s) or considered to contribute to the impairment of Cinque Hommes Creek (1781).

Part VI – Effluent Limits Determination

APPLICABLE DESIGNATIONS OF WATERS OF THE STATE:
As per Missouri's Effluent Regulations [10 CSR 20-7.015], the waters of the state are divided into the below listed seven (7) categories. Each category lists effluent limitations for specific parameters, which are presented in each outfall's Effluent Limitation Table and further discussed in the Derivation & Discussion of Limits section.

- ☐ Missouri or Mississippi River [10 CSR 20-7.015(2)]
- ☐ Lakes or Reservoirs [10 CSR 20-7.015(3)]
- ☐ Losing Streams [10 CSR 20-7.015(4)]
- ☐ Metropolitan No-Discharge Streams [10 CSR 20-7.015(5)]
- ☐ Special Streams [10 CSR 20-7.015(6)]
- ☐ Subsurface Waters [10 CSR 20-7.015(7)]
- ☒ All Other Waters [10 CSR 20-7.015(8)]

OUTFALL #001 – MAIN FACILITY OUTFALL

Effluent limitations derived and established in the below Effluent Limitations Table are based on current operations of the facility. Future permit action due to facility modification may contain new operating permit terms and conditions that supersede the terms and conditions, including effluent limitations, of this operating permit.

EFFLUENT LIMITATIONS TABLE:

PARAMETER	Unit	Basis for Limits	Daily Maximum	Weekly Average	Monthly Average	Previous Permit Limit	Sampling Frequency	Reporting Frequency	Sample Type ***
Flow	MGD	1	*		*	*/*	1/quarter	quarterly	T
BOD_5	mg/L	1		45	30	45/30	1/quarter	quarterly	C
TSS	mg/L	1		45	30	45/30	1/quarter	quarterly	C
Escherichia coli **	#/100mL	1, 3	1,030		206	1,030/206	1/week	monthly	G
Ammonia as N (Apr 1 –Sep 30)	mg/L	2, 3	5.7		1.3	3.6/1.4	1/quarter	quarterly	G
Ammonia as N (Oct 1 – Mar 31)	mg/L	2, 3	10.1		2.7	9.9/2.8	1/quarter	quarterly	G
Chlorine, Total Residual	µg/L	1, 3	< 130		< 130	<130	1/quarter	quarterly	G
Total Nitrogen	mg/L	1	*		*	*/*	1/quarter	quarterly	G
Total Phosphorus	mg/L	1	*		*	*/*	1/quarter	quarterly	G
PARAMETER	Unit	Basis for Limits	Minimum		Maximum	Previous Permit Limit	Sampling Frequency	Reporting Frequency	Sample Type
pH	SU	1	6.5		9.0	6.5-9.0	1/quarter	quarterly	G
PARAMETER	Unit	Basis for Limits	Daily Minimum		Monthly Avg Min	Previous Permit Limit	Sampling Frequency	Reporting Frequency	Sample Type
Dissolved Oxygen (DO)	mg/L	7	*		*	*/*	1/quarter	quarterly	G

* - Monitoring requirement only.
** - #/100mL; the Monthly Average for *E. coli* is a geometric mean.

*** - C = 24-hour composite
G = Grab
T = 24-hr. total

Basis for Limitations Codes:

1. State or Federal Regulation/Law
2. Water Quality Standard (includes RPA)
3. Water Quality Based Effluent Limits
4. Antidegradation Review
5. Antidegradation Policy
6. Water Quality Model
7. Best Professional Judgment
8. TMDL or Permit in lieu of TMDL
9. WET Test Policy
10. Multiple Discharger Variance

OUTFALL #001 – DERIVATION AND DISCUSSION OF LIMITS:

- **Flow**. In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. 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.

- **Biochemical Oxygen Demand (BOD_5).**

  ☒ - Effluent limitations have been retained from previous state operating permit, please see the APPLICABLE DESIGNATION OF WATERS OF THE STATE sub-section of the **Effluent Limits Determination.**

- **Total Suspended Solids (TSS).**

  ☒ - Effluent limitations have been retained from previous state operating permit, please see the APPLICABLE DESIGNATION OF WATERS OF THE STATE sub-section of the **Effluent Limits Determination.**

- ***Escherichia coli (E. coli)***. Monthly average of 206 per 100 mL as a geometric mean and Daily Maximum of 1,030 per 100 mL during the recreational season (April 1 – October 31), to protect Whole Body Contact Recreation (B) designated use of the receiving stream, as per 10 CSR 20-7.031(5)(C). An effluent limit for both monthly average and daily maximum is required by 40 CFR 122.45(d). The Geometric Mean is calculated by multiplying all of the data points and then taking the nth root of this product, where n = # of samples collected. For example: Five *E. coli* samples were collected with results of 1, 4, 6, 10, and 5 (#/100mL). Geometric Mean = 5^{th} root of (1)(4)(6)(10)(5) = 5^{th} root of 1,200 = 4.1 #/100mL.

- **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. No mixing considerations allowed; therefore, WLA = appropriate criterion.

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

Summer: April 1 – September 30

Chronic WLA: $C_e = ((0.186 + 0.0)1.5 - (0.0 * 0.01))/0.186$
$C_e = 1.5$ mg/L

Acute WLA: $C_e = ((0.186 + 0.0)12.1 - (0.0 * 0.01))/0.186$
$C_e = 12.1$ mg/L

$LTA_c = 1.5$ mg/L (0.568) = 0.85 mg/L [CV = 1.43, 99th Percentile, 30 day avg.]
$LTA_a = 12.1$ mg/L (0.150) = 1.81 mg/L [CV = 1.43, 99th Percentile]

Use most protective number of LTA_c or LTA_a.

MDL = 0.85 mg/L (6.68) = **5.7 mg/L** [CV = 1.43, 99th Percentile]
AML = 0.85 mg/L (1.48) = **1.3 mg/L** [CV = 1.43, 95th Percentile, n =30]

Winter: October 1 – March 31

Chronic WLA: $C_e = ((0.186 + 0.0)3.1 - (0.0 * 0.01))/0.186$
$C_e = 3.1$ mg/L

Acute WLA: $C_e = ((0.186 + 0.0)12.1 - (0.0 * 0.01))/0.186$
$C_e = 12.1$ mg/L

$LTA_c = 3.1$ mg/L (0.669) = 2.07 mg/L [CV = 0.99, 99th Percentile, 30 day avg.]
$LTA_a = 12.1$ mg/L (0.205) = 2.48 mg/L [CV = 0.99, 99th Percentile]

Use most protective number of LTA_c or LTA_a.

MDL = 2.07 mg/L (4.87) = **10.1 mg/L** [CV = 0.99, 99th Percentile]
AML = 2.07 mg/L (1.32) = **2.7 mg/L** [CV = 0.99, 95th Percentile, n =30]

- **Total Residual Chlorine (TRC).** Warm-water Protection of Aquatic Life CCC = 10 µg/L, CMC = 19 µg/L [10 CSR 20-7.031, Table A]. Background TRC = 0.0 µg/L.

  Chronic WLA: $C_e = ((0.186 + 0.0)10 - (0.0 * 0.0))/0.186$
  $C_e = 10$ µg/L

  Acute WLA: $C_e = ((0.186 + 0.0)19 - (0.0 * 0.0))/0.186$
  $C_e = 19$ µg/L

  $LTA_c = 10\ (0.527) = 5.3$ µg/L [CV = 0.6, 99th Percentile]
  $LTA_a = 19\ (0.321) = 6.1$ µg/L [CV = 0.6, 99th Percentile]

  Use most protective number of LTA_c or LTA_a.

  MDL = 5.3 (3.11) = **17 µg/L** [CV = 0.6, 99th Percentile]
  AML = 5.3 (1.55) = **8 µg/L** [CV = 0.6, 95th Percentile, n = 4]

  The Water Quality Based Effluent Limit for Total Residual Chlorine was calculated to be 17 µg/L (daily maximum limit) and 8 µg/L (monthly average limit). These limits are below the minimum quantification level (ML) of the most common and practical EPA approved CLTRC methods. The Department has determined the current acceptable ML for total residual chlorine to be 130 µg/L when using the DPD Colorimetric Method #4500 – CL G. from Standard Methods for the Examination of Waters and Wastewater. The permittee will conduct analyses in accordance with this method, or equivalent, and report actual analytical values. Measured values greater than or equal to the minimum quantification level of 130 µg/L will be considered violations of the permit and values less than the minimum quantification level of 130 µg/L will be considered to be in compliance with the permit limitation.

- **Total Phosphorus and Total Nitrogen.** Monitoring required for facilities greater than 100,000 gpd design flow per 10 CSR 20-7.015(9)(D)7. Total Nitrogen shall be determined by testing for Total Kjeldahl Nitrogen (TKN) and Nitrate + Nitrite and reporting the sum of the results (reported as N). Nitrate + Nitrite can be analyzed together or separately.

- **pH.** 6.5-9.0 SU. pH limitations of 6.0-9.0 SU [10 CSR 20-7.015] are not protective of the in-stream Water Quality Standard, which states that water contaminants shall not cause pH to be outside the range of 6.5-9.0 SU. Due to the classification of the receiving stream, the Department has determined that there is no assimilative capacity during critical low flow periods, therefore the water quality standard must be met at the outfall.

- **Dissolved Oxygen.** This facility utilizes dechlorination chemicals in order to reduce the amount of total residual chlorine that is discharged in the effluent. Dechlorination chemicals are known to exhibit an oxygen demand on the effluent and if not properly managed the effects on the effluent DO concentrations can be significant. Monitoring only requirements have been included in this permit in order to determine if a future effluent limitation is necessary to protect water quality

Sampling Frequency Justification:
Sampling and Reporting Frequency was retained from previous permit, except for *E. coli*. Weekly sampling is required for *E. coli*, per 10 CSR 20-7.015(9)(D)6.A.

Sampling Type Justification:
As per 10 CSR 20-7.015, samples collected for mechanical plants shall be a 24 hour modified composite sample. Grab samples, however, must be collected for pH, *E. coli*, TRC, and Dissolved Oxygen in accordance with recommended analytical methods. For further information on sampling and testing methods please review 10 CSR 20-7.015(9)(D) 2.

OUTFALL #001 – GENERAL CRITERIA CONSIDERATIONS:
In accordance with 40 CFR 122.44(d)(1), effluent limitations shall be placed into the permit for those pollutants which have been determined to cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality. The rule further states that pollutants which have been determined to cause, have the reasonable potential to cause, or contribute to an excursion above a narrative criterion within an applicable State water quality standard, the permit shall contain a numeric effluent limitation to protect that narrative criterion. In order to comply with this regulation, the permit writer will complete reasonable potential determinations on whether the discharge will violate any of the general criteria listed in 10 CSR 20-7.031(4). These specific requirements are listed below followed by derivation and discussion (the lettering matches that of the rule itself, under 10 CSR 20-7.031(4)). It should also be noted that Section 644.076.1, RSMo as well as Section D – Administrative Requirements of Standard Conditions Part I of this permit states that it shall be unlawful for any person to cause or permit any discharge of water contaminants from any water contaminant or point source located in Missouri that is in violation of sections 644.006 to 644.141 of the Missouri Clean Water Law or any standard, rule or regulation promulgated by the commission.

(A) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses. The discharge from this facility is made up of treated domestic wastewater. Based on a review of a recent Report of Compliance Inspection for the inspection conducted on August 8, 2012, no evidence of an excursion of this criterion has been observed by the Department in the past and the facility has not disclosed any other information related to the characteristics of the discharge on their permit application which has the potential to cause or contribute to an excursion of this narrative criterion. Additionally, this facility utilizes secondary treatment technology and is currently in compliance with the secondary treatment technology based effluent limits established in this permit and there has been no indication to the Department that the stream has had issues maintaining beneficial uses as a result of this discharge. Based on the information reviewed during the drafting of this permit, these final effluent limitations appear to have protected against the excursion of this criterion in the past. Therefore, the discharge does not have the reasonable potential to cause or contribute to an excursion of this criterion.
(B) Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses. Please see (A) above as justification is the same.
(C) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses. Please see (A) above as justification is the same.
(D) Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life. This permit contains final effluent limitations which are protective of both acute and chronic toxicity for various pollutants that are either expected to be discharged by domestic wastewater facilities or that were disclosed by this facility on the application for permit coverage. Based on the information reviewed during the drafting of this permit, it has been determined if the facility meets final effluent limitations established in this permit, there is no reasonable potential for the discharge to cause an excursion of this criterion.
(E) There shall be no significant human health hazard from incidental contact with the water. Please see (D) above as justification is the same.
(F) There shall be no acute toxicity to livestock or wildlife watering. Please see (D) above as justification is the same.
(G) Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community. Please see (A) above as justification is the same.
(H) Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247. The discharge from this facility is made up of treated domestic wastewater. No evidence of an excursion of this criterion has been observed by the Department in the past and the facility has not disclosed any other information related to the characteristics of the discharge on their permit application which has the potential to cause or contribute to an excursion of this narrative criterion. Additionally, any solid wastes received or produced at this facility are wholly contained in appropriate storage facilities, are not discharged, and are disposed of offsite. This discharge is subject to Standard Conditions Part III, which contains requirements for the management and disposal of sludge to prevent its discharge. Therefore, this discharge does not have reasonable potential to cause or contribute to an excursion of this criterion.

Part VII – Cost Analysis for Compliance

Pursuant to Section 644.145, RSMo., the Department is required to determine whether a permit or decision is affordable and makes a "finding of affordability" for certain permitting and enforcement decisions. This requirement applies to discharges from combined or separate sanitary sewer systems or publically-owned treatment works.

☒ - The Department is not required to complete a cost analysis for compliance because the facility is not a combined or separate sanitary sewer system for a publically-owned treatment works.

Part VIII – Administrative Requirements

On the basis of preliminary staff review and the application of applicable standards and regulations, the Department, as administrative agent for the Missouri Clean Water Commission, proposes to issue a permit(s) subject to certain effluent limitations, schedules, and special conditions contained herein and within the operating permit. The proposed determinations are tentative pending public comment.

PERMIT SYNCHRONIZATION:
The Department of Natural Resources is currently undergoing a synchronization process for operating permits. Permits are normally issued on a five-year term, but to achieve synchronization many permits will need to be issued for less than the full five years allowed by regulation. The intent is that all permits within a watershed will move through the Watershed Based Management (WBM) cycle together will all expire in the same fiscal year. This will allow further streamlining by placing multiple permits within a smaller geographic area on public notice simultaneously, thereby reducing repeated administrative efforts. This will also allow the Department to explore a watershed based permitting effort at some point in the future. Renewal applications must continue to be submitted within 180 days of expiration, however, in instances where effluent data from the previous renewal is less than 4 years old, that data may be re-submitted to meet the requirements of the renewal application. If the permit provides a schedule of compliance for meeting new water quality based effluent limits beyond the expiration date of the permit, the time remaining in the schedule of compliance will be allotted in the renewed permit. With permit synchronization, this permit will expire in the 3rd Quarter of calendar year 2023.

PUBLIC NOTICE:
The Department shall give public notice that a draft permit has been prepared and its issuance is pending. Additionally, public notice will be issued if a public hearing is to be held because of a significant degree of interest in and water quality concerns related to a draft permit. No public notice is required when a request for a permit modification or termination is denied; however, the requester and permittee must be notified of the denial in writing. The Department must issue public notice of a pending operating permit or of a new or reissued statewide general permit. The public comment period is the length of time not less than 30 days following the date of the public notice which interested persons may submit written comments about the proposed permit. For persons wanting to submit comments regarding this proposed operating permit, then please refer to the Public Notice page located at the front of this draft operating permit. The Public Notice page gives direction on how and where to submit appropriate comments.

☒ - The Public Notice period for this operating permit was from November 30, 2018 to December 31, 2018. No responses received. After the completion of the Public Notice period, the permit was updated to include Adjusted Design Flow per the facility's request. Additionally, the department reevaluated the flow monitoring frequencies in Table A and determined that flow monitoring should be reduced from once/weekday to quarterly in accordance with 10 CSR 20-7.015(8). The revised monitoring fluency is still protective of water quality.

DATE OF FACT SHEET: 10/29/2018

COMPLETED BY:

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WATER PROTECTION PROGRAM
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Appendices

APPENDIX - CLASSIFICATION WORKSHEET:

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
Maximum Population Equivalent (P.E.) served (Max 10 pts.)	1 pt./10,000 PE or major fraction thereof.	0
Maximum: 10 pt Design Flow (avg. day) or peak month; use greater (Max 10 pts.)	1 pt. / MGD or major fraction thereof.	0
EFFLUENT DISCHARGE RECEIVING WATER SENSITIVITY:		
Missouri or Mississippi River	0	0
All other stream discharges except to losing streams and stream reaches supporting whole body contact	1	0
Discharge to lake or reservoir outside of designated whole body contact recreational area	2	0
Discharge to losing stream, or stream, lake or reservoir area supporting whole body contact recreation	3	3
PRELIMINARY TREATMENT - Headworks		
Screening and/or comminution	3	0
Grit removal	3	0
Plant pumping of main flow (lift station at the headworks)	3	0
PRIMARY TREATMENT		
Primary clarifiers	5	0
Combined sedimentation/digestion	5	0
Chemical addition (except chlorine, enzymes)	4	0
REQUIRED LABORATORY CONTROL – performed by plant personnel (highest level only)		
Push – button or visual methods for simple test such as pH, Settleable solids	3	0
Additional procedures such as DO, COD, BOD, titrations, solids, volatile content	5	5
More advanced determinations such as BOD seeding procedures, fecal coliform, nutrients, total oils, phenols, etc.	7	0
Highly sophisticated instrumentation, such as atomic absorption and gas chromatograph	10	0
ALTERNATIVE FATE OF EFFLUENT		
Direct reuse or recycle of effluent	6	0
Land Disposal -- low rate	3	0
High rate	5	0
Overland flow	4	0
Total from page ONE (1)	—	8

APPENDIX - CLASSIFICATION WORKSHEET (CONTINUED):

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
VARIATION IN RAW WASTE (highest level only) (DMR exceedances and Design Flow exceedances)		
Variation do not exceed those normally or typically expected	0	0
Recurring deviations or excessive variations of 100 to 200 % in strength and/or flow	2	0
Recurring deviations or excessive variations of more than 200 % in strength and/or flow	4	0
Raw wastes subject to toxic waste discharge	6	0
SECONDARY TREATMENT		
Trickling filter and other fixed film media with secondary clarifiers	10	0
Activated sludge with secondary clarifiers (including extended aeration and oxidation ditches)	15	15
Stabilization ponds without aeration	5	0
Aerated lagoon	8	0
Advanced Waste Treatment Polishing Pond	2	0
Chemical/physical – without secondary	15	0
Chemical/physical – following secondary	10	0
Biological or chemical/biological	12	0
Carbon regeneration	4	0
DISINFECTION		
Chlorination or comparable	5	5
Dechlorination	2	2
On-site generation of disinfectant (except UV light)	5	0
UV light	4	0
SOLIDS HANDLING - SLUDGE		
Solids Handling Thickening	5	0
Anaerobic digestion	10	0
Aerobic digestion	6	6
Evaporative sludge drying	2	0
Mechanical dewatering	8	0
Solids reduction (incineration, wet oxidation)	12	0
Land application	6	0
Total from page TWO (2)	---	28
Total from page ONE (1)	---	8
Grand Total	---	36

☐ - A: 71 points and greater
☐ - B: 51 points – 70 points
☒ - C: 26 points – 50 points
☐ - D: 0 points – 25 points

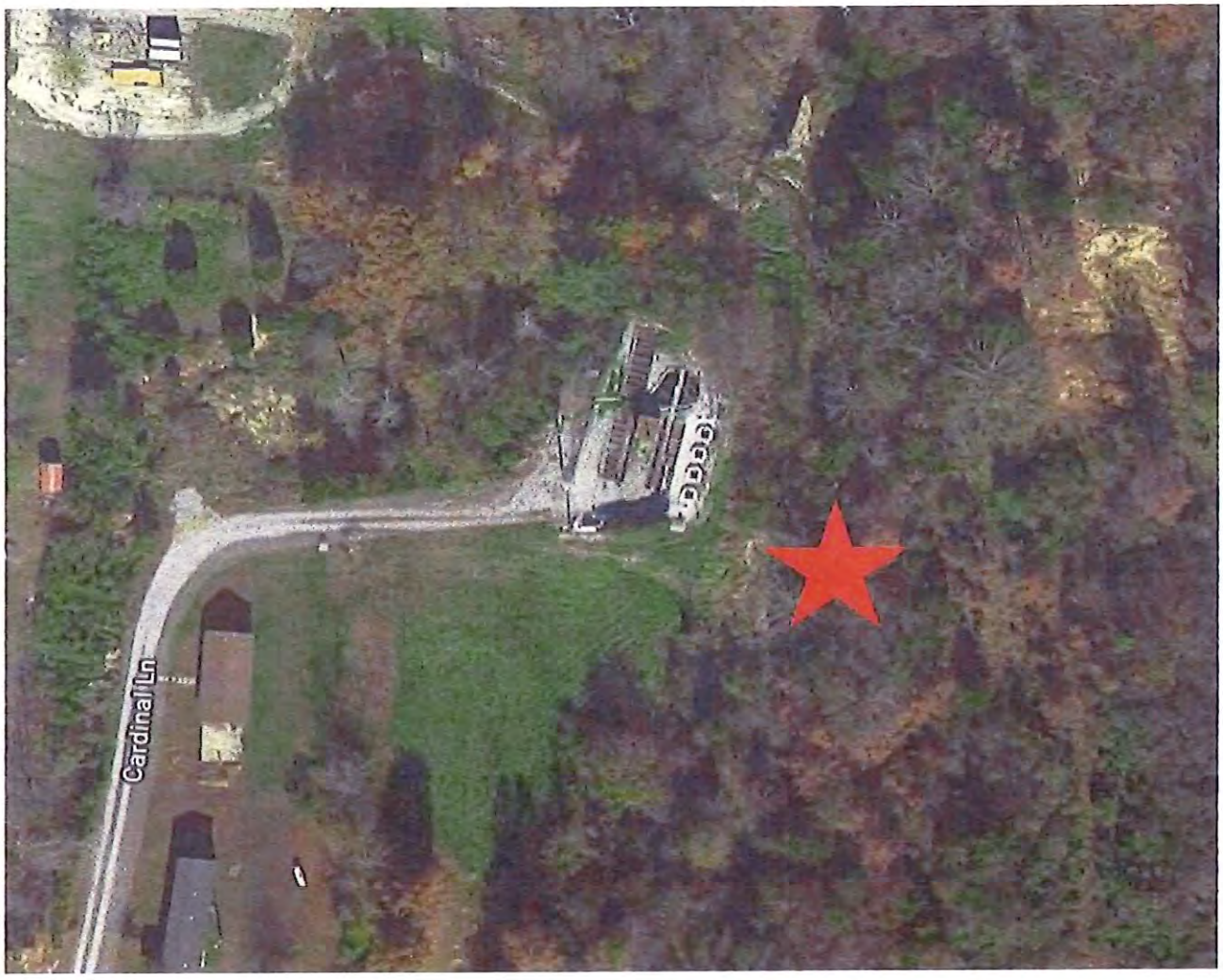
APPENDIX – RPA RESULTS:

Parameter	CMC*	RWC Acute*	CCC*	RWC Chronic*	n**	Range max/min	CV***	MF	RP Yes/No
Total Ammonia as Nitrogen (Summer) mg/L	12.1	37.53	1.5	37.53	15.00	6.25/0.012	1.43	6.01	YES
Total Ammonia as Nitrogen (Winter) mg/L	12.1	19.15	3.1	19.15	15.00	4.7/0.12	0.99	4.07	YES

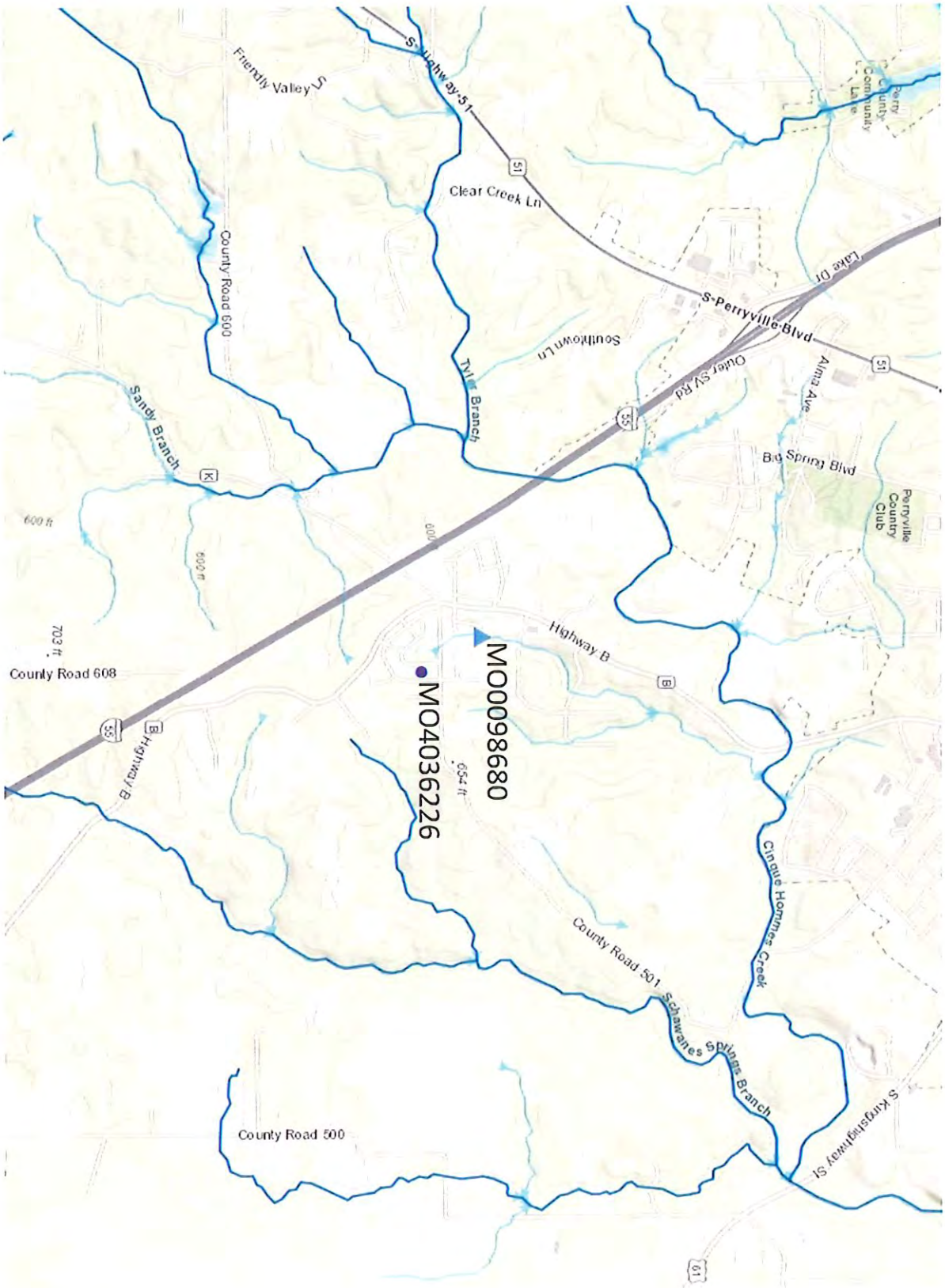
N/A – Not Applicable
* - Units are (µg/L) unless otherwise noted.
** - If the number of samples is 10 or greater, then the CV value must be used in the WQBEL for the applicable constituent.
*** - Coefficient of Variation (CV) is calculated by dividing the Standard Deviation of the sample set by the Mean of the same sample set.
RWC – Receiving Water Concentration. It is the concentration of a toxicant or the parameter toxicity in the receiving water after mixing (if applicable).
n – Is the number of samples.
MF – Multiplying Factor. 99% Confidence Level and 99% Probability Basis.
RP – Reasonable Potential. It is where an effluent is projected or calculated to cause an excursion above a water quality standard based on a number of factors including, as a minimum, the four factors listed in 40 CFR 122.44(d)(1)(ii).

