

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-0041092
Owner:	City of Shelbina
Address:	P.O. Box 646, Shelbina, MO 63468
Continuing Authority:	Same as above
Address:	Same as above
Facility Name:	Shelbina WWTP
Facility Address:	206 West Shelbina Avenue, Shelbina, MO 63468
Legal Description:	See Page 2
UTM Coordinates:	See Page 2
Receiving Stream:	See Page 2
First Classified Stream and ID:	See Page 2
USGS Basin & Sub-watershed No.:	See Page 2

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

FACILITY DESCRIPTION

See Page 2

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.

October 1, 2019
Effective Date


Edward B. Galbraith, Director, Division of Environmental Quality

June 30, 2023
Expiration Date


Chris Wieberg, Director, Water Protection Program

FACILITY DESCRIPTION (continued):

Outfall #001 – POTW

The use or operation of this facility shall be by or under the supervision of a Certified “B” Operator.

Influent wet well with two screw pumps / influent surge basin / screening / grit chamber / oxidation ditch / two final clarifiers / two sludge holding tanks / five sludge drying beds / biosolids are land applied

Design population equivalent is 6,620.

Design flow is 662,000 gallons per day.

Actual flow is 372,000 gallons per day.

Design sludge production is 106 dry tons/year.

Legal Description:	Sec. 5, T56N, R10W, Shelby County
UTM Coordinates:	X=581842, Y=4392964
Receiving Stream:	Tributary to Clear Creek (C)
First Classified Stream and ID:	8-20-13 MUDD V1.0 (C) (3960)
USGS Basin & Sub-watershed No.:	(07110005-0403)

Outfall #002 – Discharges from this outfall is no longer authorized, and shall be subject to 40 CFR 122.41(m) and reported according to 40 CFR 122.41(m)(3)(i) & (ii).

Permitted Feature #003 – Shelbina Lake – Inactive

Permitted Feature INF – Influent Monitoring Location – Headworks

Legal Description:	Sec. 5, T56N, R10W, Shelby County
UTM Coordinates:	X=581741, Y=4393043

Permitted Feature SM3 – Downstream Monitoring Point – Inactive

OUTFALL #001	TABLE A-1. INTERIM 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. In accordance with 10 CSR 20-7.031, the final effluent limitations outlined in Table A-2 must be achieved as soon as possible but no later than January 1, 2024 . These interim effluent limitations in Table A-1 are effective beginning October 1, 2019 and remain in effect through December 31, 2023 or as soon as possible. Such discharges shall be controlled, limited and monitored by the permittee as specified below:						
EFFLUENT PARAMETER(S)	UNITS	INTERIM EFFLUENT LIMITATIONS			MONITORING REQUIREMENTS	
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Limit Set: M						
Flow (Note 3)	MGD	*		*	once/weekday***	24 hr. total
Biochemical Oxygen Demand ₅ (Note 3)	mg/L		45	30	once/month	composite**
Total Suspended Solids (Note 3)	mg/L		45	30	once/month	composite**
Copper, Total Recoverable	µg/L	*		*	once/month	composite**
Total Hardness	mg/L	*		*	once/month	composite**
EFFLUENT PARAMETER(S)	UNITS	MINIMUM		MAXIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
pH – Units****	SU	6.5		9.0	once/month	grab
Temperature	° C	*		*	once/month	grab
EFFLUENT PARAMETER(S)			UNITS	MONTHLY AVERAGE MINIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
Biochemical Oxygen Demand ₅ – Percent Removal (Note 2)			%	85	once/month	calculated
Total Suspended Solids – Percent Removal (Note 2)			%	85	once/month	calculated
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY ; THE FIRST REPORT IS DUE NOVEMBER 28, 2019 . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

* Monitoring requirement only.

** A 24-hour composite sample is composed of 48 aliquots (subsamples) collected at 30 minute intervals by an automatic sampling device.

*** Once each weekday means: Monday, Tuesday, Wednesday, Thursday, and Friday.

**** pH is measured in pH units and is not to be averaged.

Note 2 – Influent sampling is not required when the facility does not discharge effluent during the reporting period. Samples are to be collected prior to any treatment process. Percent Removal is calculated by the following formula: $[(\text{Average Influent} - \text{Average Effluent}) / \text{Average Influent}] \times 100\% = \text{Percent Removal}$. Influent and effluent samples are to be taken during the same month. The Average Influent and Average Effluent values are to be calculated by adding the respective values together and dividing by the number of samples taken during the month. Influent samples are to be collected as a 24-hour composite sample, composed of 48 aliquots (subsamples) collected at 30 minute intervals by an automatic sampling device.

Note 3 – Additional effluent sampling from Outfall #001 shall be conducted according to the requirements of Special Condition #10.

OUTFALL #001	TABLE A-2. 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 January 1, 2024 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
Limit Set: M						
Flow (Note 3)	MGD	*		*	once/weekday***	24 hr. total
Biochemical Oxygen Demand ₅ (Note 3)	mg/L		45	30	once/month	composite**
Total Suspended Solids (Note 3)	mg/L		45	30	once/month	composite**
E. coli (Note 1)	#/100mL		1,030	206	once/week	grab
Copper, Total Recoverable	µg/L	29.5		19.4	once/month	composite**
Total Hardness	mg/L	*		*	once/month	composite**
EFFLUENT PARAMETER(S)	UNITS	MINIMUM		MAXIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
pH – Units****	SU	6.5		9.0	once/month	grab
Temperature	° C	*		*	once/month	grab
EFFLUENT PARAMETER(S)			UNITS	MONTHLY AVERAGE MINIMUM	MEASUREMENT FREQUENCY	SAMPLE TYPE
Biochemical Oxygen Demand ₅ – Percent Removal (Note 2)			%	85	once/month	calculated
Total Suspended Solids – Percent Removal (Note 2)			%	85	once/month	calculated
MONITORING REPORTS SHALL BE SUBMITTED MONTHLY ; THE FIRST REPORT IS DUE FEBRUARY 28, 2024 . THERE SHALL BE NO DISCHARGE OF FLOATING SOLIDS OR VISIBLE FOAM IN OTHER THAN TRACE AMOUNTS.						