Reasonable Potential Analysis is conducted as per (TSD, EPA/505/2-90-001, Section 3.3.2). A more detailed version including calculations of this RPA is available upon request.

APPENDIX – FACILITY OUTFALL LOCATION:



Appendix B. Location Maps.


Friendly Valley Ln
S Highway 51
Clear Creek Ln
County Road 600
Lake Dr
S Perryville Blvd
Outer SW Rd
Anna Ave
Big Spring Blvd
Perryville Country Club
Southtown Ln
Tyler Branch
Sandy Branch
600 ft
703 ft
County Road 608
Highway B
MO0098680
MO4036226
654 ft
Cinque Hommes Creek
County Road 501
Schawanes Springs Branch
County Road 500
S Kingshighway St


MO0098680
MO4036226

Appendix C. FEMA Map.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Missouri State Plane coordinate system, west zone (FIPSZONE 2401), Transverse Mercator projection. Horizontal datum was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for bench marks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this map was provided in digital format by the U.S. Farm Services Agency. National Agricultural Imagery Program (NAIP) data outlined October 2007 at a scale of 1"=1,2000 and by the U.S. Geological Survey Digital Orthophoto Quadrangles, dated 1993 and later, produced at a scale of 1:24,000.

Based on updated topographic information, this map reflects more detailed and up-to-date stream channel configurations and floodplain delineations than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on this map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

The "profile base lines" depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the "profile base line" in some cases, may deviate significantly from the channel centerline or appear outside the S-FIRM.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Information eXchange (FMIX) at 1-877-FEMA MAP** (1-877-336-2627) for information on available products associated with the FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Information eXchange may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

PERRY COUNTY, MISSOURI FIRM PANEL LOCATOR DIAGRAM





LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A — No Base Flood Elevations determined.

ZONE AE — Base Flood Elevations determined.

ZONE AH — Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO — Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR — Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 — Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V — Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE — Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X — Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE A — Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D — Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths, or flood velocities.

CBRS and OPA boundary

International, State or Country boundary

County boundary

Limit of study

Jurisdiction boundary

Coastal Barrier Resources System (CBRS) area

Otherwise Protected Area (OPA) boundary

Base Flood Elevation line and value; elevation in feet*

Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A — Cross section line

23 — 23 — Transect line

97°07'45", 32°22'30" — Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)

4276000 mE — 1000-meter Universal Transverse Mercator grid values, zone 15

6000000 FT — 5000-foot grid ticks: Missouri State Plane coordinate system, west zone (FIPSZONE 2401)

DX5510 — Bench mark (see explanation in Notes to Users section of this FIRM panel)

M1.2 — River Mile

Coastal Transect, Transect Extension, or Boundary Extension

Hydrologic Unit Code (HUC-12)

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP
AUGUST 2, 2011

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'
500 0 1000 2000 FEET
150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0230C

FIRM
FLOOD INSURANCE RATE MAP

PERRY COUNTY, MISSOURI
AND INCORPORATED AREAS

PANEL 230 OF 475
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
PERRY COUNTY	290847	0230	C
PERRYVILLE, CITY OF	290848	0230	C

MAP NUMBER
29157C0230C
EFFECTIVE DATE
AUGUST 2, 2011

Federal Emergency Management Agency

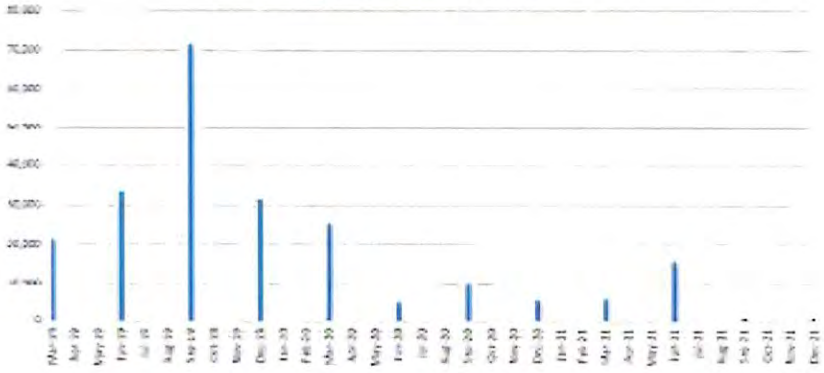
Case No. WO-2026-0360, Attachment 6, Page 40 of 119

Appendix D. DMR Analysis.

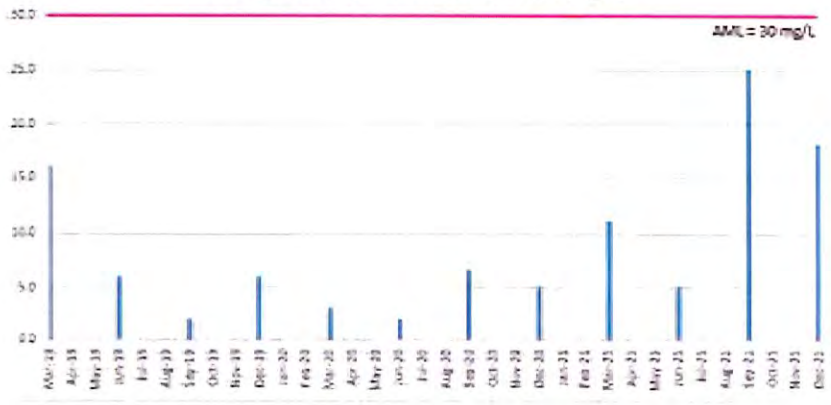
SK&M Water and Sewer Co. WWTF DMR Data 2019-2021										
	EFFLUENT MONTHLY AVERAGE									
DATE	Flow (gpd)	BOD_5 (mg/L)	TSS (mg/L)	NH_3 (mg/L)	Total Phosphorus (mg/L)	Total Nitrogen (mg/L)	Total Residual Chlorine (µg/L)	*E. Coli* (#/100mL)	Dissolved Oxygen (mg/L)	pH (SU)
Mar-19	21,000	21.00	16.00	8.50	2.70	6.40				7.20
Apr-19										
May-19								20.00		
Jun-19	33,000	8.10	6.00	0.07	0.63	12.80	0.100	8.85	5.30	7.20
Jul-19								1.24		
Aug-19								1.25		
Sep-19	71,000	2.22	2.00	0.40	4.30	20.00	0.010	1.00	2.28	7.40
Oct-19								2.34		
Dec-19	31,000	10.00	6.00	2.40	1.90	8.10	0.110		2.10	7.30
Mar-20	25,000	4.05	3.00	0.40	0.12	7.40				7.20
Apr-20								30.00		
May-20								58.00		
Jun-20	5,000	2.00	2.00	0.50	0.28	0.50	0.080	9.10	1.50	7.20
Jul-20								11.00		
Aug-20								189.00		
Sep-20	9,700	8.00	6.50	2.60	2.97	16.50	0.010	5.80	1.70	7.57
Oct-20								0.00		
Dec-20	5,600	5.00	5.00	0.65	1.90	14.70	0.008		2.11	7.20
Mar-21	5,800	9.00	11.00	0.67	2.10	7.50				7.20
Apr-21								8.00		
May-21								87.00		
Jun-21	15,300	14.00	5.00	1.10	2.50	5.30	0.010	49.00	1.80	7.10
Jul-21								204.00		
Aug-21								157.00		
Sep-21	150	30.00	25.00	0.85	1.90	10.60	0.005	225.00	2.10	7.20
Oct-21								23.00		
Dec-21	200	15.00	18.00	2.30	8.90	12.10	0.007		2.00	7.20

18,563 gpd Average 2019 - 2021

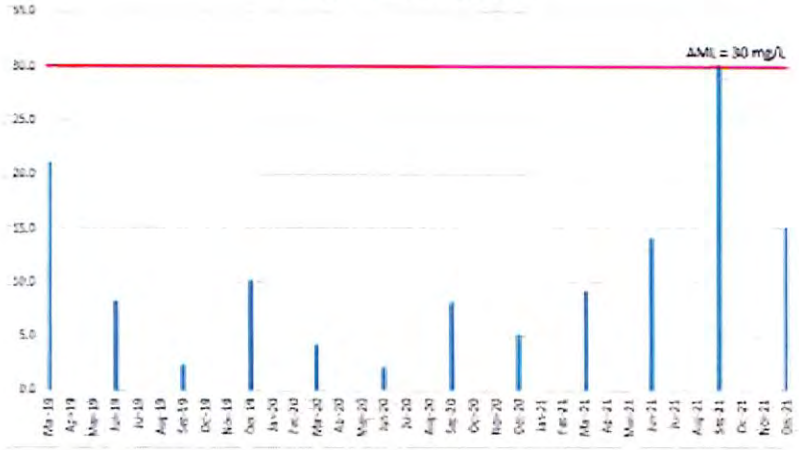
Average Monthly Effluent Flow (gpd)



Average Monthly Total Suspended Solids (mg/L)

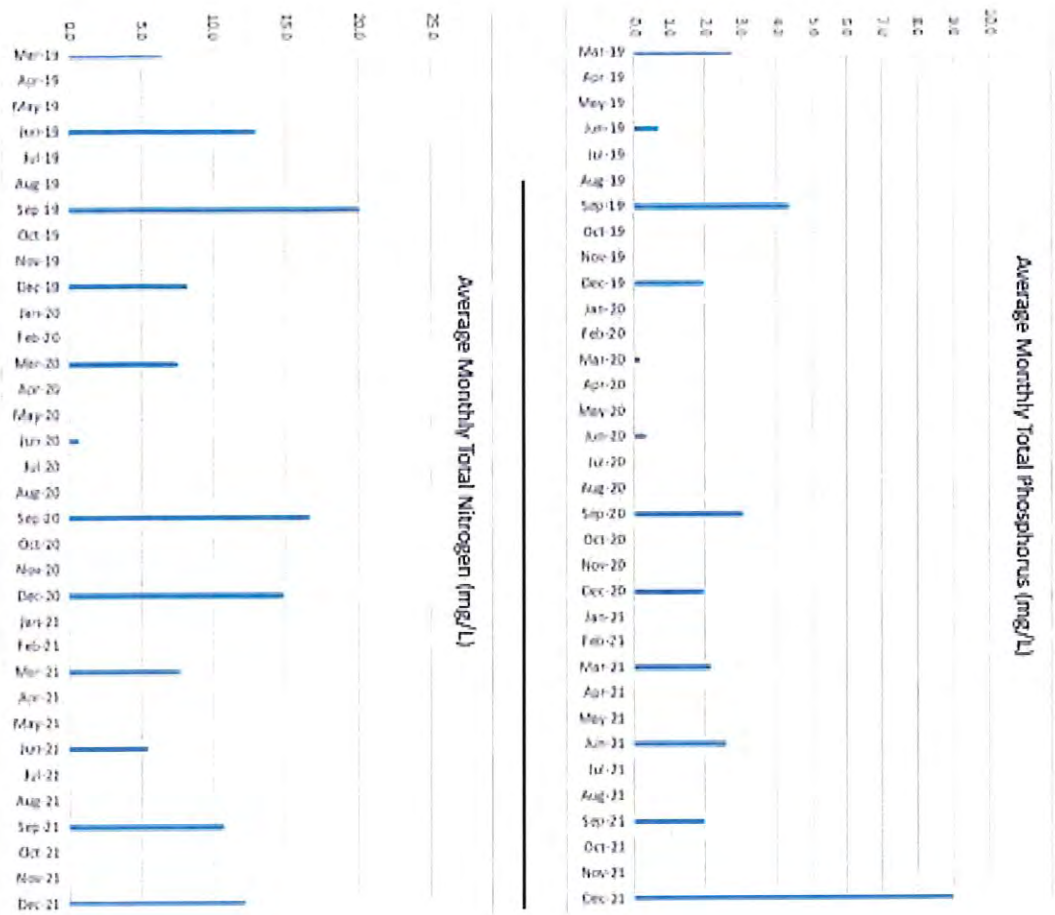


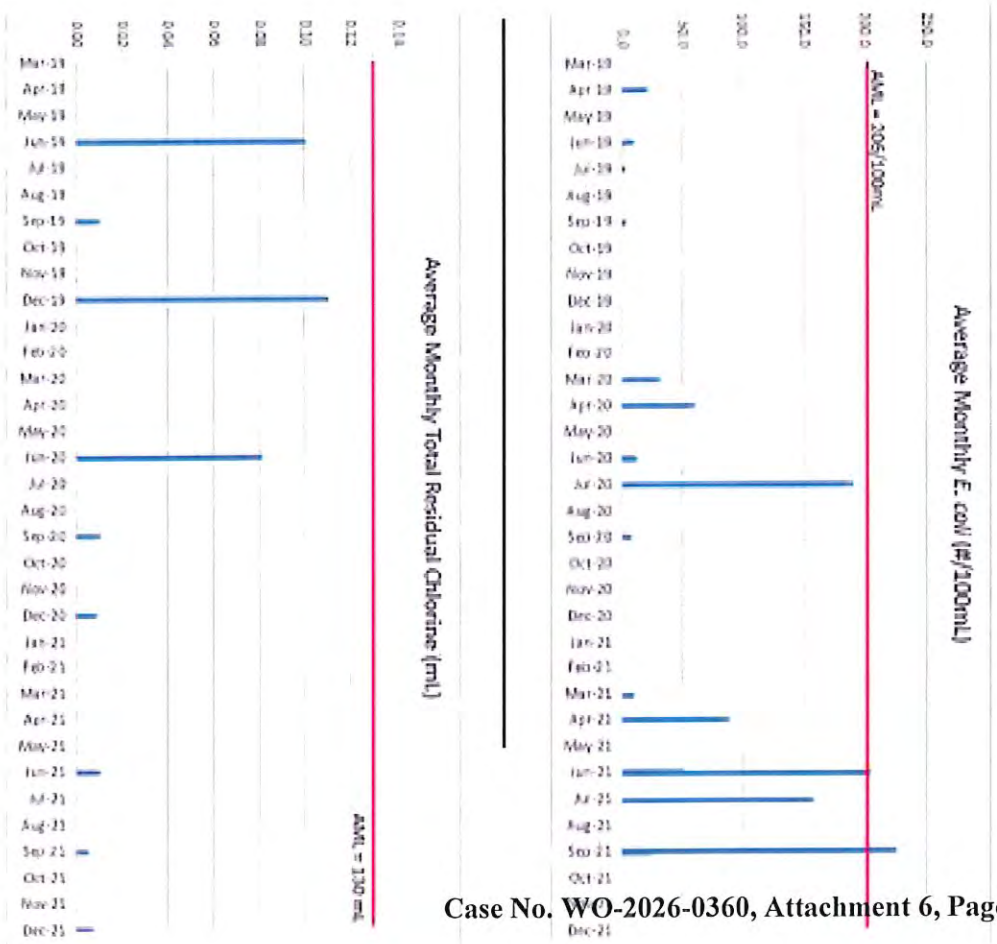
Average Monthly BOD_5 (mg/L)

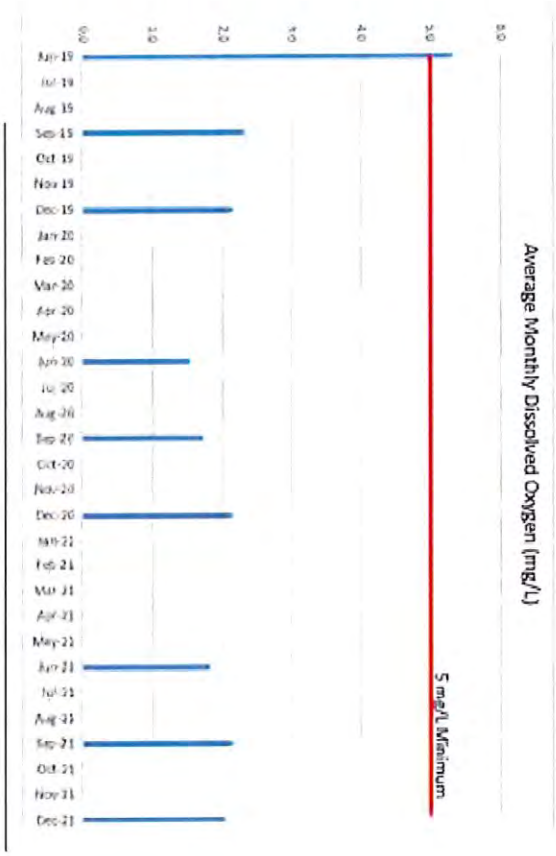


Average Monthly Ammonia (mg/L)




Average Monthly Total Phosphorus (mg/L)
Average Monthly Total Nitrogen (mg/L)


Average Monthly E. coli (#/100mL)
AML = 205/100mL
Average Monthly Total Residual Chlorine (mL)
AML = 130 mL


Average Monthly Dissolved Oxygen (mg/L)
0.0
1.0
2.0
3.0
4.0
5.0
5 mg/L Minimum
Apr-19
Jul-19
Aug-19
Sep-19
Oct-19
Nov-19
Dec-19
Jan-20
Feb-20
Mar-20
Apr-20
May-20
Jun-20
Jul-20
Aug-20
Sep-20
Oct-20
Nov-20
Dec-20
Jan-21
Feb-21
Mar-21
Apr-21
May-21
Jun-21
Jul-21
Aug-21
Sep-21
Oct-21
Nov-21
Dec-21

Appendix E. MDNR Inspection Report.

Perry County
SK & M Water and Sewer Company
MO-0098680

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

October 23, 2018

Certified Mail # 7017 2680 0000 7711 6485
Return Receipt Requested

Rodney LaRose & Susan Hall, Owners
SK & M Water and Sewer Company
636 PCR 917
Perryville, MO 63775

UNSATISFACTORY FINDINGS
RESPONSE REQUIRED

Dear Mr. LaRose and Ms. Hall:

Staff from the Missouri Department of Natural Resources conducted an inspection on October 18, 2018, of the SK & M Water and Sewer Company wastewater treatment facility (WWTF) located in Perry County.

Compliance with the Missouri Clean Water law was evaluated. The enclosed report is being issued with Unsatisfactory Findings for the violations identified.

Please refer to the enclosed report for details on findings and required actions. A written response documenting action taken to correct the Unsatisfactory Findings is required by the date specified in the report.

Fact sheets are available on the Department's website to assist entities with understanding and following environmental requirements.

The Department records will document continued noncompliance of the environmental laws and regulations until the required actions are completed. Please understand that failure to respond or address ongoing violations may result in a follow-up inspection.

If you have any questions or would like to schedule a time to meet with department staff to discuss compliance requirements, please contact John Chronister at the Southeast Regional Office, 2155 N. Westwood Blvd., Poplar Bluff, MO 63901 or call (573) 840-9750.

Sincerely,

SOUTHEAST REGIONAL OFFICE

Arthur Goodin, CHMM
Chief, Water Pollution Control Unit

Enclosures: Report of Compliance Inspection

C: Public Service Commission

Missouri Department of Natural Resources
Southeast Regional Office/Water Protection Program
Report of Inspection
SK & M Water and Sewer Company
North terminus of Cardinal Lane/Perryville/Perry County
MO-0098680
October 23, 2018

Introduction

Pursuant to Section 644.026.1 RSMo of the Missouri Clean Water Law, I conducted a routine compliance inspection of SK & M Water and Sewer Company in Perry County, Missouri, on October 18, 2018.

Participants in the inspection were:

SK & M Water and Sewer Company:	
Rodney LaRose, Owner	(573) 517-3097
Susan Hall, Owner	(573) 517-3097
MoDNR:	
John Chronister, Environmental Specialist III	(573) 840-9786

This inspection was conducted to determine the facility's compliance with Missouri State Operating Permit (MSOP) MO-0098680, the Missouri Clean Water Commission Regulations, and the Missouri Clean Water Law. This report presents the findings and observations made during the compliance inspection.

Facility Description and History

MSOP MO-0098680 was last issued on January 1, 2015, and expired on September 30, 2018. An application for renewal was received on April 4, 2018, and a permit modification request to reflect a change in ownership was received on August 14, 2018. This permit sets forth effluent limitations, monitoring requirements, and permit conditions, both standard and specific, that the permittee is to follow.

The WWTF consists of extended aeration, (1) clarifier, seasonal chlorination/dechlorination, and an aerobic digester. A contract hauler is responsible for sludge removal. The design population equivalent is 1,200. The design flow is 120,000 gallons per day (gpd). The actual flow is 22,000. The design sludge production is 25 dry tons/year.

The legal description of SK & M Water and Sewer Company is listed on the permit as SE ¼, NW ¼, Section 31, Township 35 North, Range 11 East, in Perry County, UTM coordinates X=776086, Y=4176770. The receiving stream for this facility is Unnamed tributary to Cinque Hommes Creek, watershed number 07140105-0305.

The facility was last inspected on August 8, 2012, and found in compliance at that time.

This facility is not currently in enforcement.

Discharge Monitoring Reports (DMRs) were reviewed from January 2017 through August 2018. The limit for E. coli was exceeded and data for Ammonia as Nitrogen (NH_3 as N) and Flow was not reported for the 4th quarter of 2017.

Discussion of Inspection and Observations

Prior to the inspection, the files, MSOP MO-0098680, and Permit Conditions and for SK & M Water and Sewer Company were reviewed.

The inspection was conducted during normal business hours. Mr. LaRose and Ms. Hall recently purchased this facility and contacted me to request an inspection to get a better understanding of the Department's requirements. Upon arrival, I met with Rodney LaRose and Susan Hall, Owners, and discussed the purpose scope of the inspection. Mr. LaRose and Ms. Hall granted permission to access the site and accompanied me throughout the inspection of the facility.

The fence was in good repair, "warning" signs were posted as required by MSOP MO-0098680, and the gate was locked to prevent unauthorized entry. The wastewater in aerations basins was a chocolate color with very little foam and an earthly odor. The walkways were badly corroded and several of the steel supports had been replaced with 4 x 4s and 2 x 8s.

The blower room was a bit run down, but it appears to provide protection from the weather. Only one blower was functional at the time of the inspection. Mr. LaRose stated an electrician has been contracted to build a new electrical panel. After the new panel is installed, Mr. LaRose stated he will install the second motor, which is new and already on site.

The clarifier was operating, but it needs some routine maintenance. The weir needs to be cleaned and leveled to allow the effluent to evenly flow. I observed a moderate hole in the bottom of the weir on the west side of the clarifier that needs to be patched. I advised Mr. LaRose and Ms. Hall to evaluate the appurtenances before turning any wrenches as it appeared to have been some time since any adjustments have been made. I also observed some clumping in the clarifier. Clumping is usually caused by bacterial action in older sludge. I recommended they waste some of the older sludge and reduce the age of the remaining sludge.

The digester had the same corrosion issues as the aeration basins. The aeration was providing a good uniform mix and there was no offensive odor. Granny's Toilet Pumping is contracted to remove the sludge. I reminded Mr. LaRose and Ms. Hall to keep records anytime sludge is removed and file a Form S before January 28 of the following year.

The chlorination/dechlorination system was in good repair and is checked daily. The outfall was clearly marked as required by MSOP MO-0098680. At the time of the inspection, the discharge was clear and free of visible solids and offensive odor. There was no flow upstream of the outfall. I observed a small amount of what appeared to be old sludge downstream of the outfall. The may have been from the clumping I observed in the clarifier. I recommended they check and if necessary, remove any solids that might be in the chlorination/dechlorination system.

After inspecting the outfall, we discussed operator and sampling. Natalie Lafata (5908-A) is their certified oepartor and Mr. LaRose and Ms. Hall are currently taking an MRWA operator certification class in Sikeson. Ms. Hall wasn't certain if composite or grab samples are collected, but she stated she would check with Ms. Lafata to ensure composites are collected.

After completing the inspection, I thanked Mr. LaRose and Ms. Hall for their time and returned to the office.

Sampling and Monitoring

The appropriate sampling materials were taken on the inspection, including a copy of the Missouri Department of Natural Resources' Standard Operating Procedures for Sampling. Instruments for field monitoring were taken on the inspection that are capable of testing pH, temperature, conductivity, and dissolved oxygen.

Water quality field monitoring was conducted at the following location for the listed parameters.

Outfall 001		
Parameter	**Result**	**Units**
pH	7.7	SU
Temperature	17.6	°C
Dissolved Oxygen	7.07	mg/L

Sampling was conducted at the Outfall 001 and submitted for laboratory analysis. Sample results are not yet available but will be forwarded to you upon receipt.

Compliance Determination and Required Actions

Based upon observations made at the time of the inspection and a review of Discharge Monitoring Reports, the facility is not in compliance with the Missouri Clean Water Law, the Clean Water Commission Regulations, and MSOP MO-0098680.

Unsatisfactory Findings

1. The facility does not have a reduced pressure zone (RPZ) device to prevent backflow and protect its potable water supply.

   Required Action: By December 31, 2018, install an RPZ device and provide photographic documentation of its installation to john.chronister@dnr.mo.gov.

2. The clarifier weir was not level, rusted through on the west side, and need to be cleaned.

   Required Action: By December 31, 2018, level the weir and patch the hole. The weir should be cleaned regularly to prevent biological growth. Please send a photograph to john.chronister@dnr.mo.gov when the work has been completed.

Recommendations

1. For the safety of all involved, the catwalks and supports should be replaced.

2. Ensure composite samples, not grab samples, are collected.

Comments

I would like commend Mr. LaRose and Ms. Hall for their initiative in contacting the Department and requesting an inspection to familiarize themselves with our regulations and requirements.

Once the items listed in this report have been addressed and corrected by the specified dates, the facility will be returned to compliance.

SUBMITTED BY:

John Chronister
Environmental Specialist III
Southeast Regional Office

REVIEWED BY:

Arthur Goodin, CHMM
Chief, Water Pollution Control Unit
Southeast Regional Office

Attachment 1-Photographs 1-3
Attachment 2-Photographs 4-6
Attachment 3-Aerial image

Attachment #1-Photos 1 through 3



Photo #: 001
By: John Chronister
Facility: SK & M Water and Sewer Company
Permit: MO-0098680
Location: Perry County

Description: Catwalk and east aeration basin

Date/Time Taken: 10/23/2018
Program: WPC Unit



Photo #: 002
By: John Chronister
Facility: SK & M Water and Sewer Company
Permit: MO-0098680
Location: Perry County

Description: Catwalk and west aeration basin

Date/Time Taken: 10/23/2018
Program: WPC Unit



Photo #: 003
By: John Chronister
Facility: SK & M Water and Sewer Company
Permit: MO-0098680
Location: Perry County

Description: Blower room

Date/Time Taken: 10/23/2018
Program: WPC Unit



Photo #: 004
By: John Chronister
Facility: SK & M Water and Sewer Company
Permit: MO-0098680
Location: Perry County

Description: Hole in weir, clumping

Date/Time Taken: 10/23/2018
Program: WPC Unit



Photo #: 005
By: John Chronister
Facility: SK & M Water and Sewer Company
Permit: MO-0098680
Location: Perry County

Description: Outfall sign

Date/Time Taken: 10/23/2018
Program: WPC Unit



Photo #: 006
By: John Chronister
Facility: SK & M Water and Sewer Company
Permit: MO-0098680
Location: Perry County

Description: Outfall 001
Date/Time Taken: 10/23/2018
Program: WPC Unit


001
Google Earth
80 ft
N

Appendix F. Headworks Improvements.

Municipal Equipment Company, Inc.
13625 Lakefront Drive • Earth City, MO 63045 Office • 314-290-2999 • www.munequip.com

Pricing Summary

To: Brian Strickland
Strickland Engineering
Jackson, MO

Date: February 14, 2022

Re: SK&M Flow Meter Quote

We are pleased to offer the following:

Flow Meter Options

One (1) Greyline Pulsar AVFM Area-Velocity Flow Meter w/ data logger

Greyline Flow Meter: $4,496.00

One (1) MACE Insert Area-Velocity Sensor with FLOSeries3- FloPro XCi

MACE Flow Meter: $5,830.00

One (1) Siemens Level/Flow Meter
One (1) 3" Tracom Parshall Flume Insert

Parshall Flume with Level/Flow Meter: $7,950.00

Thank you for the opportunity to work with you on this project, and if there should be any questions or comments, please contact our office.

Sincerely,

Drew Hess

Drew Hess
(314) 203-1661 mobile

General Notes and Comments:

- The prices shown above are quoted FOB factory with full freight allowed
- The prices are firm for 60 days after the bid date, unless proposal states otherwise
- Payment terms are net 30 days with 1 ½ percent per month added on to past due accounts unless the proposal states other wise
- Prices include equipment, materials, and series as specifically listed. NO other items are assumed nor intended to be provided.
- **The price does not includes start up assistance. Additional trips and days will be charged at $1,250.00 per day if performed by Municipal Equipment Company, Inc.**
- **The prices do not include any applicable taxes.**
- The prices offered are per the manufacturers' standard terms and conditions.
- Municipal Equipment Company, Inc shall not, in any event, be liable for indirect, special, consequential, or liquidated damages or penalties of any kind for any reason.

_____
Accepted by

_____
Company

_____
Date

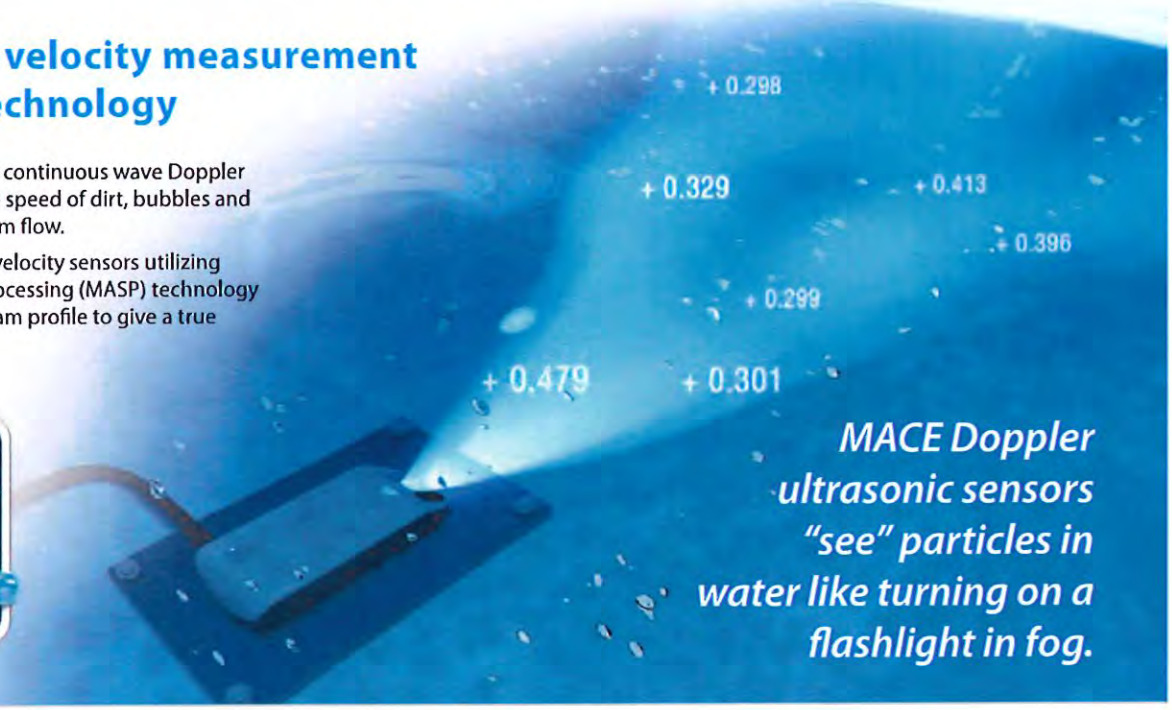
Focusing on the lowest total cost of ownership equipment since 1989
Passage Equipment • Access Tools • Pumps • Biosolids • Odor Control • Chemical Feed Systems

Doppler ultrasonic velocity sensors

True average velocity measurement with MASP Technology

MACE velocity sensors use continuous wave Doppler ultrasound to measure the speed of dirt, bubbles and other particles in the stream flow.

MACE Doppler ultrasonic velocity sensors utilizing MACE Advanced Signal Processing (MASP) technology *"see"* across the entire stream profile to give a true average velocity.



Doppler ultrasonic insert velocity sensor





For use in full pipes or partially full pipes when used in conjunction with an EchoFlo ultrasonic depth sensor.

Insertion sensors measure velocity only and require access to the outside wall of the pipe in which the sensor is to be mounted.

Installation

These sensors can be installed into existing pipework through a 2" ball valve (recommended) or just through a 2" female thread fitting.

Compatibility

The Doppler ultrasonic insert velocity sensor is compatible with the following MACE meters:

- MACE AgriFlo XCi (Requires a Doppler card)
- MACE FloPro XCi (Requires a Doppler card)
- HVFlo Logging Flow Meter

TECHNICAL SPECIFICATIONS:

Patents:	US Patent No. D544,803 AUS Patent No. AU 301464 S
Pipe size:	0.1 to 2.54m (4" to 100") diameter
Process fitting:	2" BSP or 2" NPT
Max. process fitting pressure:[1]	1034 kPa (150psi)
Max. operating pressure:[2]	253kPa (37psi)
Shaft dimensions:	33cm (L) x 2cm (D) 13" (L) x 0.8" (D)
Head dimensions:	4.5cm (D) x 2.5cm (H) 1.8" (D) x 1" (H)
Wetted materials:	Nickel plated brass and epoxy
Pipe intrusion area:	11.25cm² (1.75 sq.")

*1 The pipe **must be de-pressurized** prior to insertion or removal*

*2 The stream flow may be suitable for Doppler ultrasonic flow measurement in pressures >253kPa (37psi) if it contains **at least** 100 parts per million of suspended solids that are >75 microns in size.*

VELOCITY MEASUREMENT:

Method:	Submerged Ultrasonic Doppler
Range:	±0.025 to ± 8.0 m/s (±0.08 to ± 26ft/s)
Resolution:	1mm at 1.0 m/s (0.04" at 3.3ft/s)
Accuracy:	±1% up to 3.0 m/s (±1% up to 10ft/s)
Urethane sensor cable:	9mm (D) up to 50m (L) (0.35" (D) up to 164ft (L))
Min. operating depth:	40mm (1.57")
Max. operating temp.:	60° C (140° F)

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mace
Water Monitoring Solutions

Doppler ultrasonic velocity sensor





This sensor is used to measure velocity only in full pipes when access to the pipe is available and the pipe can be emptied when installation or maintenance is required. It can also be used in partially full pipes or open channels in situations where the user is measuring depth by a third party or ultrasonic depth sensor.

Installation

Use a MACE ZX SnapStrap to install this sensor inside a pipe in minutes. The polycarbonate ZX Snapstrap is tough, secure, does not foul and can be easily removed to take the sensor to another site.

Compatibility

The Doppler ultrasonic area/velocity sensor is compatible with the following MACE meters:

- MACE AgriFlo XCi (Requires a Doppler card)
- MACE FloPro XCi (Requires a Doppler card)
- HVFlo Logging Flow Meter

TECHNICAL SPECIFICATIONS:

Pipe size	0.15 to 2.54m (6" to 100") diameter
Max. channel width *	3m (10ft.)
Dimensions	12.5cm (L) x 5cm (W) x 1.6cm (H) 5" (L) x 2" (W) x 0.63" (H)
Wetted materials	PVC and epoxy
Pipe intrusion area	8cm² (1.25 sq.")

** MACE Doppler ultrasonic sensors **will** operate in wider channels, but a reliable stream gauging **must** be performed for best system accuracy.*

VELOCITY MEASUREMENT:

Method:	Submerged Ultrasonic Doppler
Range:	±0.025 to ± 8.0 m/s (±0.08 to ± 26ft/s)
Resolution:	1mm at 1.0 m/s (0.04" at 3.3ft/s)
Accuracy:	±1% up to 3.0 m/s (±1% up to 10ft/s)
Urethane sensor cable:	9mm (D) up to 50m (L) (0.35" (D) up to 164ft (L))
Min. operating depth:	40mm (1.57")
Max. operating temp.:	60° C (140° F)

Doppler ultrasonic area/velocity sensor





This sensor is used in open channels or pipes that run partially full. This sensor is used to measure depth (using a capacitive pressure diaphragm) and velocity. Access to the monitoring point is required for installation and maintenance.

Installation

Use a MACE ZX SnapStrap to install this sensor inside a pipe in minutes. The polycarbonate ZX Snapstrap is tough, secure, does not foul and can be easily removed to take the sensor to another site.

Compatibility

The Doppler ultrasonic area/velocity sensor is compatible with the following MACE meters:

- MACE AgriFlo XCi (Requires a Doppler card)
- MACE FloPro XCi (Requires a Doppler card)
- HVFlo Logging Flow Meter

TECHNICAL SPECIFICATIONS:

Pipe size:	0.15 to 2.54m (6" to 100") diameter
Max. channel width: *	3m (10ft.)
Dimensions:	12.5cm (L) x 5cm (W) x 1.6cm (H) 5" (L) x 2" (W) x 0.63" (H)
Wetted materials:	PVC, Alumina ceramic and epoxy
Pipe intrusion area:	8cm² (1.25 sq.")

** MACE Doppler ultrasonic sensors **will** operate in wider channels, but a reliable stream gauging **must** be performed for best system accuracy.*

DEPTH MEASUREMENT:

Method:	Ceramic pressure transducer with large flat sensing diaphragm which allows straight, undeflected flow over the sensing area to reduce drawdown effects at high stream velocities and provides for self cleaning with an impervious Alumina ceramic surface.
Full scale range:	4m (13ft) above the transducer face
Accuracy:	0.2% of full scale at constant temperature in a static stream. 1% of full scale over a stream 5 to 55° C (41 to 130° F)
Resolution:	1mm (0.04")
Overrange:	60m (200ft) without damage
Min. operating depth:	17mm (0.67")

VELOCITY MEASUREMENT:

Method:	Submerged Ultrasonic Doppler
Range:	±0.025 to ± 8.0 m/s (±0.08 to ± 26ft/s)
Resolution:	1mm at 1.0 m/s (0.04" at 3.3ft/s)
Accuracy:	±1% up to 3.0 m/s (±1% up to 10ft/s)
Urethane sensor cable:	9mm (D) up to 50m (L) (0.35" (D) up to 164ft (L))
Min. operating depth:	40mm (1.57")
Max. operating temp.:	60° C (140° F)

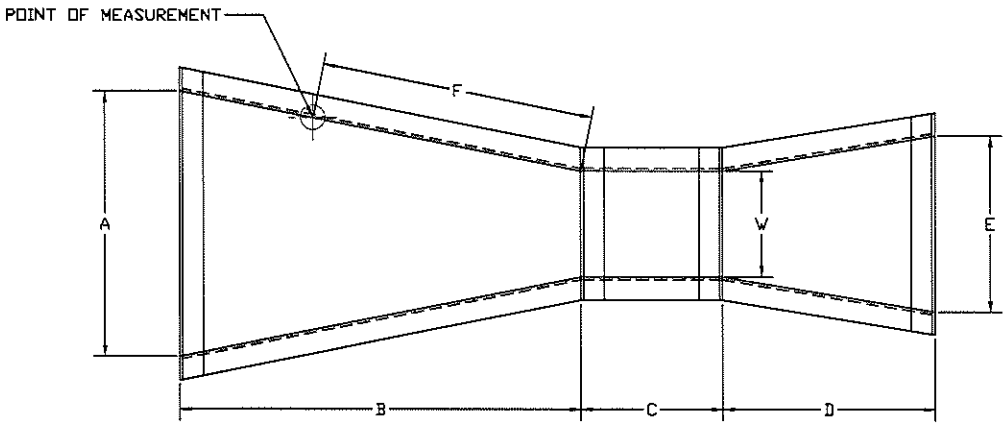
Part No. RZS-313 Rev. 2.3

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www.macemeters.com

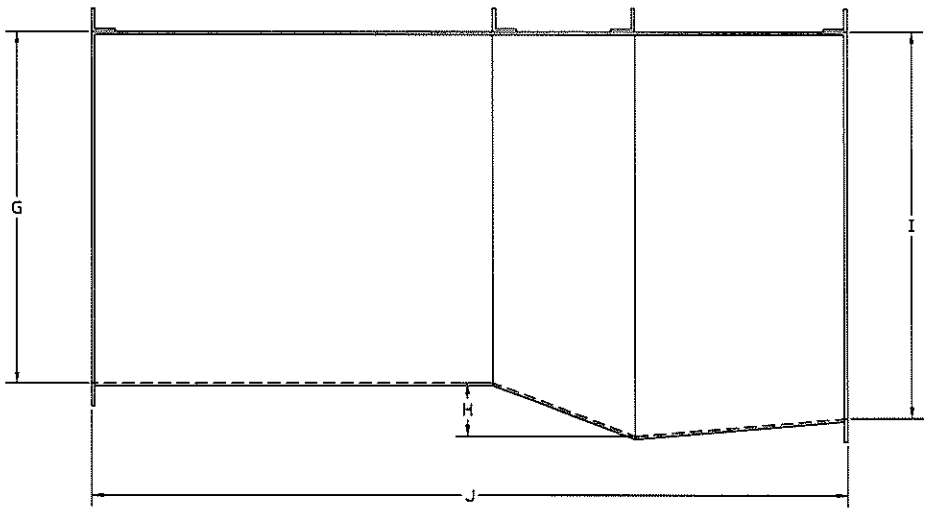
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mace
Water Monitoring Solutions



PLAN VIEW



RIGHT ELEVATION

W	A	B	C	D	E	F	G	H	I	J	MIN. FLOW GPM	MAX. FLOW GPM
1″	6 13/32″	14″	3″	8″	3 21/32″	9 17/32″	9″	1 1/8″	9 3/4″	25″	2	85
2″	8 13/32″	16″	4 1/2″	10″	5 7/16″	10 7/8″	9″	1 11/16″	9 7/8″	30 1/2″	3	210
3″	10 3/16″	18″	6″	12″	7″	12 1/4″	24″	2 1/4″	25″	36″	4	834
6″	15 5/8″	24″	12″	24″	15 1/2″	16 5/16″	24″	4 1/2″	27″	60″	22	1,754
9″	22 5/8″	34″	12″	30″	19 7/8″	23 1/8″	30″	4 1/2″	33″	64″	40	3,979
12″	33 1/4″	52 7/8″	24″	36″	24″	36″	36″	9″	39″	112 7/8″	146	7,336
18″	40 3/8″	55 7/8″	24″	36″	30″	38″	36″	9″	39″	115 7/8″	227	11,021
24″	47 1/2″	58 7/8″	24″	36″	36″	40″	36″	9″	39″	118 7/8″	296	14,853
30″	54 3/4″	61 7/8″	24″	36″	42″	42″	36″	9″	39″	121 7/8″	366	18,721
36″	61 7/8″	64 3/4″	24″	36″	48″	44″	36″	9″	39″	124 3/8″	433	22,618
48″	76 1/4″	70 5/8″	24″	36″	60″	48″	36″	9″	39″	130 3/8″	567	30,484
60″	90 5/8″	76 1/2″	24″	36″	72″	52″	36″	9″	39″	136 1/2″	994	38,426
72″	105″	82 3/8″	24″	36″	84″	56″	36″	9″	39″	142 3/8″	1,181	46,431
84″	119 3/8″	88 1/4″	24″	36″	96″	60″	36″	9″	39″	148 1/2″	1,928	54,489
96″	133 3/4″	94 1/8″	24″	36″	108″	64″	36″	9″	39″	154 1/8″	2,076	62,591
120″	187 1/4″	168″	36″	72″	144″	72″	48″	13 1/2″	54″	276″	2,575	162,414
144″	220 3/4″	192″	36″	96″	176″	80″	60″	13 1/2″	66″	324″	3,057	275,541

1) FLOW IS FROM LEFT TO RIGHT

TRACOM
FIBERGLASS PRODUCTS

PARSHALL FLUME MASTER DIMENSIONS
(ENGLISH UNITS)

DWG. NO. PAR-MD-E

REV 3

PROJECT STANDARD FLUME SIZES

DATE 10/30/12

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Appendix G. Aeration Industries ARGOS® SBR.

Aeration Industries International
a newterra company

PRELIMINARY PROCESS DESIGN REPORT

ARGOS® SEQUENCING BATCH REACTOR

Project Name: SK&M Perry County, MO

Design # 22-3-11824

Option: Argos® SBR

03/18/2022

Designed by: Alex Danuser, EIT, Aeration Industries International, LLC

The enclosed information is based on preliminary data provided by the owner/engineer. This data has been reviewed and has been utilized as the basis of the following design recommendations. There may be unknown factors which would alter the design recommendation. Aeration Industries International assumes no responsibility for the validity or any risks associated with the use of modeling software or industry standard assumptions. Aeration Industries International assumes no responsibility for or liability resulting from the use of the recommendations provided as part of the subject design.

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Aeration Industries International
a newterra company

1. Design Specifications

1.1. Average Flow Rates

The biological process unit has been designed for 24-hour / 7-day flow

The maximum biological flow is assumed to be equal to the maximum monthly design flow.

The maximum hydraulic flow is assumed to be hydraulic only and does not represent an increase in design organic load. The maximum hydraulic flow was estimated using a peaking factor of 1.5x applied to the maximum monthly design flow.

DESIGN FLOW	AVERAGE FLOW	UNITS
Maximum Monthly	0.275	MGD
Maximum Hydraulic	0.413	MGD

1.2. Influent Water Quality

Influent water quality parameters have been provided by the engineer.

PARAMETER	INFLUENT	UNITS
BOD_5	250	mg/L
TSS	250	mg/L
TKN	40	mg/L

1.3. Effluent Requirements

Effluent Requirements listed below have been provided by the engineer.

PARAMETER	EFFLUENT	UNITS
BOD_5	20	mg/L
TSS	20	mg/L

2. Sequencing Batch Reactor Process Description

2.1. Anoxic Fill Phase

The first phase of the SBR cycle; influent wastewater enters the basin under a completely mixed, anoxic environment. An organic load is received, and denitrification occurs within the basin. A release of phosphorous transpires based on the time duration in the first anoxic fill phase.

2.2. Aerobic Fill Phase

Influent continues to enter the basin under a complete mix and aerated environment and continues to receive an organic load. The Biochemical and Chemical Oxygen Demand is reduced. Nitrification and phosphorous uptake occur based on the time duration selected for each aeration phase. Aeration may be operated intermittently under low flow and organic loading conditions to conserve energy and maintain a desirable dissolved oxygen concentration within each basin. Duration of each phase is determined based on the effluent requirements of the treatment plant's discharge permit.

2.3. Aerobic Non-Fill and Anoxic Non-Fill Phases

Influent wastewater is terminated and flows into an additional SBR basin or a pre-equalization basin, if applicable. The basin remains under mixed and aerated (or anoxic) conditions, depending on the phase of the non-fill cycle. BOD/COD removal, nitrification, and denitrification are completed to the required discharge limits. Aeration may also be operated intermittently under low flow and organic loading to conserve energy.

2.4. Settle Phase

No influent enters the basin, mixing and aeration equipment is terminated, and the basin is in a quiescent settling environment. Liquid-solids separation occurs as the activated sludge settles as a flocculent mass (or sludge blanket). A distinctive interface, with a clear supernatant, is formed.

2.5. Decant / Sludge Wasting Phase

No influent enters the basin, mixing and aeration equipment remains off, and settling continues. The decanter is lowered by a variable frequency drive (VFD) electric motor to remove clarified effluent until the pre-determined low water level is reached. Sludge is wasted to digestion as required to maintain the design mixed liquor concentration.

3. Design Considerations

3.1. Pre-Biological Unit Process

Neutralization is recommended/required ahead of the biological unit process if the pH is expected to fall outside of 6.5-8.5 for extended durations.

¼" fine solids removal/reduction is recommended prior to the biological unit process.

3.2. Biological Unit Process Aeration

The aeration system has been designed to provide 1.1 lbs O2/lb BOD5 applied and 4.6 lbs O2/lb TKN applied at the design maximum biological flow.

No denitrification credits have been assumed.

3.3. Process Conditions

Sufficient alkalinity is required for nitrification as approximately 7.1 mg alkalinity (as CaCO3) is required for each milligram of NH3-N nitrified. If the raw water cannot support this consumption while maintaining residual alkalinity concentration of 50 mg/L, supplemental alkalinity shall be provided (by others).

The effluent quality is predicated upon the ability of the sludge to settle to reasonable levels to prevent the discharge of TSS. And SVI of 150 is assumed.

Maximum fats, oils, and grease to the biological process unit is 100 mg/L. Depending on the nature of the FOG, reduction in activated sludge treatment is unpredictable. If FOG effluent requirements exist, FOG should be reduced to the effluent limit prior to the biological unit process. High FOG levels may also cause poor settling and excessive foaming, resulting in effluent quality degradation.

3.4. Site Conditions

Basin dimensions have been determined based upon the required volumes for hydraulic retention at peak hydraulic flow. By doing so, the cycle structure will not need to be condensed at peak hydraulic flow.

The biological unit process tanks are to be provided by others.

Influent is assumed to enter the reactor above the high waterline and located to avoid the decanter for hydraulic purposes.

Influent located below the waterline must provide adequate hydraulic capacity in the headworks to prevent backflow from one reactor to the another during the transition of influent.

A minimum of one foot of driving head is required from the decanter discharge effluent pipe invert elevation to the High Water Level (HWL) of the post-SBR equalization basin.

3.5. Post-Biological Process Unit Treatment

In most cases, post-SBR equalization will be necessary to optimize the sizing of the disinfection and filtration discharge facilities. If post-SBR equalization is not utilized, the effluent may not receive adequate treatment and downstream equipment processes may require sizing for the decant flow rate of 533 gpm.

4. Equipment Summary

4.2. Argos SBR

Two (2) AIRE-O2 Triton® Aerators, consisting of:

- 10HP, 230/460 volt, 3-phase, 900 RPM, TEFC, premium efficiency motor
- 2.0HP regenerative blower
- Field replaceable, water-lubricated lower bearing
- Field replaceable, water-resistant sleeve
- 316 SS dual-blade primary PowerMix™ propeller
- 316 SS Saturn Ring diffuser
- 304 SS housing, mounting flange, and hollow shaft

Note: Aerators shall arrive fully assembled for immediate mounting

Two (2) Eight-Float Assemblies, consisting of:

- Four (4) molded, LDPE, close-cell foam filled pontoons
- 304 SS rails and mounting hardware
- Vortex shield attached to frame

Note: Floatation devices require field assembly

Two (2) 304 SS Slide Rails Assemblies

200' SEOOW Electrical Cable

One (1) Portable Davit Crane (for both SBR basins & digester)

Two (2) Davit Crane Base

Two (2) 304 SS Decanter Assemblies, consisting of:
- 8" diameter discharge piping
- 5'-10 7/8" weir

Two (2) Waste Activated Sludge [WAS] Submersible Pumps, consisting of:
- Painted cast iron pump housing, discharge elbow
- Multi-conductor electrical cable
- 304 SS upper guide bar brackets
- 304 SS slide rail assemblies
- 304 SS intermediate supports

Two (2) Manual Plug Valves

Two (2) Check Valves

Two (2) Pressure Transducer Assemblies, consisting of:
- Stainless steel submersible pressure transducers
- Mounting bracket weldments
- Transducer mounting weldments
- 304 SS anchors

Two (2) Level Transducer Assemblies: consisting of:
- Three (3) float switches
- Float switch mounting bracket
- 304 SS anchors

Two (2) Dissolved Oxygen Probes and Mounting Hardware

Two (2) Oxygen Reduction Potential (ORP) Probes and Mounting Hardware

Two (2) Probe Controllers, including:
- Mounting hardware
- Sunshield

Note: Each controller can receive two probes

4.3. Aerobic Digester

One (1) AIRE-O2 Triton® Aerators, consisting of:

- 10HP, 230/460 volt, 3-phase, 900 RPM, TEFC, premium efficiency motor
- 2.0HP regenerative blower
- Field replaceable, water-lubricated lower bearing
- Field replaceable, water-resistant sleeve
- 316 SS dual-blade primary PowerMix™ propeller
- 316 SS Saturn Ring diffuser
- 304 SS housing, mounting flange, and hollow shaft

Note: Aerators shall arrive fully assembled for immediate mounting

One (1) Eight-Float Assemblies, consisting of:

- Four (4) molded, LDPE, close-cell foam filled pontoons
- 304 SS rails and mounting hardware
- Vortex shield attached to frame

Note: Floatation devices require field assembly

One (1) 304 SS Slide Rails Assemblies

100' SEOOW Electrical Cable

One (1) Davit Crane Base

One (1) Pressure Transducer Assembly, consisting of:

- Stainless steel submersible pressure transducers
- Mounting bracket weldments
- Transducer mounting weldments
- 304 SS anchors

One (1) Level Transducer Assembly: consisting of:

- Two (2) float switches
- Float switch mounting bracket
- 304 SS anchors

One (1) Dissolved Oxygen Probes and Mounting Hardware

4.4. Post-Equalization

Two (2) Submersible Transfer Pumps, consisting of:
- Painted cast iron pump housing, discharge elbow
- Multi-conductor electrical cable
- 304 SS upper guide bar brackets
- 304 SS slide rail assemblies
- 304 SS intermediate supports

Two (2) Manual Plug Valves

Two (2) Check Valves

One (1) Pressure Transducer Assembly, consisting of:
- Stainless steel submersible pressure transducer
- Mounting bracket weldment
- Transducer mounting weldment
- 304 SS anchors

One (1) Level Transducer Assembly: consisting of:
- Two (2) float switches
- Float switch mounting bracket
- 304 SS anchors

4.5. Controls

One (1) Control Package, consisting of:
- NEMA 12 panel enclosure suitable for indoor installation
- Variable frequency drives
- PLC with communication connection
- Operator interface
- UPS
- UL508 serialized label

5. Freight and Installation/Startup Supervision

Freight, Delivered at Place (DAP) Perry County, MO

Startup and Installation Supervision, consisting of:
- Two trips, two days per trip, including travel expenses

Aeration Industries International
a newterra company

6. Items Not Included

- Installation
- Civil Engineering
- Influent Screening and Grit Removal
- Supernatant Return Pumps
- Digested Sludge Handling/Disposal (i.e. Sludge Pumps, Dewatering Equipment, etc.)
- Conduit, Junction Boxes, Local Disconnects, Local Control Stations
- Chemicals and Chemical Feed Systems
- Disinfection
- Interconnecting Piping, Valves, and Fittings Outside of Basin
- Concrete Anchor or Epoxy Bolts
- Unloading, Storage, and Accounting of Equipment
- Taxes or Duties of Any Kind
- Anything not Specifically Mentioned Above

TOTAL PRELIMINARY BUDGETARY PRICE: $700,000 USD

NOTE: If required, submittals will be provided six weeks from receipt of purchase order. Delivery is sixteen to twenty weeks from submittal approval.

Quotation valid for Thirty (30) days.

Three (3) year non-prorated warranty (see General Terms and Conditions)

TERMS: General Terms and Conditions attached (2 pages)

4100 Peavey Road • Chaska, Minnesota 55318 • USA
Telephone: (952) 448-6789 • Email: aii@aireo2.com • Fax: (952) 448-7293

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Argos Sequencing Batch Summary

PROJECT DETAILS

Project Name:	SK&M Perry County SBR	Date:	3/9/2022
Design #	22-3-11824	Prepared By:	AMD
Application	Municipal	Revision:	0
Unit Processes	SBR		

DESIGN PARAMETERS

Influent Characteristics

*BOD_5	250	mg/L
*TSS	250	mg/L
*TKN	40	mg/L
*pH	7	
*Minimum Basin Temperature	50	degrees F
*Maximum Basin Temperature	68	degrees F

*assumed

Design Influent Conditions

Biological Design Flow	0.120	MGD
Hydraulic Design Flow	0.240	MGD

Effluent Requirements

BOD_5	20	mg/L
TSS	20	mg/L

Reactors

Number of Basins	2	
Design Inside Width	34	ft
Design Inside Length	17	ft
Design Total Volume	0.16	MG

Water Depth

Low Water Level	13.0	ft
Average (biological)	15.8	ft
Maximum (hydraulic)	18.6	ft

SBR DESIGN VAUES

Number of Cycles	10				
Cycle Duration	4.8	hours	Decant Flow Rate @ HWL	533	GPM
Food/Mass (F/M) ratio	0.09	lbs BOD/ lb MLSS	BOD Oxygen Requirement	1.1	Lbs of O2/lbs of BOD
MLSS Concentration	3000	mg/L at LWL	TKN Oxygen Requirement	4.6	Lbs of O2/lbs of TKN
Hydraulic Retention Time	0.67	Days (AWL)	Actual Oxygen Required	459	lbs/day
Hydraulic Retention Time	16.04	hours (MMWWF)			
Solids Retention Time	11.2	Days	Process Oxygen Requirement (SOR)	766	lbs O2/day

AERATION AND MIXING

Aeration

Type of Aerator	Triton		
Power Required	11.9	HP/basin	
Equipment Recommendation	12	HP	
Units	1	per basin	

Mixing

Design Mixing Intensity	60	HP/MG
Power Required	10	HP per basin
Total Units	2	
Total Installed Power	24	HP

Argos Equalization Basin Summary

POST EQUALIZATION BASIN DETAILS

Hydraulic Residence Time (HRT)	7.0 hours
Design Volume	0.037 MG

BASIN DIMENSIONS

Number of Basins	1
Length	35 ft
Width	11 ft
Minimum Water Depth	1 ft
Maximum Water Depth	13 ft

Argos Aerobic Digester Summary

DESIGN PARAMETERS

Assume Solids Fraction in Waste Sludge	0.85	%
Mass of Activated Sludge produced, Px,TSS	251	lb/day
Volume of Activated Sludge Produced	3542	gallon/day
Waste Sludge Pumping Time	4	min
Waste Sludge Pumping Capacity	100	gal/min

	SRT (days)	Percent Reduction
Winter at 15ºC	60	46%
Summer at 20ºC	40	44%

Number of Aerobic Digesters	1	
Design Inside Width	34.00	ft
Design Inside Length	17.00	ft
Design Total Volume	0.069	MG

AERATION AND MIXING

Aeration

Process Oxygen Requirement (SOR)	492	lbs O2/day/basin
Aerator Efficiency	3	lbs O2/ Hp-hr
Power Required	7.59	HP/basin
HP per unit	12.0	HP
Units	1	per basin
Total Installed Power	12	HP

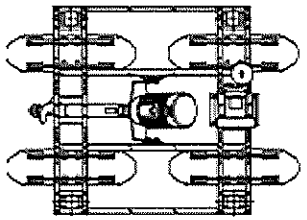
Mixing

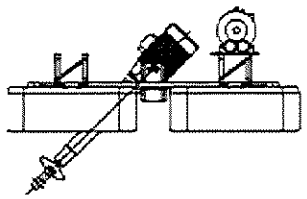
Design Mixing Intensity	100	HP/MG
Power Required	6.92	HP per digester
HP per unit	12.0	HP
Units	1	per digester
Total Units	1	
Total Installed Power	12	HP per digester
Mixing Intensity	173	HP/MG

EQUIPMENT	QTY
TRITON 2.0 10HP ON 4-FLT W/ ROLLERS	3
UPS-150 DECANTER	2
WAS PUMP	2
INFLUENT VALVE W/ ACTUATOR	2
EQ PUMP	2
LEVEL ASSEMBLY	4
DO PROBE	3
ORP PROBE	2

	LWL	AWL	HWL
	13.0'	13.5'	10.5'
T-EQ	1.0'	-	13.0'
ESTER	-	-	16.0'

T REPRESENTATION

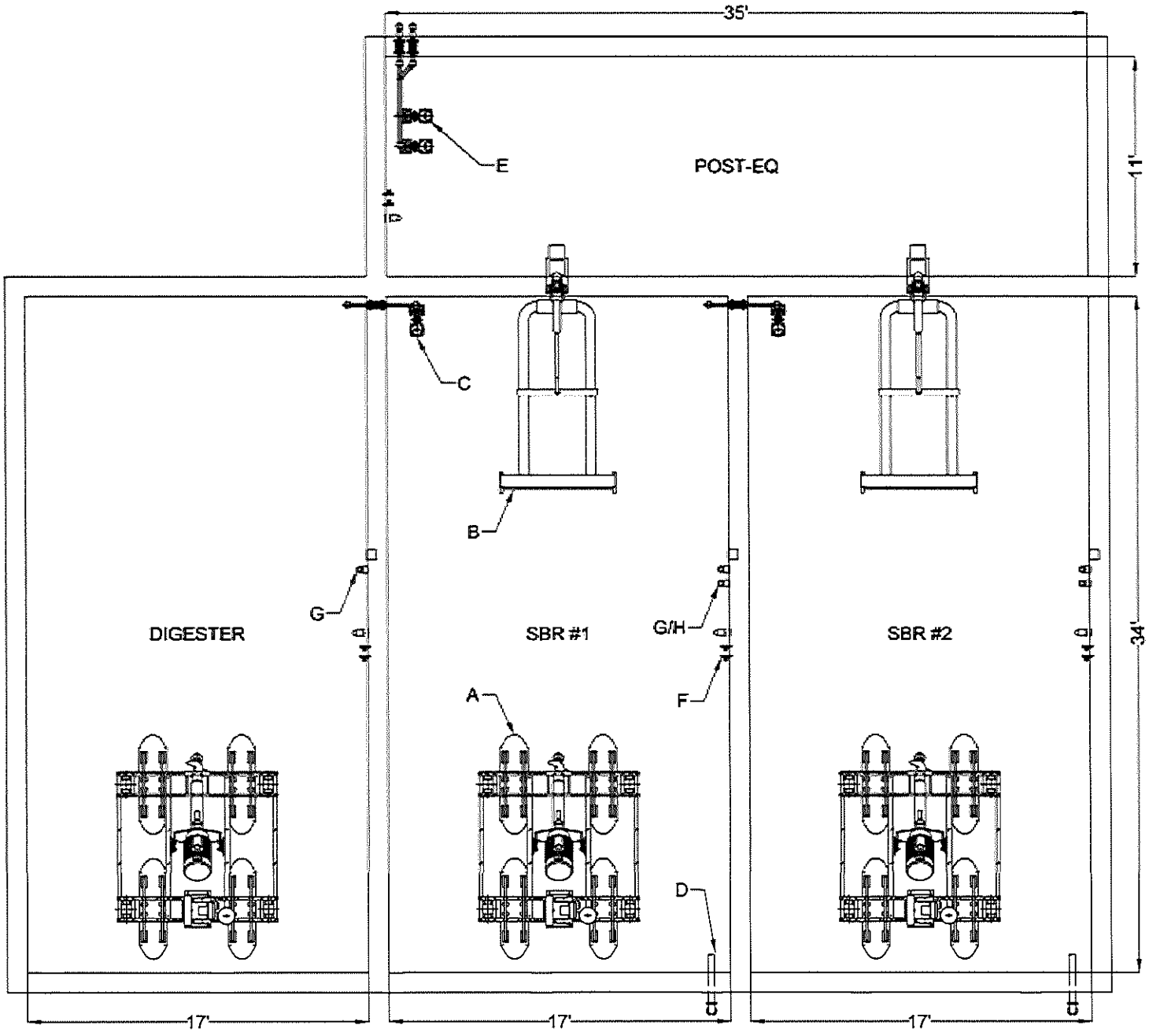




TALLATION NOTES:

UCTURAL ENGINEERING BY OTHERS.

WING IS PRELIMINARY AND NOT FOR CONSTRUCTION



WO:2017203601 Attachment 6, Page 73 of 119

SK&M PERRY COUNTY SBR
MISSOURI, USA
ARGOS SBR LAYOUT

SK&M Water and Sewer Co. WWTF - Aeration Industries ARGOS SBR

Construction Item	Quantity	Unit	Unit Price	Total Price	
Headworks					
A. Manual coarse bar screen	1	EA	$ 10,000	$ 10,000	
B. Parshall flume	1	EA	$ 7,950	$ 7,950	
C. Ultrasonic flow meter	1	EA	$ 4,496	$ 4,496	
D. Piping	1	LS	$ 5,000	$ 5,000	
E. Headworks structure	1	LS	$ 15,000	$ 15,000	
F. Electrical	1	LS	$ 5,000	$ 5,000	
				Headworks Sub-total	$ 47,446
Argos SBR Equipment Package					
A. AIRE-O2 Triton Aerators	3	EA			
B. Eight-Float Assemblies	3	EA			
C. 304 SS Slide Rails Assemblies	3	EA			
D. SEOOW Electrical Cable	300	LF			
E. Portable Davit Crane	1	EA			
F. Davit Crane Base	3	EA			
G. 304 SS Decanter Assemblies	2	EA			
H. Waste Activated Sludge Submersible Pumps	2	EA			
I. Manual Plug Valves	4	EA			
J. Check Valves	4	EA			
K. Pressure Transducer Assemblies	4	EA			
L. Level Transducer Assemblies	4	EA			
M. Dissolved Oxygen Probes & Mounting Hardware	3	EA			
N. Oxygen Reduction Potential Probes & Mounting Hardware	2	EA			
O. Probe Controllers	2	EA			
P. Submersible Transfer Pumps	2	EA			
Q. Control Package	1	EA			
R. Freight and Installation/Startup Supervision	1	LS		$ 540,000	
O. Installation	1	LS	$ 20,000	$ 20,000	
				Argos Equipment Package Sub-Total	$ 560,000
SBR Structure					
A. Piping	1	LS	$ 10,000	$ 10,000	
B. Concrete Structure	1	LS	$ 150,000	$ 150,000	
				SBR Structure Sub-Total	$ 160,000
Disinfection					
A. Enaqua M4 Ultraviolet Disinfection	1	LS	$ 16,000	$ 16,000	
B. Disinfection Structure	1	EA	$ 20,000	$ 15,000	
C. Control Panel & Electrical	1	EA	$ 5,000	$ 5,000	
D. Piping	1	LS	$ 5,000	$ 5,000	
E. Installation	1	LS	$ 10,000	$ 10,000	
				Disinfection System Sub-Total	$ 51,000
Emergency Operations					
A. Onsite Generator	1	LS	$ 75,000	$ 75,000	
				Emergency Operations Sub-Total	$ 75,000
Sitework & Startup					
A. Electrical Service and Installation	1	LS	$ 75,000	$ 75,000	
B. Site Restoration	1	LS	$ 10,000	$ 10,000	
C. Mobilization/Demobilization	1	LS	$ 20,000	$ 20,000	
D. Startup	1	LS	$ 7,500	$ 7,500	
				Sitework & Startup Sub-Total	$ 112,500

	WWTF Improvements Subtotal		**$ 1,006,000**
TOTAL ESTIMATED CONSTRUCTION COST		**$**	**1,006,000**
Engineering (design and construction)	10.00%	$	100,600
Engineering (resident inspection)	5.00%	$	51,000
Contingency	10.00%	$	101,000
TOTAL ESTIMATED PROJECT COSTS		**$**	**1,259,000**

Note:

The quantities estimate is based on a preliminary, ***not final***, design of the proposed project. The final quantities may vary based on detailed information developed during the final design of the project.

This preliminary cost estimate is based on recent bids submitted for similar projects. Actual costs may vary depending on Contractor methods, sources of project funding, modification to the project by review agencies or Client after the date of the estimate, market conditions, when the project is bid or the length of time since the estimate was prepared.

Appendix H. Schreiber Continuously Sequencing Reactor.

SCHREIBER

CSR

CONTINUOUSLY SEQUENCING REACTOR

GR Configuration



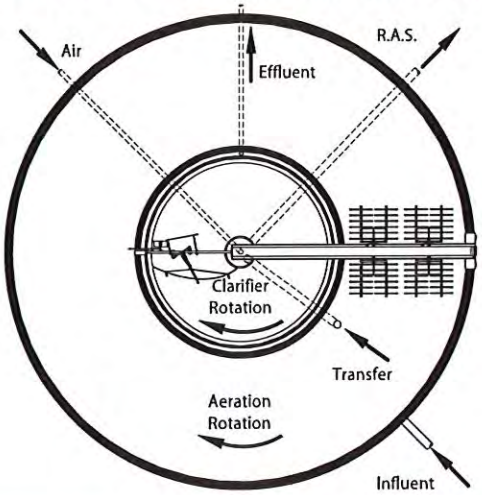
Aeration/Clarification
in a single basin -
suitable for ADF's
up to 1.5 MGD.

SCHREIBER CSR
CONTINUOUSLY SEQUENCING REACTOR

GR Configuration

Schreiber's Model GR basin configuration utilizes Schreiber's *Continuously Sequencing Reactor (CSR)* system, to provide high efficiency aeration and *separate* low energy mixing for activated sludge. Designed for smaller flows, the GR unit incorporates aeration and clarification within the same structure for optimum space utilization. A single GR aeration / clarification basin is capable of handling average daily flows to 1.5 MGD.

The GR model utilizes a circular tank with an aeration diameter up to 168' with typical sidewater depths from 10' to 20'. Circular structures provide the most economical construction - minimum concrete and excavation with maximum basin volumes. A concentric internal wall is built within the aeration tank to form the clarifier structure. Helical scraper assemblies are suspended from a lightweight horizontal arm that rotates within the clarifier section via peripheral drive. Independent from the clarifier arm, flexible membrane diffusers are suspended just inches above the basin floor, within the aeration ring, from a peripherally driven rotating aeration bridge. The continuous rotation of the bridge in the aeration ring provides constant mixing (separate from aeration) with minimal energy consumption. The movement of the diffusers through the water enhances fine bubble aeration, achieving high oxygen transfer efficiency. The design of Schreiber's CSR permits 100% turndown of aeration while maintaining complete mixing.



FEATURES

- Separation of aeration from mixing
- High oxygen transfer
- Retrievable membrane diffusers
- Low mixing costs
- Minimal head loss and aerosol release
- Low life-cycle costs
- Maximum process flexibility





The Schreiber Continuously Sequencing Reactor, or CSR, is a Biological Nutrient Removal (BNR) system contained in a Single Basin. It sequences through the 3 process phases required for BNR – Oxic, Anoxic and Anaerobic – in one basin. The 3 phases do not occur at the same time in the basin. They occur sequentially – one after the other, repetitively, over time. During the Oxic phase, the entire basin is Oxic (i.e. aerobic). When the air is turned off, the entire basin becomes anoxic and then ultimately anaerobic. After the anaerobic phase is completed, the air is turned back on and the cycle repeats –over and over - i.e. a Continuously Sequencing Reactor.

For the CSR, the secret to this "phase sequence-ability" lies in its unique design for complete separation of aeration and mixing. It has a 100% aeration turndown capability! This important feature allows the aeration to be turned completely off while the CSR applies its low energy mixing without aeration. Through the use of Schreiber FlexControls, the CSR process can be advanced to meet the most stringent of requirements for today and the future.

To:	**Drew Hess**	**Date:**	**5/4/2022**
Company:	**Municipal Equipment**	**From:**	**Janet Goforth**
cc:	**Brad Linsey, Kevin Gabbart, Adam Thiedke**		
Subject:	**Schreiber CSR Treatment System, Preliminary Design Proposal for SK&M Perry, MO**		

Dear Mr. Hess,

Thank you for your interest in Schreiber's *Continuously Sequencing Reactor (CSR)* treatment system. The Schreiber *CSR* is an activated sludge treatment process which utilizes countercurrent aeration. The CSR process is ideal for organics removal, BNR, and ENR applications. Based upon the data provided for this project, we believe the Schreiber *CSR* process is an ideal treatment selection.

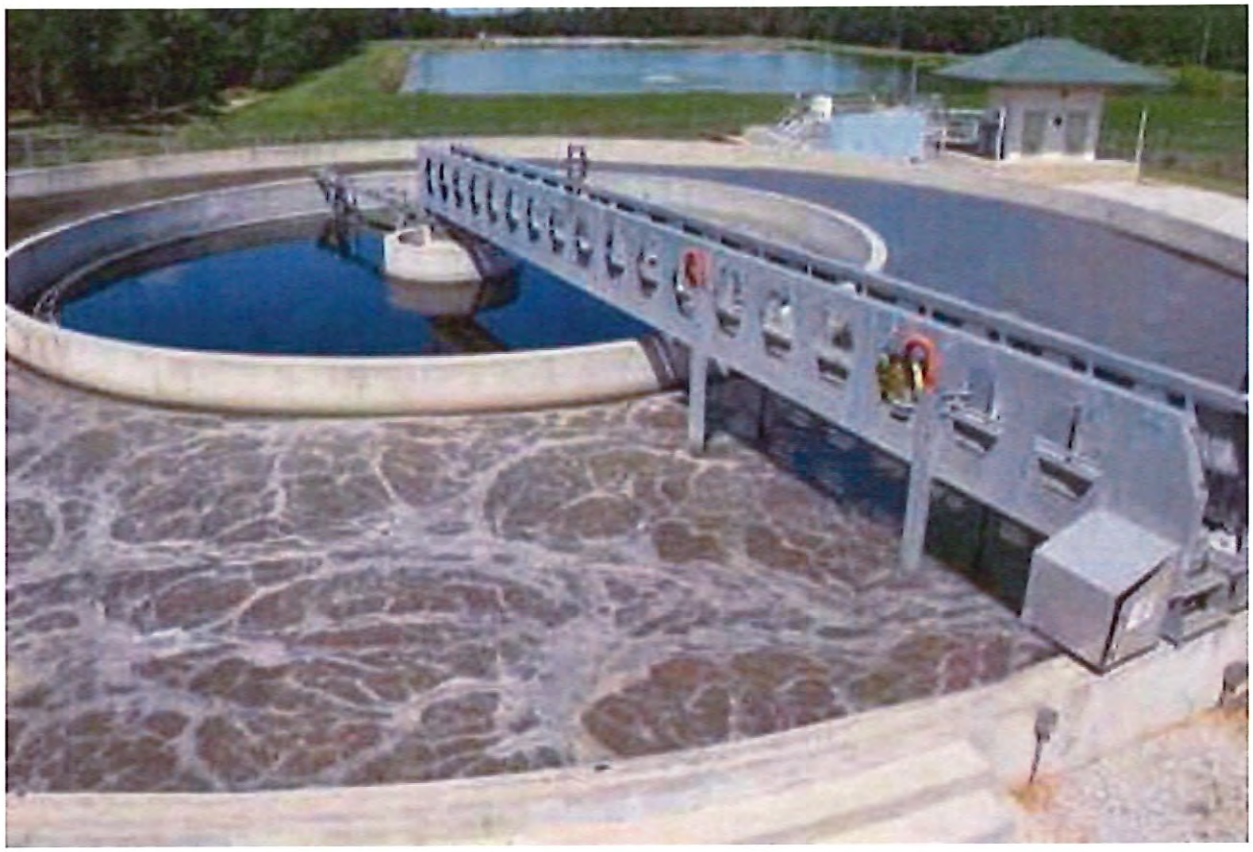
A number of equipment options and configurations can be used with the Schreiber *CSR*, all of which are designed to meet each project's specific needs. Equipment selections most suitable for each application are dependent on variables such as effluent requirements, O&M costs, energy efficiency, expansion capabilities, and initial capital cost. Schreiber welcomes the opportunity to discuss equipment options that will best meet the project requirements.

We appreciate the opportunity to offer our equipment and services for this project. Should you have any questions or need clarifications, please do not hesitate to contact me at (205) 661-5320.

Sincerely,

SCHREIBER
A Parkson Brand

Janet Goforth
Sr. Application Engineer
205-661-5320
jgoforth@parkson.com



SCHREIBER
A PARKSON BRAND

SK&M Perry, MO

Preliminary Design Proposal

May 4, 2022

Proprietary and Confidential to Parkson Corporation

1. Design Basis

1.1. Influent and Effluent Information

The proposed system design is based on wastewater influent with the following characteristics:

Table 1.1 – Design Influent flow requirements

PARAMETER	UNITS	AVERAGE
Ave Daily Flow	MGD	0.12
Peak Hourly Flow	MGD	0.24

Table 1.2 - Influent Water Quality

PARAMETER	UNITS	AVERAGE
Max WW Temperature	Deg C	20
Minimum WW Temperature	Deg C	12
BOD_5	mg/L	225
Total Suspended Solids	mg/L	225
NH_3-N	mg/L	44
TKN	mg/L	45
pH		6 to 8

Table 1.3 - Effluent Water Quality

PARAMETER	UNITS	QUALITY
BOD_5	mg/L	30
Total Suspended Solids	mg/L	30
NH_3-N	mg/L	0.6

A process design spreadsheet has been attached which includes details regarding the process design, equipment sizing calculations, and estimated power costs. The calculations were utilized as the basis for the equipment that has been selected and included in this proposal. The design spreadsheet may include some assumed values that will need to be confirmed as the project moves forward. This proposal is contingent upon the following criteria:

a. The wastewater will be pretreated to remove debris and grit. Fine screening is recommended.

b. Sufficient alkalinity is present or will be added to allow uninhibited nitrification and pH of 6.5-8.

c. The incoming oil and grease is below 100 mg/l.

d. Chemical and metals concentrations are below toxic thresholds for organics and ammonia removal.

e. Sufficient nutrients (P, N, micronutrients) are present in the influent for biomass growth or will be added by the plant operating staff.

f. A qualified operator will supervise plant activities and performance.

2. System Description

The ***Schreiber Continuously Sequencing Reactor (CSR)*** is an activated sludge process that achieves organics and biological nutrient removal (BNR) in a single basin. The system consists of a rotating bridge with fine bubble diffuser assemblies suspended from the bridge. The suspended diffuser assemblies provide mixing as they move through the mixed liquor as the bridge rotates. Complete mix is achieved with or without aeration being provided through the diffusers. The ability to mix independent of aeration allows the CSR to achieve the conditions necessary for BNR by cycling blowers on and off. This creates aerobic, anoxic, and anaerobic conditions necessary for nitrification, denitrification, and biological phosphorous removal.

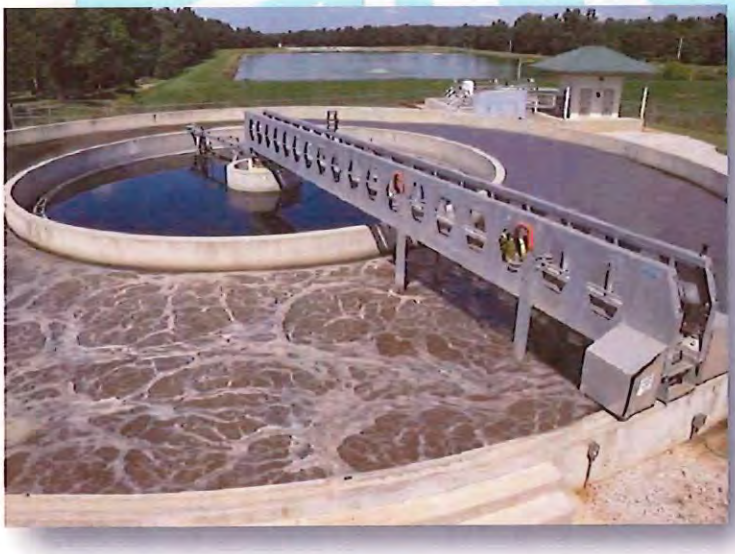


The ***Schreiber Clarifier*** utilizes spiral collectors that provide for rapid sludge removal and continuous collection and removal of floatables. The clarifier utilizes a peripheral drive unit which is typically more reliable than high torque, center drive units. A low horsepower single drive unit is all that is needed to rotate both the scraper and the skimming assemblies. The assemblies are suspended from a rotating access bridge or, in the case of smaller units, a lightweight rotating beam arm. The rotating skimming equipment removes floatable regardless of wind direction, and the helical scrapers convey settled solids to the center of the basin for removal in one revolution or less.

The clarifiers are designed so all underwater equipment can be hoisted above the water level for inspection and maintenance without dewatering the basin. For corrosion protection, clarifier components are hot dip galvanized and hardware is stainless steel.



The ***Schreiber GR*** configuration is designed for smaller treatment plants and consists of a center circular clarifier surrounded by an outer concentric aeration basin. The nested arrangement combines biological treatment and final clarification in one simple, compact package optimizing the space required for a treatment plant.



3. Equipment and Services Provided

Aeration or Digester / Clarification Units: One Aeration/Clarification and one (1) digester/clarification units, to be located in a concentric tank 48'-0" diameter with approximate 14'-0" SWD with inner clarifier of 20-0". Each unit is complete with the following:

1. One (1) center pivot bearing assembly with collector rings, with galvanized transition air pipe.
2. One (1) radius U-Profile Bridge constructed of mild steel. Bridge is equipped with 2'-0" wide full-length walkway constructed of aluminum 3003H grating, and 1-1/2" square-galvanized handrails. Bridge is pre-wired with start-stop disconnect station at access end.
3. One (1) 2.0 HP aeration drive with 18" diameter wheels. Wheels are steel rim coated with vulcalon traction surface. Aluminum drive guard with hinged door for easy access.
4. One (1) proximity switch for bridge stall detection. (Switch shall be mounted on the D.O. bracket.)
5. Two (2) single arm rotating aeration assemblies. The header, drop pipe, and c-guide to be constructed of mild steel and hot dipped galvanized after fabrication. Each assembly includes a 4" x 4" square tubing air supply with isolation valve. Flexible hose with connectors to air mains on bridge. Drop pipe, c-guide and stainless-steel lifting cable arrangement allows for raising the diffusers above the liquid level for inspection and/or servicing.
   (A total of 84 SchreiberFlex membrane diffuser tubes (210 feet) shall be provided per tank.)
6. One (1) emergency stop shall be mounted on the leading side of the bridge drive to stop the bridge if it comes in contact with an obstruction.
7. One (1) peripheral drive final clarifier mechanism including 5" x 5" support beam with 0.25 HP gear motor with 10" diameter wheel; scraper assemblies with two or more solid wheels; scum removal system with full radius skimmer, scum pump and bucket.
8. One (1) clarifier stall alarm switch mounted on the center pier.
9. One (1) set FRP weirs and baffles including brackets and anchorage.
10. One (1) set of rolled galvanized steel unistrut for weirs and baffles installation. The unistrut to be embedded by the General Contractor.
11. All hardware including anchor bolts are stainless steel type 304 or 18-8. At locations where graded bolts are required for structural reasons, material shall be zinc-plated steel.
12. One (1) portable electric hoist frame and manual winch shall be furnished to provide lifting capability of diffuser headers, clarifier scrapers, and scum pump.

D.O. Control: One (1) D.O. probe with mounting bracket and one (1) analyzer shall be provided for each aeration basin and digester basin.

Process Control Panel: A control panel capable of directing operation of components listed in this proposal shall be provided.

Aeration Basin Blowers and Accessories: Two (2) Rotary Positive Displacement Blowers (one as a standby) shall be provided. Each blower will be selected to deliver 260 SCFM at 7.65 PSIG. Each blower will be furnished complete with inlet filter, inlet silencer, discharge silencer, butterfly valve, check valve, pressure relief valve, base plate, V-belt with sheaves, and a 20 Hp, 1800 RPM, 460 volt, 3 ph, 60 hz, TEFC motor. Sound Enclosures are included.

Digester Basin Blowers and Accessories: Two (2) Rotary Positive Displacement Blowers (one as a standby) shall be provided. Each blower will be selected to deliver 158 SCFM at 8.55 PSIG. Each blower will be furnished complete with inlet filter, inlet silencer, discharge silencer, butterfly valve, check valve, pressure relief valve, base plate, V-belt with sheaves, and a 20 Hp, 1800 RPM, 460 volt, 3 ph, 60 hz, TEFC motor. Sound Enclosures are included.

Hardware: Anchor bolts, gaskets, and connecting hardware for mounting in-basin equipment supplied by Schreiber are included. Anchor bolts and connecting hardware shall be 18-8 SS.

Note: Hardware and gaskets at Schreiber/Contractor interfacing flanged connections are not included and shall be provided by the installing contractor.

CSR On-Site Service: Field service shall be provided for dry inspection, wet start up, O&M training. A total of three (3) trips / Nine (9) man days of service are included.

Additional service can be provided at Parkson's daily field service rates.

Submittals and O&M Manuals: Submittals and O&M Manuals shall be provided as required by the project specifications.

4. Cost Estimate and Terms

Budget price for equipment and services.....$615,500.00

Freight terms are FOB jobsite, offloading by others.

Taxes are not included.

Terms are 10% on Order, 15% on Submittal issuance, 75% on Shipment.

Approval drawings:	8-12 weeks after receipt of written order.*
Equipment Shipment:	18-22 weeks after complete release for manufacture.*

*Schedules will be verified at time of Order.

5. Clarifications / Exclusions

All motors, gear reducers, bearing housings, and valves are quoted with manufacturer's standard coatings. All other mild steel parts shall be hot dip galvanized following fabrication. No field painting is required.

Chemical feed equipment has not been included. Any requirements for addition of metal salts, carbon source, alkalinity, nutrients, or micronutrients shall be by others.

If blower sound enclosures are used, contractor shall be responsible for providing 120 volt power source if required.

This proposal is based on providing Schreiber's standard control program. Additional programming for other equipment or upgrades to standard hardware formats can be provided at additional cost. SCADA / PC graphics packages are available if not already included in this proposal.

Out of basin (including underground) air and liquid piping are not included.

Any electrical wiring, conduit, or junction boxes not expressly included in this proposal shall be by others.

Concrete grouting is not included.

Contractor/Owner shall be responsible for providing freeze protection.

All welding shall be per AWS standards only (ASME standards, if required, may result in additional cost).

MCC, VFD's, and motor starters are by others.

6. Supplemental Information and References (Attachments)

Design Calculations

SCHREIBER®
Pure Ingenuity

Technical Solution Calculations
for

SK&M

Perry, MO
0.12 MG Dplant
(1) Aeration/Clarifier
(1) Digester/Clarifier

Prepared For
Drew Hess

Representative
Municipal Equipment

May 04, 2022

SCHREIBER
Pure Ingenuity

SK&M

Flows Given or Assumed

	Average Flow			Peak Daily Flow	
	MGD	gpm		MGD	gpm
Design Flow	**0.12**	**83**	**Ratio: 2.00**	**0.24**	**167**
Equipment					
Bar Screen	--	--		--	--
Fine Screen	--	--		--	--
Washer Compactor	--				
Grit & Grease	--	--		--	--
Aeration GR - AOR	**0.12**	**83**		0.24	167
Aeration GRO - AOR	--	--		--	--
Digester	**0.12**	**83**		0.24	167
Clarifier	--	--		--	--
Fuzzy Filter				--	--
RAS		--			
Open Flight		--			
Tube Pump		--			

This Technical Solutions Calculation Basis of Design has been prepared exclusively for the convenience of the design engineer. The design parameters used have been obtained from other sources. Schreiber assumes no responsibility for the accuracy of the design parameters.

The design engineer is responsible for the final facility design. Schreiber LLC's sole function is to supply equipment based upon the final facility design.

SCHREIBER CSR
CONTINUOUSLY SEQUENCING REACTOR

Aeration

Flows

			Aeration & Clarifiers
Average Daily Flow	ADF	MGD	0.12
Peak Flow	PDF	MGD	0.24

Site Conditions

			Aeration & Clarifiers
Wastewater Temperature	T	°C	20
Site Elevation		feet	500
Dissolved Oxygen	DO	mg/L	2.00
Air Temperature		°F	110
Vapor Pressure @ T		psi	1.275
Relative Humidity	RH		80%

BOD

			Aeration & Clarifiers
BOD Influent	BOD_{Inf}	mg/L	225
BOD Influent		PPD	225
BOD Effluent Limit	BOD_{Eff}	mg/L	30
Pounds of Oxygen required per pound BOD		# O2/#BOD	1.5
Assumed Volatile Portion of Solids	%VSS		68%
TSS Influent	TSS_{Inf}	mg/L	225
TSS Effluent	TSS_{Eff}	mg/L	30

Nitrogen

			Aeration & Clarifiers
TKN Influent	TKN_{Inf}	mg/L	45
TKN Effluent	TKN_{Eff}	mg/L	2.6
TKN Removed = Nitrate (NO3) Produced	TKN_{Rem}	mg/L	42.4
Influent Nitrates & Nitrites	$NO3_{Inf}$	mg/L	0.0
Total Nitrogen Influent	TN_{Inf}	mg/L	45.0
Organic N Influent	$Org\ N_{Inf}$	mg/L	35.0
Organic N Effluent	$Org\ N_{Eff}$	mg/L	2.0
Ammonia Influent	$NH3_{Inf}$	mg/L	44.0
Ammonia Effluent	$NH3_{Eff}$	mg/L	0.6

Nitrates Produced by Nitrification	NO3 prod by N	mg/L	42.40
Total Nitrates Loading	$NO3_{Load}$	mg/L	42.40
Nitrates Removed	$NO3_{Rem}$	mg/L	0.00
Carbon Ratio	$BOD:NO3_{Rem}$		NA
Nitrates Effluent	$NO3_{Eff}$	mg/L	42.40
Total Nitrogen Effluent	TN_{Eff}	mg/L	45.00

Reactor Design

Volume & Suspended Solids

			Aeration & Clarifiers
Food:Mass Ratio	F:M		0.070
Mixed Liquor Suspended Solids	MLSS	mg/L	4,000
Mixed Liquor Volatile Suspended Solids	MLVSS	mg/L	2,720
Total Process Volume Required	$Vol_{(process)}$	MG	0.14
Pounds of Mixed Liquor Volatile Suspended Solids	#MLVSS	pounds	3,217

SCHREIBER CSR
CONTINUOUSLY SEQUENCING REACTOR

Nitrification Kinetics

			Aeration & Clarifiers
Maximum specific growth rate of Nitrifiers @ 15°C	μ_N, max	g NVSS / g NVSS-day	0.45
Nitrifier Yield Coefficient	a_N	g NVSS/ g NH3	0.15
Half-Saturation Coefficient for Nitrogen	K_N	mg/L	0.50
Half-Saturation Coefficient for Oxygen	K_O	mg/L	0.30
Heterotrophs yield coefficient	a	g VSS / g BOD	0.55
Maximum Specific Growth Rate of Nitrifiers @ T	μ_N, max @ T	g NVSS / g NVSS-day	0.735
Specific Growth Rate of Nitrifiers	μ_N	g NVSS / g NVSS-day	0.348
Specific Rate of Nitrification	q_N	g NH3 / g NVSS - day	2.323
Fraction of nitrifying organisms	F_N		0.0560
Nitrification Rate	R_N	mg/L NH3 rem / day	353.67
Specific Nitrification Rate, # NH3 / #MLVSS - d	SNR_d	# NH3 / # MLVSS - day	0.1300
Specific Nitrification Rate, # NH3 / #MLVSS - hr @ T	SNR	# NH3 / #MLVSS - hour @ T°C	0.0054

Denitrification Kinetics

			Aeration & Clarifiers
Specific Denitrification Rate per day at 20°C	$SDNR_d$	# NO3/# MLVSS - Day @ 20°C	0.03110
Specific Denitrification Rate per hour @ 20°C	SDNR @20°	# NO3/# MLVSS - Hour @ 20°	0.00130
Specific Denitrification Rate per hour @ T°C	SDNR	# NO3/# MLVSS - Hour @ T°C	0.00130

Process Phase Times

Oxic Time (Aerobic/Nitrification/"N" time)

			Aeration & Clarifiers
BOD Reduction: NH3 Reduction Ratio			8
Specific BOD Reduction Rate @T°C	SBRR	#BOD / #MLVSS-hr	0.043
Time for Total BOD Reduction	T_{TBOD}	hours per day	1.40
Time for Soluble BOD Reduction	T_{SBOD}	hours per day	0.52
Time for Nitrification	T_N	hours per day	2.43
Minimum Oxic (Aerobic) Time Required	T_{omin}	hours per day	2.43
Percent Oxic (Aerobic) Time In CSR	$\%T_{oxic}$		67%
Design Blower Operating Hours per day		hours per day	16.08

Anoxic Time (Denitrification/"DN" Time)

Required Time for Anoxic(Denitrification)	T_{DN}	hours per day	0.00

Calculate Combination times

Combined Oxic(N) + Anoxic(DN) Reaction Time	$T_{Omin+DN}$	hours	2.43

SCHREIBER CSR
CONTINUOUSLY SEQUENCING REACTOR

Air Calculations

Actual Oxygen Required (AOR)

			Aeration & Clarifiers
Oxygen required in PPD	O2 reqd	PPD	488
Oxygen Recovery via Denitrification		PPD	-
Allowed Oxygen Recovery via DN	$O2_{Rec}$	PPD	-
Actual Oxygen Required in PPD	AOR	PPD	488

Standard Oxygen Transfer Rate

Saturation Concentration (C*∞20)	C*∞20	mg/L	10.50
Select Alpha	α		0.70
Aged Diffusers Factor	F		0.99
Theta	Θ		1.024
Standard Pressure	Ps	psia	14.696
Site Pressure	Pb	psia	14.460
Pressure Correction	Ω		0.984
Oxygen Saturation @ 20°C	C^*_{s20}	mg/L	9.09
Oxygen Saturation @ T	C^*_T	mg/L	9.09
Oxygen Saturation Correction	τ		1.00
Beta	β		0.95
Standard Oxygen Transfer Rate lbs/day	SOTR	lbs/day	946
Standard Oxygen Transfer Rate lbs/hour	SOR	lbs/hour	59

SOR to AOR Ratio

Calculated SOR/AOR ratio			1.94
Selected SOR/AOR ratio for Design			1.94
SOR from AOR using (SOR:AOR ratio)		# O2/Day	946

Process Control

Process Monitoring

			Aeration & Clarifiers
Dissolved Oxygen Monitoring	DO		Yes
Nitrate Monitoring	N		no
Ammonia Monitoring	A		no

SCHREIBER CSR
CONTINUOUSLY SEQUENCING REACTOR

Aeration GR

GR Aeration

GR

			Aeration & Clarifiers
Number of GR Aeration/Clarifier Basins		basins	1
GR Aeration SWD		feet	14.00

CSR Volume and Diameter

Total GR CSR Volume Required (Vol(process) - Vol(DNB))		million gallons	0.14
GR Process Volume per Basin, MG		million gallons	0.14
GR Process Volume per Basin, CF		cubic feet	18,958
GR Aeration Basin Diameter		feet	48.00
GR Channel Width		feet	12.75
Total CSR Volume		million gallons	0.15

Volumetric Loading

GR Volumetric Loading		# BOD /per day/ 1,000 CF	11.39

Maximum Cycle Times, (MCTs)

Max "Air On" Cycle Time	T_{ONmax}	hours	14.79
Max "Air Off" Cycle Time	$T_{OFFcycle}$	hours	7.28
Max Cycle Time	T_{CYmax}	hours	22.07

GR Clarifier

GR Clarifier

Clarifier Model			GR
Number of Clarifier Duty Units			2
Underflow Concentration - MLSS			10,000

Minimum Clarifier Surface Area

Minimum Clarifier Diameter		feet	15.79
GR Clarifier Inner Diameter		feet	20.00

Surface Settling Rate

Surface Settling Rate @ Qav		gal/day/sq. ft.	191
Surface Settling Rate @ Qpk		gal/day/sq. ft.	382

Solids Loading Rate

Average RAS Flow		MGD	0.08

Clarifier Depth

Clarifier Depth = 1 ft less than Aeration Depth		feet	13
Actual Clarifier Depth Desired (SWD) >12'		feet	13

SCHREIBER CSR
CONTINUOUSLY SEQUENCING REACTOR

GR Blower Air Requirements

Transfer Efficiency of deepest diffusers

			Aeration & Clarifiers
Height of deepest diffuser off bottom		feet	0.67
Diffuser submergence		feet	13.33
O2 transfer, %/Meter			5.30%
Net Transfer Efficiency			21.53%

Discharge Pressure

Minimum Blower Discharge Pressure		psi	7.65
Blower Design Pressure		psi	8.80

Air required - SCFM, ICFM, Ratio

GR SCFM Required		SCFM	260
Site Elevation		feet	500
Inlet Pressure = Pa - Pv*RH		psi	13.440
ICFM Required @ Site Conditions:		ICFM	307

Horsepower of Blowers

Operating Horsepower of Blowers		HP	14.70
Design Horsepower of Blowers		HP	16.58

GR Diffusers Required

Diffusers Required

			Aeration & Clarifiers
GR air flow rate thru diffuser		scfm/lf	1.50

Rotating Headers

Rotating diffusers per GR basin		diffusers	84
Linear feet of rotating diffusers per GR basin		linear feet	210
GR rotating diffuser submergence		feet	13.33

Total Diffusers for System

Total linear feet of diffusers for system		linear feet	210
GR diffuser loading at design		SCFM/LF	1.24
GR average net transfer, %			21.54%
GR weighted transfer efficiency			5.30%

GR Blower Arrangement

Number of Blowers

			Aeration & Clarifiers
Number of operating blowers for rotating diffusers			1
Number of standby blowers			1
Total number of blowers			2

Blowers for Rotating Headers

Selected rotating blower capacity in SCFM		SCFM	260
Selected rotating blower capacity in ICFM		ICFM	307

Blower Model

Schreiber blower model designation		Model	Aerzen 10S
Motor HP of selected blower model		HP	20.0
Operating BHP of selected blower model		HP	16.0
Includes enclosure(s)			yes
BHP of selected model for aged diffuser			0.0

Diffuser Loading

Actual GR rotating diffuser loading		SCFM/LF	1.24

SCHREIBER CSR
CONTINUOUSLY SEQUENCING REACTOR

GR Aeration/Clarifier Mechanical & Structural

Mechanical Details			Aeration & Clarifiers
Type GR Bridge			U450
Materials of Construction			Carbon Steel

Motors

Aeration Bridge Drive Motor Horsepower		hp	2.00
Aeration Bridge Drive Operating Horsepower		hp	1.50
Clarifier Beam Drive Motor Horsepower		hp	0.20
Clarifier Beam Drive Operating Horsepower		hp	0.16

Structural/Concrete

Floor Slab Thickness		feet	1.25
GR Freeboard		feet	2.00
GR Wall Height		feet	16.00
GR Aeration Wall Thickness		feet	1.25
GR Clarifier Wall Thickness		feet	1.25
Total Cubic Yards of Concrete		cubic yards	262

GR Aeration/Clarifier Options

Optional Epoxy Coated			No
Optional Electric Drill			Yes
Optional Manifold Header			No
Optional Fabricated Skirt			No
Optional Launder Brush			No
Optional Scum Trough			No

SCHREIBER CSR
CONTINUOUSLY SEQUENCING REACTOR

Digester with Inner Clarifier

Waste Sludge Removal

Biological Production:

BOD Production		68	PPD
NH3 Production		4	PPD
Total Biological Production		72	PPD

Inerts:

Sludge Produced from Inerts		90	PPD

Chemical: (Ignoring Bio P Removal)

FePO4 Sludge produced = P x 151/31	34	PPD
Fe(OH)3 Sludge Produced by Excess	6	PPD
Total Chemical Sludge Produced	40	PPD

Inventory Reduction Allowance

Percent Inventory Reduction Allowance	2%	
Inventory Reduction Allowance	64	PPD

Solids Design Basis

Design Solids Loading (Wasting, Digestion/Storage, Thickeni	266	PPD
Normal Solids Operations (excluding inventory reduction)	202	PPD

WAS Pumping

Assume underflow of		8,000	mg/l
Normal wasting on 24 hour basis		2	GPM
Max wasting on 24 hour basis		3	GPM
Capacity to waste max in 8 hours		8	GPM
Number of WAS Pumps		2	
WAS pumping capacity of:		8	GPM/Each

SCHREIBER CSR
CONTINUOUSLY SEQUENCING REACTOR

Digester with Inner Clarifier

Sludge Handling

SRT (Theta) = 1200/ Temp.		100	Days
SRT (Theta) Used		100	Days
Number Degree Days		1,200	Degree-Days
Est. VSS reduction		45%	
Q, Normal		0.003	MGD
Q, Design		0.004	MGD
Kd		0.06	@ 12 Deg C
Volatile Fraction , Pv @ Normal Operation		0.35	
Volatile Fraction , Pv @ Design		0.46	
Assume :			
MLSS		16,000	mg/l
Underflow, Conc., Xu		30,080	mg/l
Influent Conc., Xi		8,000	mg/l

Digester Volume = Q x (Xi) / (MLSS x (Kd x Pv + 1/ Theta))

Digester Volume @ Normal Operation		0.048	MG
Digester Volume @ Design		0.053	MG

Use concentric circular arrangement with outer digester and inner clarifier

Number of Units		1	Units

Clarifier - see aeration for additional information

Diameter		20	ft.

Digester/Holding Tank

Digester/Holding Tank & Thickener SWD		14	ft.
Digester/Holding Tank Diameter		48.0	ft.
Channel Width		13.0	ft.

SCHREIBER CSR
CONTINUOUSLY SEQUENCING REACTOR

Digester with Inner Clarifier

Oxygen Required @ 2.3 # O2 / # VSS Reduced

Total Design Solids :		266	PPD
Volatile Portion :		0.46	
Est. % reduction :		45%	
VSS Reduced :		55	PPD
O2 Required (AOR) :		127	PPD

Blower Sizing

Transfer Efficiency @	5.30%	/Meter =	21.54%
Vol. Air (AOR)		23.45	SCFM
SOR/AOR		4.50	
SOR		106	SCFM
ICFM/SCFM		1.090	
ICFM Required		115	ICFM

Discharge Pressure Required :

Static Pressure		5.80	PSI
Diffuser Loss		1.00	PSI
Piping Loss		0.75	PSI
Allowance for future fouling		1.00	PSI
Total Pressure, Minimum		8.55	PSI

Blower Model:

Number of Duty Blowers		1	
Number of Standby Blowers		1	
Total Number of Blowers		2	
Aerzen		10S	
Blower ICFM		173	ICFM
Blower Speed		2796	RPM
Blower HP		20	HP

SK&M Water and Sewer Co. WWTF - Schreiber Continuously Sequencing Reactor

Construction Item	Quantity	Unit	Unit Price	Total Price	
Headworks					
A. Manual coarse bar screen	1	EA	$ 10,000	$ 10,000	
B. Parshall flume	1	EA	$ 7,950	$ 7,950	
C. Ultrasonic flow meter	1	EA	$ 4,496	$ 4,496	
D. Piping	1	LS	$ 5,000	$ 5,000	
E. Headworks structure	1	LS	$ 15,000	$ 15,000	
F. Electrical	1	LS	$ 5,000	$ 5,000	
				Headworks Sub-total	$ 47,446
Schreiber Equipment Package					
A. Center Pivot Bearing Assembly	1	LS			
B. U-Profile Bridge	1	LS			
C. 2.0 HP Aeration Drive with 18" dia Wheel	1	LS			
D. Proximity Switch	1	EA			
E. Single Arm Rotating Aeration Assembly	2	EA			
F. SchreiberFlex Membrane Diffuser Tube	210	LF			
G. Emergency Stop Switch	1	EA			
H. Clarifier Peripheral Drive with 0.25 HP Gear Motor	1	LS			
I. Clarifier Scum Removal System	1	LS			
J. Clarifier Stall Alarm Switch	1	EA			
K. FRP Weirs and Baffles Set	1	LS			
L. Weirs and Baffles Unistrut Installation	1	LS			
M. Portable Electric Hoist Frame & Manual Winch	1	EA			
N. Dissolved Oxygen Probe & Analyzer	1	LS			
O. Process Control Panel	1	LS			
P. Digester Rotary Positive Displacement Blowers	2	LS			
Q. Schreiber Installation/Startup Supervision	1	LS		$ 615,500	
R. Installation	1	LS	$ 40,000	$ 40,000	
				Schreiber Equipment Package Sub-Total	$ 655,500
Schreiber CSR GR & Digester/Clarifier Structures					
A. Piping	1	LS	$ 50,000	$ 50,000	
B. Concrete Structure [4B' dia, 14' SWD with 20' inner clarifier]	2	LS	$ 200,000	$ 400,000	
				Schreiber Structures Sub-Total	$ 450,000
Disinfection					
A. Enaqua M4 Ultraviolet Disinfection	1	LS	$ 16,000	$ 16,000	
B. Disinfection Structure	1	EA	$ 20,000	$ 15,000	
C. Control Panel & Electrical	1	EA	$ 5,000	$ 5,000	
D. Piping	1	LS	$ 5,000	$ 5,000	
E. Installation	1	LS	$ 10,000	$ 10,000	
				Disinfection Sub-Total	$ 51,000
Emergency Operations					
A. Onsite Generator	1	LS	$ 75,000	$ 75,000	
				Emergency Operations Sub-Total	$ 75,000
Sitework & Startup					
A. Electrical Service and Installation	1	LS	$ 75,000	$ 75,000	
B. Site Restoration	1	LS	$ 10,000	$ 10,000	
C. Mobilization/Demobilization	1	LS	$ 20,000	$ 20,000	
D. Startup	1	LS	$ 7,500	$ 7,500	
				Sitework & Startup Sub-Total	$ 112,500
			WWTF Improvements Subtotal		**$ 1,392,000**

TOTAL ESTIMATED CONSTRUCTION COST		**$ 1,392,000**
Engineering (design and construction)	10.00%	$ 139,200
Engineering (resident inspection)	5.00%	$ 70,000
Contingency	10.00%	$ 140,000
TOTAL ESTIMATED PROJECT COSTS		**$ 1,742,000**

Note:

The quantities estimate is based on a preliminary, ***not final***, design of the proposed project. The final quantities may vary based on detailed information developed during the final design of the project.

This preliminary cost estimate is based on recent bids submitted for similar projects. Actual costs may vary depending on Contractor methods, sources of project funding, modification to the project by review agencies or Client after the date of the estimate, market conditions, when the project is bid or the length of time since the estimate was prepared.

Appendix I. Triplepoint Environmental NitrOx®.

NitrOx® Basis of Design

Date: 05-04-2022
Project Name: Strickland Engineering, MO
Project Number: 6484

The NitrOx® Process

The patented NitrOx Process was developed based on the principle that nitrification will reliably occur when the proper conditions are created. For wastewater lagoon systems that receive primarily domestic waste, the critical conditions required for nitrification include:

- **CBOD** of 20–30 mg/L
- **Dissolved Oxygen** of 4.6 lb/O2 per pound of NH3-N (Metcalf & Eddy)
- **Sufficient population of Nitrifying bacteria**
- Given sufficient Nitrifying bacteria, a **water temperature of 4–5° C**

The NitrOx Process utilizes the existing lagoon infrastructure for 90% BOD removal, after which nitrifying bacteria begin to nitrify. The effluent from the lagoons then flows hydraulically or is pumped into a two-stage nitrification reactor. In colder climates where the winter water temperature drops below 4° C, a thermal regulation heat exchanger is added in order to increase the water temperature; typically, only a few degrees during the coldest months of the year. In the two NitrOx Reactor cells, there are millions of individual biofilm carriers that provide a habitat for nitrifying bacteria, ensuring that there are sufficient nitrifying bacteria even in the coldest water conditions. Each NitrOx Reactor cell has aeration to provide the necessary oxygen, as well as to create a complete mix environment to keep the biofilm carriers in constant motion. The two cells are covered with floating insulated covers to mitigate heat loss and the media is kept in the tanks with stainless steel sieves. Finally, the effluent from the second NitrOx Reactor is discharged into a final polishing/clarification lagoon prior to the ultimate discharge from the lagoon system.

NitrOx LAGOON AMMONIA REMOVAL

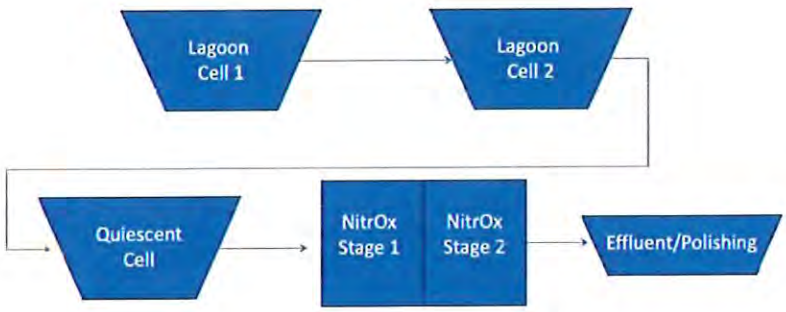


Figure 1: Typical flow process of the NitrOx Lagoon Ammonia Removal Process.
*Note that other configurations are possible.

	SUMMARY - Design Input Values		
	Plant Influent Characteristics	**Units**	**Values**
1	Annual Average Daily Flow	gpd	120,000
2	Maximum Monthly Average Daily Flow	gpd	120,000
3	Peak Daily Flow	gpd	240,000
4	Peak Hourly Flow	gpd	480,000
5	Influent BOD	mg/L	408
6	Influent BOD	lbs/day	408.0
7	Influent TSS	mg/L	480
8	Influent TSS	lbs/day	480.0
9	Influent NH3-N	mg/L	81.3
10	Influent NH3-N	lbs/day	81.4
11	Influent TKN	mg/L	86.3
12	Influent TKN	lbs/day	86.4
13	Influent pH		7
14	Water Temperature	deg-C	12
	NitrOx Influent Characteristics	**Units**	**Values**
15	Annual Average Daily Flow	gpd	120,000
16	Maximum Monthly Average Daily Flow	gpd	120,000
17	Peak Daily Flow	gpd	240,000
18	Peak Hourly Flow	gpd	480,000
19	Influent BOD	mg/L	408
20	Influent TSS	mg/L	480
21	Influent NH3-N	mg/L	81.3
22	Influent TKN	mg/L	86.3
23	Design Influent TKN	mg/L	86.3
A4	Alkalinity Required as CaCO3 (Minumum)	mg/L	691
24	Influent pH		7
25	NitrOx Water Temperature	deg-C	5
	SUMMARY - General Design Parameters		
	NitrOx Tank Sizing Summary	**Units**	**Values**
26	Number of Treatment Trains Proposed		1
27	Number of Tanks Per Train		3
28	Total Number of Tanks		3
29	Length of Each	ft	16.0
30	Width of Each	ft	8.0
31	Side Water Depth of Each	ft	16
32	Tank Height of Each	ft	19
33	Volume of Each	gallons	15,319
34	Volume Total	gallons	45,957
35	Hydraulic Retention Time at Max Month Flow	hours	9.2
36	Hydraulic Retention Time at Peak Hourly Flow	hours	2.3
40	Number of Ares Units per Tank		2
41	Total Number of Ares Units		6

	NitrOx Air Requirement (Per Treatment Train)	Stage 1	Stage 2
42	AOR (lbs/day)	606	162
43	Assumed Diffuser Subm. at AWL (ft.)	15.25	15.25
44	Elevation (ft.)	1,100	1,100
45	Alpha	0.60	0.60
46	Beta	0.9	0.9
47	Target DO Residual (MBBR Process) (mg/L)	3.0	5.0
48	SOR (lbs/day)	1,672	635
49	Target Diffuser Efficiency/ft. Submergence	1.5	1.5
50	**Airflow (scfm)**	**282**	**107**

	NitrOx Blower Requirement Summary	Units	Values
51	No. of Blowers		2
52	Airflow Requirement per Blower	scfm	495
53	Airflow per 1,000 scfm	scfm/1,000 cf	81
54	Water Pressure at Air Release Depth	psig	6.60
55	Piping and Diffuser Losses	psig	0.50
56	Cushion	psig	1.00
57	**Maximum Design Discharge Pressure**	**psig**	**8.10**
58	Assumed Overall Efficiency		0.62
59	Approximate BHP Requirement/Blower	bhp	27.4
60	Approximate BHP Requirement Total	bhp	27.4
61	Estimated Nameplate HP / Blower	hp	40
62	Blower Type		Tri-Lobe PD

SUMMARY - Calculated Output Values

	NitrOx Effluent Parameters	Units	Values
63	Effluent SCBOD	mg/L	7.5
64	Effluent SCBOD	lbs/day	7.5
65	Effluent NH3-N in Winter (Monthly Average)	mg/L	2.1
66	Effluent NH3-N in Winter (Monthly Average)	lbs/day	2.1
67	Effluent NH3-N in Summer (Monthly Average)	mg/L	0.6
68	Effluent NH3-N in Summer (Monthly Average)	lbs/day	0.6

4. $FTE = \alpha\ (SOTE)\ \theta^{(T-20)}\ (\beta\ C^*_{\infty T} - DO) \div C^*_{\infty 20}$ *field transfer efficiency*

Where,

α	contaminant factor {contaminants, depth, bubble size} (range: 0.40–0.70)
β	TDS factor {total dissolved solids} (range: 0.90–1.00)
$\theta = 1.024$	temperature factor
DO	target dissolved oxygen level (mg/L)
$C^*_{\infty T}$	saturation oxygen concentration at site—adjusted for water depth
$C^*_{\infty 20}$	sat. oxygen concentration at STP conditions—adjusted for water depth
T	water temperature (Celsius)

NitrOx® Budgetary Quote

Date: 05-04-2022
Project Name: Strickland Engineering, MO
Project Number: 6484

QUOTE TO:

Drew Hess
Municipal Equipment Company, Inc.
Phone Number: (314) 203-1661
Email: dhess@munequip.com

PREPARED BY:

Ben Shakman
Triplepoint Environmental LLC
Phone Number: (314) 873-7141
Email: ben@lagoons.com

NITRIFICATION EQUIPMENT

NitrOx® Reactor System Equipment:

- Capable of heating and treating an average daily flow 120,000 GPD.
- Capable of handling an influent NH3-N up to 81.3 mg/L & BOD of 408.0 mg/L.
- Capable of producing an effluent NH3-N of 0.6 mg/L in summer and 2.1 mg/L in winter conditions.
- **Total Cost: $527,040.**

Standard Package	Quantity	Unit
MBBR Media	3	set
Estimated Duty Blower: Excelsior 30 HP	1	ea
Media Retention Sieves: Custom Welded	3	ea
Ares Aeration Units	6	ea
Integrated Electric Heating Unit	2	ea
Control Panel: NEMA 3R	1	ea
Insulated Tank Cover	459	sf
Estimated Redundant Blower	1	ea
Heavy Flex Tubing	200	ft
Manifold	2	ea
Ball Valves & Fittings	6	ea
Guiderails & Retrieval Chain	6	ea
Influent Duckbill	3	ea
Clarifier Weir	1	ea

NOT Included: Optional Items

Triplepoint Installation Supervision.....$2,500/day.*
Blower Startup & Training.....$2,000.
Blower Header System.....To Be Determined.
Shipping to Site.....To Be Determined.
Real-Time Monitoring: DO/Temperature Probe.....To Be Determined.
*Minimum (2) days.
NOTE: Due to supply-chain disruptions, pricing and lead-times are highly variable and subject to change. Triplepoint cannot guarantee pricing or delivery until a PO is issued.

TERMS & CONDITIONS

Scope of Supply

Triplepoint Environmental will supply all process expertise and equipment as part of this quote. The customer is responsible for the costs associated with the installation and infrastructure needed, including the concrete tanks, pumps (if required), operations building (as needed), and any influent/ effluent/connecting piping that may be necessary.

Payment Terms

The quote in this proposal remains valid for a period of 15 days. Fifty percent (50%) is due upon contract acceptance, forty percent (40%) is due upon offer to ship, and the final ten percent (10%) is due upon startup by Triplepoint's personnel. Any invoices past due 30 days will be charged a 1.5%/mo. late fee.

Material Cost Escalation

If at any time the cost of materials quoted here significantly increases, through no fault of Triplepoint, the price shall be equitably adjusted by an amount reasonably necessary to cover any such increase in the costs of materials. As used herein, a significant cost increase shall mean any increase in cost of materials exceeding 5% experienced by Triplepoint either before or after a PO is issued. Such increase in material costs may be documented by quotes, invoices, or receipts. Where the delivery of materials is delayed, through no fault of the contractor, as a result of the shortage or unavailability of the materials, contractor shall not be liable for any additional costs or damages associated with such delay(s).

Currency & Taxes

Unless otherwise noted, all quotes are in United States dollars. This price does not include local taxes and/or duty fees/taxes. Sales tax exception certificate must be submitted when applicable. All non-exempt taxes will be self-assessed and payable by the customer to the local tax authority.

Design Limitations

The preliminary design(s) presented in this document were calculated with information provided at the time of proposal request. The design is only as good as the information provided. If incorrect or incomplete data was provided, assumptions have been made in order to develop the finished design. Prior to product installation, design properties and considerations must be reviewed and validated by the purchasing parties.

Delivery

Equipment will be delivered within a period of ten (10) to twenty-four (24) weeks. Lead-time begins once items have been approved by owner or engineer of record. Unless otherwise specified, all packing and shipping costs are FOB ORIGINATION.

Installation Supervision

If included, a Triplepoint certified project manager will provide supervision of installation, inspection, testing, training and startup for a minimum of two (2) days during installation.

Force Majeure

Neither party will be liable for any default or delay in performing an obligation under this Agreement when caused by strike, riot, war, terrorism, Act of God, generalized lack of availability of raw materials or energy, or other similar circumstances beyond our control.

Limits of Liability
Triplepoint Environmental shall not be liable for any loss of profits, business, goodwill, interruption of business, nor for incidental or consequential merchantability or fitness of purpose damages related to this quote.

Warranty
Triplepoint Environmental warrants your NitrOx® products to be free from defects in material and workmanship for a period of five (5) years from the date of substantial project completion for municipal applications and a period of two (2) years from the date of substantial project completion for industrial applications. If a defect is discovered in any of the constituent components covered by this warranty, Triplepoint will repair at our option using new or refurbished components for equal or improved quality. If a suitable repair is not possible, the product will be replaced. All defective parts, assemblies, and products become the property of Triplepoint Environmental. Any soft costs incurred during a warranty claim, including costs associated with removing, shipping and re-installing a warranted component, shall be the responsibility of the customer. Warranty is voided in the event issues are caused due to excessive existing sludge and/or ragging which inhibit proper operation.

NitrOx Process Guarantee
Triplepoint Environmental guarantees your NitrOx process for a period of one (1) year from the date of substantial project completion. The guarantee assumes site conditions match design conditions and is voided in the event of excessive existing sludge and/or ragging which inhibit proper operation.

Thermal Regulation
The NitrOx® Reactor will achieve nitrification at water temperatures as low as 4°C. If the influent water temperature for the reactor is likely to dip below this level in the winter months, a thermal regulation system is necessary to regulate the water temperature in order to guarantee year-round nitrification.

Recommended Influent Screening
Due to the presence of sanitary wipes and/or other debris in influent collection systems, influent screening is highly recommended. Triplepoint has consistently found that aeration systems of all types collect rags, which ultimately prevent proper operation. Screening down to 1/4" min. is recommended.

Confidentiality Notice
The NitrOx processes are the subject of one or more confidential patents or patent applications filed in the United States Patent Office, and may be the subject of one or more confidential foreign patent applications. The customer and any other related parties contracted recognize the importance of maintaining the continued confidentiality of the design of the NitrOx processes. The customer and any other parties contracted all agree that they shall not sell, transfer, or disclose any such confidential information relating to the design of the NitrOx processes to any other person, organization, or corporation without the express written authorization of Triplepoint Environmental LLC and pursuant to an enforceable agreement of confidentiality, except as required by law or as necessary in connection with the use, operation, maintenance, repair, or replacement of the system. Additionally, the customer and any other parties contracted all agree to preserve the confidentiality of this proposal and all materials attached and not to distribute or copy such materials for any other parties not previously authorized by Triplepoint.

SK&M Water and Sewer Co. WWTF - Triplepoint Environmental NitrOx

Construction Item	Quantity	Unit	Unit Price	Total Price	
Headworks					
A. Manual coarse bar screen	1	EA	$ 10,000	$ 10,000	
B. Parshall flume	1	EA	$ 7,950	$ 7,950	
C. Ultrasonic flow meter	1	EA	$ 4,496	$ 4,496	
D. Piping	1	LS	$ 5,000	$ 5,000	
E. Headworks structure	1	LS	$ 15,000	$ 15,000	
F. Electrical	1	LS	$ 5,000	$ 5,000	
				Headworks Sub-total	$ 47,446
NitrOx Equipment Package					
A. MBBR Media	3	EA			
B. Media Retention Sieves: Custom Welded	3	EA			
C. Ares Units	6	EA			
D. Integrated Electric Heating Unit	2	EA			
E. Insulated Tank Cover	459	sf			
F. Heavy Flex Tubing	200	LF			
G. Manifold	2	EA			
H. Ball Valves & Fittings	6	EA			
I. Guiderails & Retrieval Chain	6	EA			
J. Influent Duckbill	3	EA			
K. Clarifier Weir Trough and Scum Baffle	1	EA			
L. Estimated Blower: Excelsior 30 HP	2	EA			
M. Control Panel: NEMA 3R	1	EA		$ $27,040.00	
N. Installation	1	LS	$ 40,000	$ 40,000	
				NitrOx Equipment Package Sub-Total	$ 567,040
NitrOx Structure					
A. Piping	1	LS	$ 25,000	$ 25,000	
B. Concrete Structure	1	LS	$ 100,000	$ 100,000	
				NitrOx Structure Sub-Total	$ 125,000
Clarifiers					
A. Piping	1	LS	$ 25,000	$ 25,000	
B. Concrete Structure	1	LS	$ 100,000	$ 200,000	
C. Installation	1	LS	$ 25,000	$ 25,000	
				Clarifiers Sub-Total	$ 250,000
Disinfection					
A. Enaqua M4 Ultraviolet Disinfection	1	LS	$ 16,000	$ 16,000	
B. Disinfection Structure	1	EA	$ 20,000	$ 15,000	
C. Control Panel & Electrical	1	EA	$ 5,000	$ 5,000	
D. Piping	1	LS	$ 5,000	$ 5,000	
E. Installation	1	LS	$ 10,000	$ 10,000	
				Disinfection Sub-Total	$ 51,000
Emergency Operations					
A. Onsite Generator	1	LS	$ 75,000	$ 75,000	
				Emergency Operations Sub-Total	$ 75,000
Sitework & Startup					
A. Electrical Service and Installation	1	LS	$ 75,000	$ 75,000	
B. Site Restoration	1	LS	$ 10,000	$ 10,000	
C. Mobilization/Demobilization	1	LS	$ 20,000	$ 20,000	
D. Startup	1	LS	$ 7,500	$ 7,500	
				Sitework & Startup Sub-Total	$ 112,500
			WWTF Improvements Subtotal		**$ 1,228,000**

TOTAL ESTIMATED CONSTRUCTION COST		**$ 1,228,000**
Engineering (design and construction)	10.00%	$ 122,800
Engineering (resident inspection)	5.00%	$ 62,000
Contingency	10.00%	$ 123,000
TOTAL ESTIMATED PROJECT COSTS		**$ 1,536,000**

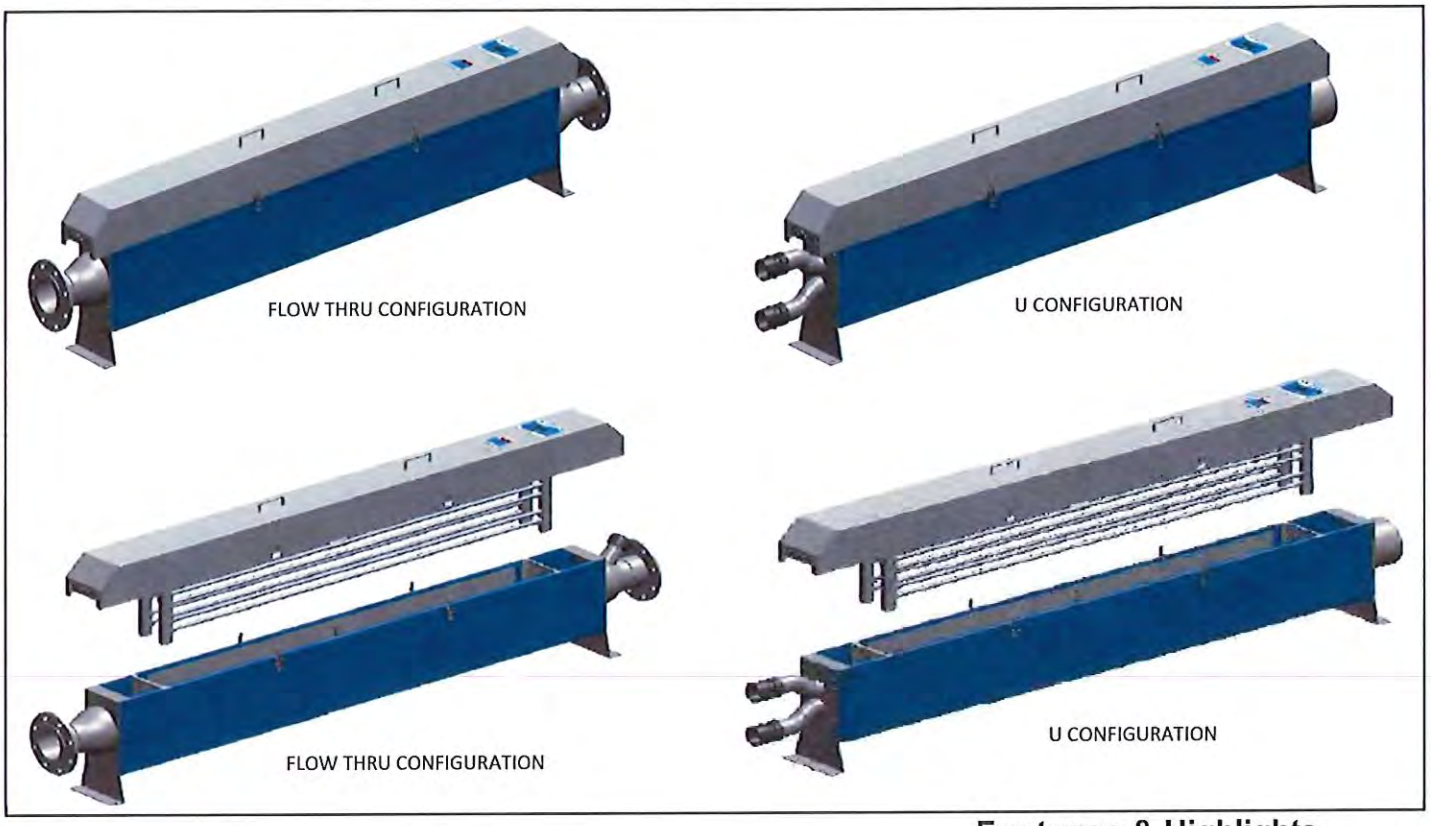
Note:

The quantities estimate is based on a preliminary, ***not final***, design of the proposed project. The final quantities may vary based on detailed information developed during the final design of the project.

This preliminary cost estimate is based on recent bids submitted for similar projects. Actual costs may vary depending on Contractor methods, sources of project funding, modification to the project by review agencies or Client after the date of the estimate, market conditions, when the project is bid or the length of time since the estimate was prepared.

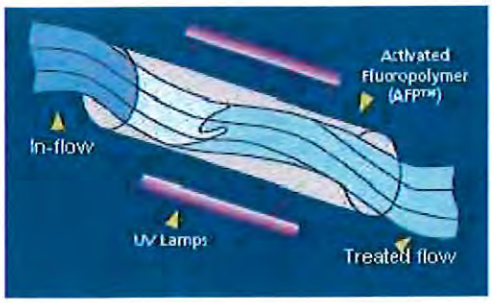
Appendix J. Ultraviolet Disinfection.

M-4 UV Disinfection system for Wastewater



The M-4 Series UV Reactors from Enaqua are the most practical and efficient UV disinfection systems for low and moderate flow wastewater treatment plants, small package plants, and Sequencing Batch Reactors (SBR's).

Each M-4 utilizes Enaqua's Non-Contact™ UV process which promotes superior, efficient disinfection. Using AFP™840 tubes and a unique plug flow design, you receive the maximum disinfection capability from the lamps, while the turbulent action of the water scours the inside of the tubes, keeping them free from scale build up.



With its compact size, the M-4 fits most Package Treatment plants designs and budgets. The M-4 is designed for flows up to 120 GPM and multiple units can be configured in Parallel or Series for higher flows.

Features & Highlights

- ☑ Flow up to 120 GPM per Unit at 65% UVT
- ☑ All wetted components constructed of 304 SS
- ☑ No Quartz Sleeves to foul
- ☑ Turbulent flow-self cleaning
- ☑ Air cooled lamps
- ☑ More consistent UV output
- ☑ Reduced maintenance
- ☑ Up to 24 On/Off cycles per day without damaging lamps & ballasts
- ☑ Dry lamp changes
- ☑ No special cleaning requirements or fixtures
- ☑ Lamp racks weigh less than 40 lbs.
- ☑ Quick Disconnect lamp racks
- ☑ Remote start via dry contacts

ENAQUA™
A GRUNDFOS INNOVATION COMPANY

TYPICAL SPECIFICATIONS:

Disinfection capacity	Up to 120 GPM @ 65% UVT
Connection	4.0" Θ Flange (100 mm)
Housing	Corrosion Resistant Alloy
Dimensions	97" x 21.5" x 7.5"
Lamp Type	145 W LPHO Non Amalgam
Number of lamps	8
Ballast design	Electronic
Removable lamp rack	Yes
UV Sensor	Yes
Lamp life detection	Yes
Controls#	Menu driven LCD Display
Remote Start Capability	Yes
Alarm Outputs^	1/1
Operating Pressure*	< 40.0 psig (2.76 bar)
Operating Voltage	120/240 Volts
Operating Current	12 Amps (max)@ 120 V 1PH

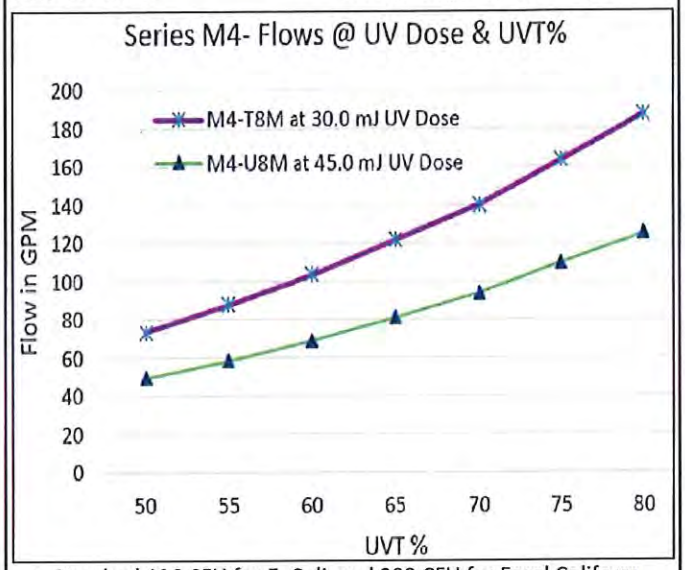
* Up to 80 psig systems available upon request

^ One UV Status (On/Off), one master alarm output

MODBUS TCP/IP compatible controller available upon request

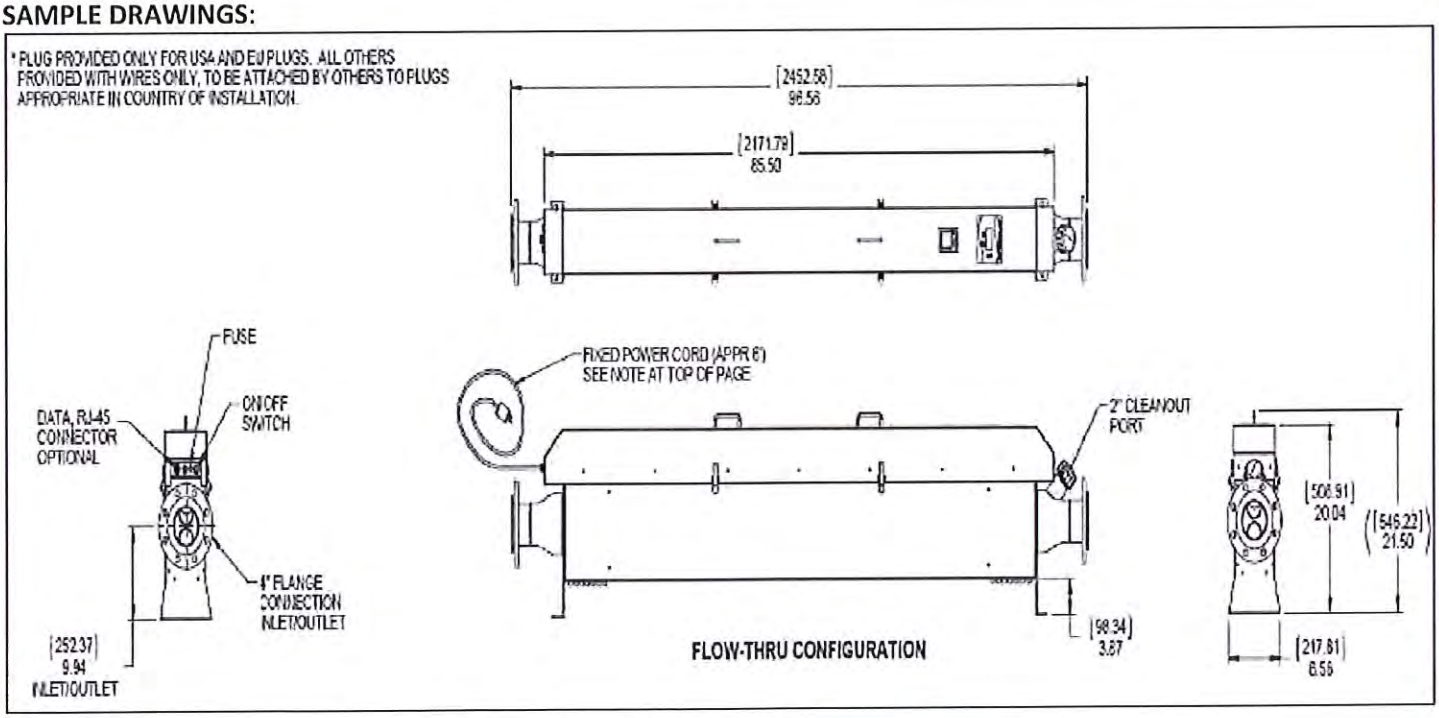
For a typical Waste Water Treatment process effluent:

UVT:	>65.0(%)
TSS:	<30.0 (mg/L)
UV Dosage Requirement:	30.0 (mJ/cm2)
Influent Limit:	≤200,000 (CFU/100 mL)
Effluent Limit:	≤126/200(CFU/100 mL)+



+: Standard 126 CFU for E. Coli, and 200 CFU for Fecal Coliform

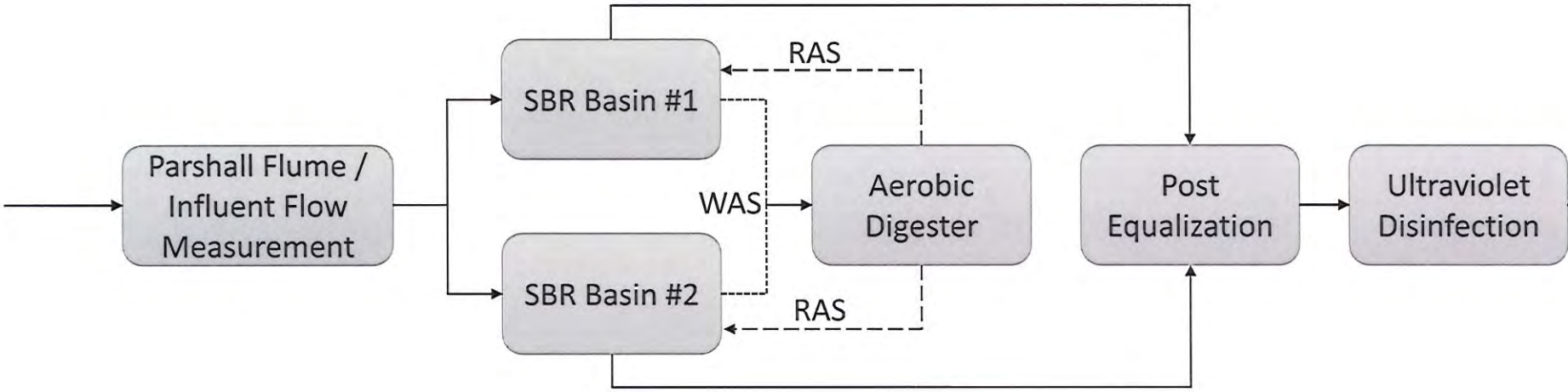
SAMPLE DRAWINGS:



For more information, visit our website at www.enaqua.com
All values are nominal; specifications subject to change without notice.

Enaqua, a Grundfos Innovation Company
2410 Birch Street
Vista, CA 92081 (USA)
Phone: (760) 599-2644
Fax: (760) 599-2642
Info@enaqua.com

Appendix K. Wastewater System Recommendations.


Parshall Flume / Influent Flow Measurement
SBR Basin #1
SBR Basin #2
RAS
RAS
WAS
Aerobic Digester
Post Equalization
Ultraviolet Disinfection

Appendix L. PSC User Rate Agreement.

NON-UNANIMOUS AGREEMENT REGARDING DISPOSITION OF SMALL UTILITY COMPANY REVENUE INCREASE REQUEST

S. K. & M. WATER AND SEWER COMPANY

MO PSC FILE NO. SR-2019-0157

BACKGROUND

S. K. & M. Water and Sewer Company ("Company") initiated the small company revenue increase request ("Request") for water and sewer service that is the subject of the above-referenced Missouri Public Service Commission ("Commission") File Number by submitting a letter to the Secretary of the Commission in accordance with the provisions of Commission Rule 4 CSR 240-3.050, Small Utility Rate Case Procedure ("Small Company Procedure"). In its request letter, which was received at the Commission's offices on November 27, 2018, the Company set forth its request for an increase of $200,000 in its annual water service operating revenues and $100,000 in annual sewer revenues. The Company also acknowledged that the design of its customer rates, its service charges, its customer service practices, its general business practices and its general tariff provisions would be reviewed during the Commission Staff's ("Staff") review of the revenue increase request, and could thus be the subject of Staff's recommendations. The Company is located in one residential area southwest of Perryville, Missouri, providing service to approximately 302 water customers and 156 sewer customers. As explained in the attached documentation, the annualized number of customers for the test year is 284 water customersand 158 sewer customers. All but one of these customers is residential.

Pursuant to the provisions of the Staff Assisted Rate Case Procedure[1] and related internal operating procedures, Staff initiated an audit of the Company's books and records, a review of the Company's customer service and general business practices, a review of the Company's existing tariff, an inspection of the Company's facilities and a review of the Company's operation of its facilities. (These activities are collectively referred to hereinafter as Staff's "investigation" of the Company's Request.)

Upon completion of its investigation of the Company's Request, Staff provided the Company and the Office of the Public Counsel ("Public Counsel") information regarding Staff's

[1] Commission Rule 4 CSR 240-10.075

investigation and the results of the investigation, including Staff's initial recommendations for resolution of the Company's Request.

RESOLUTION OF THE COMPANY'S RATE INCREASE REQUEST

Pursuant to negotiations held subsequent to the Company's receipt of the above-referenced information regarding Staff's investigation of the Company's request, Staff and the Company hereby state the following agreements:

(1) The agreed upon revenue requirement increase for water of $13,280 (13% increase) added to the level of previous revenues of $105,822 results in overall annual revenues of $119,102. The agreed upon revenue requirement increase for Sewer of $15,598 (24% increase) added to the level of previous revenues of $65,460 results in overall annual revenues of $81,058. This revenue requirement is just and reasonable and designed to recover the Company's cost of service. These amounts are shown on the ratemaking income statements found in Attachment A, incorporated by reference herein;

(2) The above increases are in addition to revenue received from the previously approved Emergency Rates. The Emergency Rates for both water and sewer will be eliminated upon Commission approval of replacement tariffs associated with this agreement.

(3) Staff's Auditing Department conducted a full and complete audit of the Company's books and records using the 12-month period ended December 31, 2018, as the basis for the revenue requirement determined above. The audit findings can be found in Attachment B, incorporated by reference herein;

(4) The agreed upon net rate base for sewer is $880 as of January 1, 2019. The agreed upon net rate base for water $55,892. The development of this amount is shown on the rate base worksheet that is found in Attachment C, incorporated by reference herein. This amount is included in the audit work papers in the ultimate determination of the revenue requirement shown in (1) above;

(5) Included in Attachment B is the agreed upon capital structure which includes 25% common equity and 75% long-term debt. Return on Equity is 11.53%, with a cost of debt of 6%. After-tax Rate of Return is 8.37%;

(6) The schedule of depreciation rates in Attachment D, incorporated by reference herein, includes the depreciation rates used by Staff in its revenue requirement analysis and shall be the prescribed schedule of water and sewer plant depreciation rates for the Company;

(7) To allow the Company the opportunity to collect the revenue requirement agreed to in (1) above, the rates as shown on Attachment E, incorporated by reference herein, are just and reasonable rates that the Company will be allowed to charge its customers. The impact of these rates will be as shown on Attachment F, also attached and incorporated by reference herein;

(8) For the purposes of implementing the agreements set out in this disposition agreement, the Company will file with the Commission, proposed tariff revisions containing the rates, charges, and language set out in the example tariff sheets attached as Attachment G. The proposed tariff revisions will bear an effective date of May 31, 2019;

(9) The current PSC MO No. 1 tariff will be cancelled and replaced by PSC MO No. 4, which is included in the example tariff described above. The current PSC MO No. 3 tariff will be cancelled and replaced by PSC MO No. 5;

(10) The Company agrees to implement the recommendations contained in the Auditing Department Report, attached hereto as Attachment B and incorporated by reference herein, and provide proof of implementing the recommendations to the Manager of the Commission's Auditing Unit:

(a) Within ninety (90) days of an order approving this Disposition Agreement, the Company will:

1. Adjust the Company general ledger used for regulatory ratemaking purposes to agree with the plant and depreciation reserve account balances that are shown in the Staff/Company Disposition Agreement for this rate case;
2. Modify its timesheets in the following manner: (1) add a new category named "Inst/Rep/Maint – **Sewer**" so the Company can appropriately split the installation, repair, and maintenance hours between the water and sewer operations; and (2) add a category on timesheets to record any time spent on new construction, split out between water and sewer;

3. Comply with the requirements of the NARUC Uniform System of Accounts ("USOA"), including its guidelines for the recording of cost of removal and gross salvage in the Company ledger as adjustments to plant and reserves; and

4. Purchase property and general liability insurance;

(11) The Company agrees to implement the recommendations contained in the Customer Experience Department (CXD) Report, attached hereto as Attachment H and incorporated by reference herein, and provide proof of implementing the recommendation to the Manager of the Commission's CXD:

(a) Within thirty (30) days of an order approving this Disposition Agreement, the Company will:
   1. Change billing practices such that a monthly-billed customer shall have at least twenty-one (21) days to pay the bill in accordance with 4 CSR 240-13.020(7);
   2. Change Company procedures such that the Company shall make reasonable efforts to contact the customer to advise the customer of the proposed discontinuance and what steps must be taken to avoid it, at least twenty-four (24) hours preceding discontinuance, in accordance with 4 CSR 240-13.050(8). Reasonable efforts shall include either a written notice, a door hanger, or at least two (2) telephone call attempts reasonably calculated to reach the customer;
   3. Create and implement a complaint log in accordance with 4 CSR 204-13.040(5); and
   4. Create and distribute to customers a 'Customer Rights and Responsibilities Brochure' in accordance with 4 CSR 240-13.040(3).

(b) Within ninety (90) days of an order approving this Disposition Agreement, the Company will:
   1. Modify the customer bill format such that information required by 4 CSR 240.13.020(9) is clearly presented;

(12) The Company agrees to implement the recommendations contained in the Water & Sewer Department Report, attached hereto as Attachment I and incorporated by reference herein, and provide proof of implementing the recommendation to the Manager of the Commission's Water & Sewer Department:

(a) The Company agrees to complete the following tasks, as listed in Attachment I, no later than the dates listed, in accordance with the Environmental Improvement Contingency Fund (EICF), pursuant to Commission Rule 4 CSR 240-10.095:
   1. Submit Engineering Report to PSC Staff – December 1, 2020;
   2. Install Backup Booster Pump – January 1, 2021
   3. Repair Sewer Line Breaks – January 1, 2021;
   4. Replace Master Meters – June 1, 2021;
   5. Complete Sewer Camera Survey and Jetting – January 2022.

(b) The Parties agree that this schedule requires that the Commission grant a waiver from 4 CSR 240-10.095(4)(B)3. This section requires that if a requested EICF includes funds for a preliminary engineering report, the report must be completed and submitted to the commission prior to the first disbursement from the EICF account; however, the Parties agree good cause exists to allow disbursements from the fund for other improvements prior to the completion of the engineering study. Good cause exists for allowing fund disbursement for a backup booster pump because if the existing single booster pump is taken down by failure or for maintenance, all water pressure in the drinking water system would immediately be lost for an indeterminate amount of time. Good cause exists for allowing fund disbursements for repairing the sewer line breaks because these represent a significant threat of sewer blockage and sewer backups into customer's homes. The intent of 4 CSR 240-10.095(4)(B)3 is to ensure prudent spending on the most cost effective upgrades to a water or sewer system; however, the parties agree no engineering analysis is necessary to determine that the backup booster pump and sewer line repairs are critical for continued safe and reliable service;

(13) The parties agree that an EICF shall be implemented in this proceeding. The EICF charge shall be $2.14 each month for water customers, and $5.11 for sewer customers, as shown in Attachment I;

(a) The Company agrees that these charges are to be collected as part of the monthly customer charge. The Company agrees to comply with revenue recording and segregation required by 4 CSR 240-10.095(5).
(b) The Company shall comply with 4 CSR 240-10.095(5)(C), including at least 30 days' notice to Staff prior to making a disbursement.
(c) The Company agrees to file quarterly reports in the SR-2019-0157 Docket in EFIS showing monthly EICF funds received, deposits to the escrow account, expenditures, and end of the month balances in accordance with 4 CSR 240-10.095(6).
(d) This charge shall be reviewed in the Company's next rate case;

(14) The Company agrees to cease collection of "Sewer Maintenance Fees"; the remaining balance of fees collected shall be spent only on sewer plant, repairs, or maintenance, and shall be recorded as contribution in aid of construction. The Company agrees to provide documentation of the spending of the remaining funds for review at the next rate case. Provided that the Company fulfills this requirement, Staff agrees it will not claim, in any Commission proceeding, that the Company's collection of the "Sewer Maintenance Fee" was a violation of any tariff, statute, rule, order, or decision within the Commission's jurisdiction;

(15) The Company has identified several customer meters in the system which are not functioning. Water customers currently served by a non-functioning meters, or customers at a future date whose meter stops functioning, shall be charged the non-metered rate found in the tariff. The non-metered rate shall be effective until

June 1, 2024, or until changed or replaced by a subsequent rate case. Unless changed or replaced by a subsequent rate case, customers on the non-metered rate after June 1, 2024, shall be charged the metered rate. Customers being switched to the non-metered rate shall first be notified by letter at least 21 days prior to the change taking effect. Once the non-functioning meter is replaced, customers will be notified at least 21 days before being switched back to the metered rate. The Company may mail or hand-deliver these notifications. The Company agrees to receive approval of the language in these customer notifications from Staff prior to implementing this procedure. For the purpose of this agreement, and execution of the tariff language associated with the non-metered rate, non-functioning meters are those for which the meter can be observed to not be turning while water is flowing through the meter. The Company shall document the date the meter was evaluated, how water was determined to be flowing through the meter at the time of the evaluation, and any customer contact associated with the evaluation;

(16) The Company shall mail its customers a final written notice of the rates and charges included in its proposed tariff revisions prior to or with its next billing cycle after issuance of the Commission order approving the terms of this Company/Staff Disposition Agreement. The notice shall include a summary of the impact of the proposed rates on an average residential customer's bill. When the Company mails the notice to its customers, it shall also send a copy to Staff Case Coordinator who will file a copy in this case;

(17) The Company shall provide adequate notification and information regarding changes to customers' service and billing as they occur. This information shall include, but not be limited to, an explanation of new rates and rate structures, billing charges, and meter replacements;

(18) The Company agrees to immediately undertake actions to verify customer information at each billing address and determine the functioning and accuracy of its meter at each address. The Company agrees to develop procedures to ensure the integrity of future customer information, and will verify function of any meter observed to have unusually low usage over a two-month period;

(19) The Company agrees to file a rate case for both water and sewer utilities no later than January 31st, 2022;

(20) Staff may conduct follow-up reviews of the Company's operations to ensure that the Company has complied with the provisions of this Company/Staff Disposition Agreement;

(21) Staff may file a formal complaint against the Company, if the Company does not comply with the provisions of this Company/Staff Disposition Agreement;

(22) The Company and Staff agree that they have read the foregoing Company/Staff Disposition Agreement, that facts stated therein are true and accurate to the best of the Company's knowledge and belief, that the foregoing conditions accurately reflect the agreement reached between the Company and Staff; and that the Company freely and voluntarily enters into this Disposition Agreement; and

(23) The above agreements satisfactorily resolve all issues identified by Staff, and the Company regarding the Company's request, except as otherwise specifically stated herein.

Additional Matters

Other than the specific conditions agreed upon and expressly set out herein, the terms of this Unanimous Disposition Agreement reflect compromises between the Staff and the Company, and no party has agreed to any particular ratemaking principle, unless specifically detailed herein, in arriving at the amount of the annual operating revenue increase specified herein.

Staff has completed a Summary of Case Events and has included that summary as Attachment K to this Disposition Agreement.

The Company and Staff acknowledge that Staff will be filing this Unanimous Disposition Agreement and the attachments hereto, in the existing case and that the Company will file the proposed tariff revisions called for in the agreement. The Company also acknowledges that Staff may make other filings in this case.

Additionally, the Company agrees that subject to the rules governing practice before the Commission and without waiving the confidentiality of the facts and positions disclosed in the course of settlement, Staff shall have the right to provide an oral explanation to support its entering into this Partial Disposition Agreement, if the Commission requests one at any agenda meeting at which this case is noticed to be considered by the Commission. Subject to the rules governing practice before the Commission and without waiving the confidentiality of the facts and positions disclosed in the course of settlement, Staff will be available to answer Commission questions regarding this Partial Disposition Agreement. To the extent reasonably practicable, Staff shall provide the Company with advance notice of any such agenda meeting so that they may have the opportunity to be present and/or represented at the meeting.

SIGNATURES

Agreement Signed and Dated:

5-17-19
Date

Rodney LaRose
President
S. K. & M. Water and Sewer Company

5-17-19
Date

Susan LaRose
Vice President
S. K. & M. Water and Sewer Company

5/17/19
Date

Jim Busch
Manager – Water & Sewer Department
Missouri Public Service Commission Staff

List of Attachments

Attachment A – Income Statements

Attachment B – Auditing Department Report

Attachment C – EMS Runs

Attachment D – Schedule of Depreciation Rates

Attachment E – Rate Design Worksheets

Attachment F – Billing Comparison Worksheets

Attachment G – Example Tariff Sheets

Attachment H – CXD Report

Attachment I – Water and Sewer Department Report

Attachment J – Summary of Events

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Michael L. Parson
Governor

Dru Buntin
Director

CERTIFIED MAIL # 9414 8118 9956 2241 3636 39
RETURN RECEIPT REQUESTED

June 7, 2023

Rodney LaRose II and Susan Hall
SK & M Water and Sewer Company
636 PCR 917
Perryville, MO 63775

LETTER OF WARNING
RESPONSE REQUIRED

Dear Rodney LaRose II and Susan Hall:

On May 16-17, 2023, a team member from the Missouri Department of Natural Resources conducted an inspection of the SK & M Water and Sewer Company, located at the north terminus of Cardinal Lane, Perryville, in Perry County. The entity operates under the authority of Missouri State Operating Permit (MSOP) MO0098680.

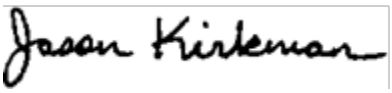
Compliance with the Missouri Clean Water Law was evaluated. The enclosed report is being issues with a Letter of Warning (LOW) for the violations identified.

Please direct your attention to the **Compliance Determination and Listing of Violations and Required Actions** in the enclosed report. The report documents the findings and the actions that you must take to address the violations. **A written response documenting actions taken to correct the violations is required by the date specified in the report.**

Failure to address the required actions will result in the issuance of a Notice of Violation. If you have any questions or would like to schedule a time to meet with Department staff to discuss compliance requirements, please contact Camden Bryant at 573-840-9764 or in writing at the Southeast Regional Office, 2155 North Westwood Blvd., Poplar Bluff, MO 63901.

Sincerely,

SOUTHEAST REGIONAL OFFICE



Jason Kirkman
Environmental Manager

Enclosure: Report of Inspection

Compliance Summary

Facility Name: SK&M Water and Sewer Company
Permit Number: MO0098680
Inspection Date: May 16-17, 2023

This summary is intended to direct your attention to violations noted during the inspection of your facility.

Violations noted during the inspection:

1. Failed to comply with the effluent limits contained in Table A of Missouri State Operating Permit (MSOP) MO0098680 for several consecutive quarters.
2. Failed to pay fees associated with MSOP MO0098680.
3. Failed to comply with *E.coli* limits contained in Table A of MSOP MO0098680.

Actions necessary to return to compliance:

1. Submit a response outlining the cause of the effluent violations, as well as a plan to bring the facility into compliance by meeting the effluents limits by July 7, 2023.
2. Immediately pay the outstanding balance including late fees. Please note that a 2% late fee is assessed every month that the balance is not paid. For an up to date fee balance, please contact the Budget and Fees Unit at 573-751-1300 or P. O. Box 176, Jefferson City, MO 65102.
3. Submit a written response detailing actions to prevent any future *E. coli* exceedances limits by July 7, 2023.

Refer to the Letter of Warning section on page four (4) and five (5) of the enclosed report for detailed information about these violations and how to correct them so your facility may be returned to compliance.

We appreciate your prompt attention to these issues. If you have any questions, or if you would like to meet to discuss these violations further, please contact Camden Bryant at the Southeast Regional Office at 573-840-9764 or at camden.bryant@dnr.mo.gov.

Missouri Department of Natural Resources
Southeast Regional Office
Report of Inspection
SK&M Water and Sewer Company
North terminus of Cardinal Lane/ Perryville / Perry
MO0098680
June 7, 2023

Introduction

Pursuant to Section 644.026.1 RSMo of the Missouri Clean Water Law, a routine compliance inspection of the SK&M Water and Sewer Company in Perry County, was conducted by Camden Bryant of the Missouri Department of Natural Resources' Southeast Regional Office on May 16-17, 2023. Participants during the inspection are listed below.

SK&M Water and Sewer Company
Rodney LaRose, Owner 573-517-3097 skmwaterandsewer@gmail.com

Missouri Department of Natural Resources (Department)
Camden Bryant, Environmental Specialist 573-840-9764 camden.bryant@dnr.mo.gov

This inspection was conducted, pursuant to Section 644.026.1 RSMo of the Missouri Clean Water Law, to determine the facility's compliance with Missouri State Operating Permit (MSOP) MO0098680, the Missouri Clean Water Commission Regulations, and the Missouri Clean Water Law. This report presents the findings and observations made during the compliance inspection.

Entity Description and History

The latest issuance of MSOP MO0098680 was placed into effect on March 1, 2019, and expires on September 30, 2023. A permit renewal application has been submitted and is currently in draft. This permit sets forth effluent limitations, monitoring requirements, and permit conditions, both standard and specific, that the permittee is to follow.

The SK & M Water and Sewer Company is located at the north terminus of Cardinal Lane, Perryville, in Perry County, and operates under the ownership and continuing authority of Rodney LaRose II and Susan Hall, located in Perryville, MO.

The SK & M Water and Sewer Company consists of extended aeration, one (1) clarifier, chlorination/dechlorination, and an aerobic sludge digester. Sludge is disposed of by a contract hauler. The design population equivalent is 1,200. The design flow is 72,000 gallons per day. The actual flow is 33,500 gallons per day. The design sludge production is 25 dry tons per year.

The legal description of the facility is Sec. 31, T35N, R11E, and in Perry County. The UTM coordinates for this location is X=776008, Y=4176396.

The receiving stream is Tributary to Cinque Hommes Creek. The first classified stream and ID is listed as Cinque Hommes Creek (C) (1781). This facility is located in USGS Basin and Sub-watershed No. 007140105 – 0305.

This facility was previously inspected by John Chronister on October 18, 2018. The facility was issued an Unsatisfactory Findings letter. The facility is not in enforcement with the Department at this time.

During a two (2) year records review, the following effluent violations were noted.

Monitoring Period	Parameter(s)	Violation Code
06/30/2022	*E.coli*	Limit value exceeded
04/30/2022	*E.coli*	Limit value exceeded
09/30/2021	*E.coli*	Limit value exceeded
08/31/2021	*E.coli*	Limit value exceeded
07/31/2021	*E.coli*	Limit value exceeded
03/31/2022	Ammonia total as N	Limit value exceeded

Discussion of Inspection and Observations

Prior to the inspection, the files and Permit Conditions of MSOP MO0098680 were reviewed. The inspection was conducted during normal business hours. Prior notification of the inspection was provided to ensure timely access to the site. Upon arrival, I met with Rodney LaRose outside of the facility. We discussed the purpose and scope of the inspection.

We began the inspection by discussing the facility's Operation and Maintenance Manual (O&M). Rodney LaRose was able to provide a copy of the facility's O&M Manual, and I suggested that the O&M Manual remain onsite for the foreseeable future. After discussing the O&M Manual, we discussed operator certification and sampling. Natalie Stahl is the facility's certified operator, and the facility does not take composite samples.

After our discussion, Rodney Larose explained that he would not be able to accompany me for the remainder of the inspection. Rodney LaRose granted me permission to access the site, and asked that I lock the gate when I left. Before Rodney LaRose left, I explained that a report discussing my findings would be sent within the next 30 days.

The fence surrounding the facility was locked and in good condition. Warning signs were posted on all four (4) sides of the facility's fencing, and there was an all-weather access road leading to the facility.

The wastewater in the aeration basins was a chocolate color with very little foam and an earthy odor. The walkways over the aeration basins were badly corroded and in need of repair. Both blower motors were functioning at the time of inspection. Though a bit run down, the blower room seemed to provide proper protection for the electrical panel and blower motors.

I then made my way to the facility's clarifier and aerobic sludge digester. The clarifier was operating but was in need of maintenance. One (1) side of the v-notched weir is lower than the other side. This is allowing the effluent to flow unevenly. The aerobic sludge digester seemed to be providing a uniform mix, and there was no offensive odor.

Walking east, I observed the chlorination system. The chlorination system seemed to be in good repair, but there was some visible solids within the system. Rodney LaRose had previously stated that the facility was not dechlorinating.

I then walked east of the facility to the facility's outfall. At the time of inspection, the outfall was clearly marked. The discharge seemed to be clear in color, and there was no offensive odor.

Overall, the facility is in need of maintenance and repair. Solids should routinely be removed from the chlorination chambers, the boardwalks over the aeration basins are not safe, and the weir within the clarifier is in need of repair. I would like to thank Rodney LaRose for his time and assistance during this inspection.

Sampling and Monitoring

The appropriate sampling materials were taken on the inspection, including a copy of the Missouri Department of Natural Resources' Standard Operating Procedures for Sampling. Instruments for field monitoring were taken on the inspection that are capable of testing pH, temperature, conductivity, total residual chlorine, and dissolved oxygen. The instruments that were utilized during the inspection were the Hach Pocket Pro pH pen, the Hach Pocket Pro Cond pen, the Hach HQ40d/HQ1130 Dissolved Oxygen Meter, the Hach Pocket Colorimeter 2, and the VWR Traceable Thermometer.

The facility was discharging at the time of the inspection. Therefore, samples were collected from Outfall 001.

SK&M Water and Sewer Company Outfall 001		
Parameter	**Result**	**Units**
pH	7.5	SU
Conductivity	576	uS/cm
Temperature	20.6	°C
Dissolved Oxygen	5.46	mg/L

Composite sampling and grab sampling were conducted and submitted for laboratory analysis. The sample results will be forwarded upon receipt.

SK&M Water and Sewer Company Outfall 001					
Results of Sample Analyses		**Permit Limits – Final Effluent Limitations**			
Parameters	**Result**	**Units**	**Daily Max**	**Weekly Average**	**Monthly Average**
Biochemical Oxygen Demand	NA	mg/L		45	30
Total Suspended Solids	NA	mg/L		45	30
Ammonia as N (Apr 1 – Sep 30)	NA	mg/L	5.7		1.3
Total Phosphorus	NA	mg/L	*		*
Total Nitorgen	NA	mg/L	*		*
Total Residual Chlorine	40	ug/L	<130		<130
E. coli	1299.7	#/100mL	1030		206

*****Monitoring requirement only.

Compliance Determination and Required Actions

The facility was found to be **not in compliance** with the Missouri Clean Water Law, the Clean Water Commission Regulations, and Missouri State Operating Permit MO0098680, based upon findings identified during the inspection and review of paperwork.

Letter of Warning

1. During a two (2) year DMR records review, it was noted that the SK & M Water and Sewer Company has failed to comply with the effluent limits contained in Table A of MSOP MO0098680 for several consecutive quarters. Failure to comply with effluent limits is a violation of the MSOP MO0098680, Missouri Clean Water Law Sections 644.051.1(3) and 644.076.1, RSMo and Missouri Clean Water Commission Regulation 10 CSR 20-7.015.

   REQUIRED ACTION: The permittee must determine the cause of these violations, take corrective action if the problem is due to operation and maintenance, or plan a corrective action if the problem is a design deficiency. The permittee must submit a response outlining the cause and a plan to bring the facility into compliance by meeting the effluents limits in the MSOP by July 7, 2023.

2. According to Department records, the facility has an outstanding fee balance of $2,250, including late fees. This is a violation of Missouri Clean Water Law Section 644.076.1, MSMo and Missouri Clean Water Commission Regulation 10 CSR 20-6.011(1)(F).

   C. SPECIAL CONDITIONS #8 states “It is a violation of the Missouri Clean Water Law to fail to pay fees associated with this permit (644.055 RSMo).”

REQUIRED ACTION: Immediately pay the outstanding balance including late fees. Please note that a 2% late fee is assessed every month that the balance is not paid. For an up to date fee balance, please contact the Budget and Fees Unit at 573-751-1300 or P. O. Box 176, Jefferson City, MO 65102.

3. The following safety issues were identified during the inspection, which are a violation of Missouri Clean Water Law 644.076.1, RSMo and Missouri Clean Water Commission 10 CSR 20-8.140(8). The board walks and railings over the aeration basins were rusted through, and presented a safety hazard to those conducting general maintenance and operation.

   Missouri Clean Water Commission 10 CSR 20-8.140(8) (B) states:

   "Safety. Adequate provisions shall be made to effectively protect facility personnel and visitors from hazards. The following shall be provided to fulfill the particular needs of each wastewater treatment facility:

   (B) Gratings over appropriate areas of treatment units where access for maintenance is necessary;"

   REQUIRED ACTION: The facility must make necessary repairs to the walkway and railing system to ensure safety of those at the facility. The permittee must submit a plan to bring the facility into compliance by July 7, 2023.

4. An effluent sample collected by Department staff on May 17, 2023, revealed a violation of permitted effluent limits as shown in the table in the Sampling and Monitoring Section of the Report. Failure to comply with permitted effluent limits is a violation of Missouri Clean Water Law Sections 644.051.1(3) and 644.076.1, RSMo and Missouri Clean Water Commission Regulation 10 CSR 20-7.015.

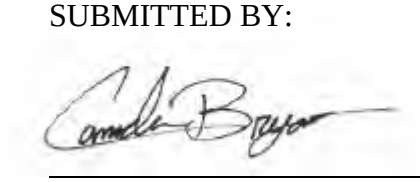
   REQUIRED ACTION: The permittee must submit a response outlining the cause and a plan to bring the facility into compliance by meeting the effluents limits in the MSOP July 7, 2023.

Additional Comments / Conclusion

I would like to thank Rodney LaRose for his time and assistance during the inspection. If there are any questions concerning this report, please feel free to contact Camden Bryant by phone at 573-840-9764, by email at Camden.bryant@dnr.mo.gov, or at 2155 N. Westwood Blvd., Poplar Bluff, Missouri 63901.

Signatures

SUBMITTED BY:



Camden Bryant
Environmental Specialist
Southeast Regional Office

REVIEWED BY:



Dustin Hampton
Environmental Supervisor
Southeast Regional Office

Attachments

Attachment #1 – Photograph (#001) Through Photograph (#012)
Attachment #2 – Aerial View / Site Map

ATTACHMENT #1 – Photos 001-003

	**Photograph #:** 001 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** View of facility's warning signs. Taken facing east. **Date Taken:** May 16, 2023 **Media:** WPC Unit
	**Photograph #:** 002 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** View of the facility's influent structure. **Date Taken:** May 16, 2023 **Media:** WPC Unit
	**Photograph #:** 003 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** View of the west aeration basin. Taken facing north. **Date Taken:** May 16, 2023 **Media:** WPC Unit

ATTACHMENT #1 – Photos 004-006

	**Photograph #:** 004 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** View of the east aeration basin. Taken facing north **Date Taken:** May 16, 2023 **Media:** WPC Unit
	**Photograph #:** 005 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** View of the corroded boardwalks. **Date Taken:** May 16, 2023 **Media:** WPC Unit
	**Photograph #:** 006 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** Overall view of the facility's clarifier. Taken facing southwest. **Date Taken:** May 16, 2023 **Media:** WPC Unit

ATTACHMENT #1 – Photos 007-009

	**Photograph #:** 007 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** View of the low side of the v-notched weir. **Date Taken:** May 16, 2023 **Media:** WPC Unit
	**Photograph #:** 008 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** View of the high side of the v-notched weir. **Date Taken:** May 16, 2023 **Media:** WPC Unit
	**Photograph #:** 009 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** View of Aerobic Sludge Digester. Taken facing south. **Date Taken:** May 16, 2023 **Media:** WPC Unit

ATTACHMENT #1 – Photos 010-012

	**Photograph #:** 010 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** View of facility's chlorination structure. Taken facing South. **Date Taken:** May 16, 2023 **Media:** WPC Unit
	**Photograph #:** 011 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** View of the facility's blower room. **Date Taken:** May 16, 2023 **Media:** WPC Unit
	**Photograph #:** 012 **Taken by:** Camden Bryant **Entity:** SK&M Water and Sewer Company **Permit:** MO0098680 **Location:** Perry County **Description:** View of the facility's Outfall. **Date Taken:** May 16, 2023 **Media:** WPC Unit

ATTACHMENT #2 – Aerial View / Site Map



UNITED STATES POSTAL SERVICE

June 13, 2023

Dear Stacie McElhaney:

The following is in response to your request for proof of delivery on your item with the tracking number: **9414 8118 9956 2241 3636 39**.

Item Details

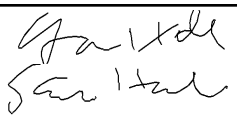
Status:	Delivered, Left with Individual
Status Date / Time:	June 12, 2023, 2:11 pm
Location:	PERRYVILLE, MO 63775
Postal Product:	First-Class Mail®
Extra Services:	Certified Mail™
	Return Receipt Electronic
Recipient Name:	RODNEY LAROSE II AND SUSAN HALL Sk M Water and

Shipment Details

Weight:	3.0oz

Recipient Signature

Signature of Recipient:



Address of Recipient:



Note: Scanned image may reflect a different destination address due to Intended Recipient's delivery instructions on file.

Thank you for selecting the United States Postal Service® for your mailing needs. If you require additional assistance, please contact your local Post Office™ or a Postal representative at 1-800-222-1811.

Sincerely,
United States Postal Service®
475 L'Enfant Plaza SW
Washington, D.C. 20260-0004

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Michael L. Parson
Governor

Dru Buntin
Director

July 19, 2023

Rodney LaRose II and Susan Hall
SK & M Water and Sewer Company
636 PCR 917
Perryville, MO 63775

INSUFFICIENT RESPONSE
RESPONSE REQUIRED

Dear Rodney LaRose II and Susan Hall:

The Missouri Department of Natural Resources (Department) has not received a sufficient response to the required actions listed in the June 7, 2023, Letter of Warning. On May 16-17, 2023, a team member from the Missouri Department of Natural Resources conducted an inspection of the SK & M Water and Sewer Company, located at the north terminus of Cardinal Lane, Perryville, in Perry County. The entity operates under the authority of Missouri State Operating Permit (MSOP) MO0098680.

If you do not have a copy of the report available, please contact the team member listed below immediately. By August 31, 2023, the required actions in the report must be completed. Failure to respond, failure to address the required actions, or providing an inadequate response may result in a follow-up inspection and/or referral for enforcement actions.

If you have any questions or would like to schedule a time to meet with a Department team member to discuss compliance requirements, please contact Camden Bryant at 573-840-9764 or camden.bryant@dnr.mo.gov.

Sincerely,

SOUTHEAST REGIONAL OFFICE

Dustin Hampton
Chief, Water Pollution Control Unit

Case No. WO-2026-0360
Attachment 8

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Mike Kehoe
Governor

Kurt U. Schaefer
Director

December 10, 2025

Rodney Larose and Susan Hall
636 PCR 917
Perryville MO 63775

LETTER OF WARNING
RESPONSE REQUIRED

Dear Permittee:

The Missouri Department of Natural Resources' Southeast Regional Office is issuing you a Letter of Warning for violations of Missouri State Operating Permit (MSOP) MO0098680 and the Missouri Clean Water Law (MCWL) at SK and M Water and Sewer Company WWTP. The department requests that you take immediate action to correct the violations found on the attached list.

MSOP MO0098680 sets forth specific effluent limitations, monitoring requirements, and permit conditions regarding your facility. Failure to comply with effluent limitations established in part "A" of the MSOP is a violation of Sections 644.051.1(3) and 644.076.1, RSMo. **Failure to address the violation(s) may result in heightened enforcement action.**

By **January 9, 2026**, please email a response to the email address below or submit a written response to the Southeast Regional Office, 2155 North Westwood Blvd., Poplar Bluff, MO 63901, addressing the violations and explaining what steps you have taken or will take to prevent future violations. Your facility will be considered not in compliance until the violation(s) is/are addressed. If you have any questions or would like to schedule a meeting in person, please contact Mr. Dustin Hampton at 573-840-9054, dustin.hampton@dnr.mo.gov or the address above. Thank you for your cooperation in this matter.

If you have already provided this information, the department appreciates your efforts to return your facility to compliance.

Sincerely,

SOUTHEAST REGIONAL OFFICE

Dustin Hampton
Environmental Supervisor

Issue	Permitted Feature	Monitoring Period End Date or Event Due Date	Parameter or Event Type
Limit value exceeded	001	09/30/2025	Nitrogen, ammonia total (as N)

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Mike Kehoe
Governor

Kurt U. Schaefer
Director

April 3, 2026

Rodney Larose and Susan Hall
636 PCR 917
Perryville MO 63775

LETTER OF WARNING
RESPONSE REQUIRED

Dear Permittee:

The Missouri Department of Natural Resources' Southeast Regional Office is issuing you a Letter of Warning for violations of Missouri State Operating Permit (MSOP) MO0098680 and the Missouri Clean Water Law (MCWL) at SK and M Water and Sewer Company WWTP. The department requests that you take immediate action to correct the violations found on the attached list.

MSOP MO0098680 sets forth specific effluent limitations, monitoring requirements, and permit conditions regarding your facility. Failure to comply with effluent limitations established in part "A" of the MSOP is a violation of Sections 644.051.1(3) and 644.076.1, RSMo. **Failure to address the violation(s) may result in heightened enforcement action.**

By **May 4, 2026**, please email a response to the email address below or submit a written response to the Southeast Regional Office, 2155 North Westwood Blvd., Poplar Bluff, MO 63901, addressing the violations and explaining what steps you have taken or will take to prevent future violations. Your facility will be considered not in compliance until the violation(s) is/are addressed. If you have any questions or would like to schedule a meeting in person, please contact Mr. Dustin Hampton at 573-840-9054, dustin.hampton@dnr.mo.gov or the address above. Thank you for your cooperation in this matter.

If you have already provided this information, the department appreciates your efforts to return your facility to compliance.

Sincerely,

SOUTHEAST REGIONAL OFFICE

Dustin Hampton-Environmental Supervisor

Issue	Permitted Feature	Monitoring Period End Date or Event Due Date	Parameter or Event Type
Limit value exceeded	001	12/31/2025	Nitrogen, ammonia total (as N)

MISSOURI DEPARTMENT OF NATURAL RESOURCES

Mike Kehoe
Governor

Kurt U. Schaefer
Director

July 24, 2026

Rodney LaRose II and Susan Hall
636 PCR 917
Perryville, MO 63775

SAMPLE RESULTS

Dear Rodney LaRose II and Susan Hall:

An inspection of the SK&M Water and Sewer Company facility was conducted by a team member from the Missouri Department of Natural Resources pursuant to the Missouri Clean Water Law on June 3-4, 2026. As part of the inspection, the inspector collected samples from Outfall 001 and delivered the samples to the department's Environmental Services Program for sample analysis. The sample analysis results were not available for inclusion in the inspection report dated July 7, 2026.

Please find enclosed a Report of Laboratory Analysis for samples collected during the site visit. The results reflect compliance with the effluent limitations set forth in your Missouri State Operating Permit.

Outfall #001					
Results of Sample Analyses		**Permit Limits – Final Effluent Limitations**			
Parameters	**Result**	**Units**	**Daily Max**	**Weekly Average**	**Monthly Average**
Biochemical Oxygen Demand (BOD)	39.5	mg/L	NA	45	30
Total Suspended Solids (TSS)	43.0	mg/L	NA	45	30
Ammonia as N	**37.4**	**mg/L**	**5.7**	**NA**	**1.3**
E.coli	**>2419.6**	**mg/L**	**1,030**	**NA**	**206**

Exceeding permit effluent limitations is a violation of the Missouri Clean Water Law (Sections 644.051.1(3) and 644.076.1), the Missouri Clean Water Commission Regulations (10 CSR 20-7.015) and your Missouri State Operating Permit.

Please contact the Water Pollution Control Branch's Compliance and Enforcement Section at P.O. Box 176, Jefferson City, MO 65102, or by phone at 573-751-1300 for further instructions to return your facility to compliance.

Sincerely,

SOUTHEAST REGIONAL OFFICE



Dustin Hampton
Environmental Supervisor

c: Rodney LaRose II, Owner: skmwaterandsewer@gmail.com
Curtis Gately, Public Service Commission: curtis.gateley@psc.mo.gov
Joe Clayton, WPCP Compliance and Enforcement Section (electronically)

Data Response Display - WO-2026-0360 - 0024.0

← Request Display | ← Full DR List | Print | Help

Request Summary

Submission No.	WO-2026-0360
Request No.	0024.0
Requested Date	7/1/2026
Due Date	7/21/2026
Issue	Quality of Service
	Treatment/Operations
Requested From	S. K. & M. Water and Sewer Company (Water) Susan LaRose (skmwaterandsewer@gmail.com)
Requested By	MO PSC Staff (Other) Douglas Hennon (douglas.hennon@psc.mo.gov) Russell Drury (russell.drury@psc.mo.gov)
Brief Description	Plant upgrades
Description	Please provide the company's current plan for upgrading the sewer treatment plant and collection system to eliminate bypassing, and its timeline for completing the upgrades. Requested by Russell Drury (russell.drury@psc.mo.gov)
Request Security	Public (DR)
Response Date	7/27/2026
Response	we do not bypass on our treatment plant
Objections	
Response Security	Public (DR)
Rationale	

Attachments

No Attachments Found