* Monitoring requirement only.

** A 24-hour composite sample is composed of 48 aliquots (subsamples) collected at 30 minute intervals by an automatic sampling device.

*** Once each weekday means: Monday, Tuesday, Wednesday, Thursday, and Friday.

**** pH is measured in pH units and is not to be averaged.

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. The Weekly Average for *E. coli* will be expressed as a geometric mean if more than one (1) sample is collected during a calendar week (Sunday through Saturday).

Note 2 – Influent sampling is not required when the facility does not discharge effluent during the reporting period. Samples are to be collected prior to any treatment process. Percent Removal is calculated by the following formula: [(Average Influent – Average Effluent) / Average Influent] x 100% = Percent Removal. Influent and effluent samples are to be taken during the same month. The Average Influent and Average Effluent values are to be calculated by adding the respective values together and dividing by the number of samples taken during the month. Influent samples are to be collected as a 24-hour composite sample, composed of 48 aliquots (subsamples) collected at 30 minute intervals by an automatic sampling device.

Note 3 – Additional influent and effluent sampling from Outfall #001 shall be conducted according to the requirements of Special Condition #10.

OUTFALL #001	TABLE A-3. 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 in Table A-3 shall become effective on October 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
Limit Set: Q						
Ammonia as N	mg/L	*		*	once/quarter *****	composite**
Total Phosphorus	mg/L	*		*	once/quarter *****	composite**
Total Kjeldahl Nitrogen	mg/L	*		*	once/quarter *****	composite**
Nitrate + Nitrite	mg/L	*		*	once/quarter *****	composite**
Oil & Grease	mg/L	*		*	once/quarter *****	grab
MONITORING REPORTS SHALL BE SUBMITTED QUARTERLY ; THE FIRST REPORT IS DUE JANUARY 28, 2020 .						

* Monitoring requirement only.

***** See table below for quarterly sampling requirements.

Quarterly Minimum Sampling Requirements			
Quarter	Months	Total Phosphorus, Total Nitrogen, Oil & Grease	Report is Due
First	January, February, March	Sample at least once during any month of the quarter	April 28 th
Second	April, May, June	Sample at least once during any month of the quarter	July 28 th
Third	July, August, September	Sample at least once during any month of the quarter	October 28 th
Fourth	October, November, December	Sample at least once during any month of the quarter	January 28 th

OUTFALL #001	TABLE A-4. WHOLE EFFLUENT TOXICITY 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 in Table A-4 shall become effective on October 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	
Limit Set: WA							
Acute Whole Effluent Toxicity (Note 4)	TU _a	*				once/permit cycle	composite**
MONITORING REPORTS SHALL BE SUBMITTED ONCE PER PERMIT CYCLE ; THE FIRST REPORT IS DUE <u>DECEMBER 28, 2022</u> .							

* Monitoring requirement only.

** A 24-hour composite sample is composed of 48 aliquots (subsamples) collected at 30 minute intervals by an automatic sampling device.

Note 4 – The Acute WET test shall be conducted once per permit cycle. See Special Condition #15 for additional requirements.

PERMITTED FEATURE <u>INF</u>	TABLE B-1. INFLUENT MONITORING REQUIREMENTS					
The monitoring requirements in Table B-1 shall become effective on <u>October 1, 2019</u> and remain in effect until expiration of the permit. The influent wastewater shall be monitored by the permittee as specified below:						
PARAMETER(S)	UNITS	MONITORING REQUIREMENTS				
		DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	MEASUREMENT FREQUENCY	SAMPLE TYPE
Limit Set: IM						
Biochemical Oxygen Demand ₅ (Note 3)	mg/L			*	once/month	composite**
Total Suspended Solids (Note 3)	mg/L			*	once/month	composite**
MONITORING REPORTS SHALL BE SUBMITTED <u>MONTHLY</u> ; THE FIRST REPORT IS DUE <u>NOVEMBER 28, 2019</u> .						
Limit Set: IQ						
Ammonia as N	mg/L	*		*	once/quarter *****	composite**
Total Phosphorus	mg/L	*		*	once/quarter *****	composite**
Total Kjeldahl Nitrogen	mg/L	*		*	once/quarter *****	composite**
Nitrite + Nitrate	mg/L	*		*	once/quarter *****	composite**
MONITORING REPORTS SHALL BE SUBMITTED <u>QUARTERLY</u> ; THE FIRST REPORT IS DUE <u>JANUARY 28, 2020</u> .						

* 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 below for quarterly sampling requirements.

Quarterly Minimum Sampling Requirements			
Quarter	Months	Quarterly Influent Parameters	Report is Due
First	January, February, March	Sample at least once during any month of the quarter	April 28 th
Second	April, May, June	Sample at least once during any month of the quarter	July 28 th
Third	July, August, September	Sample at least once during any month of the quarter	October 28 th
Fourth	October, November, December	Sample at least once during any month of the quarter	January 28 th

Note 3 – Additional influent and effluent sampling from Outfall #001 shall be conducted according to the requirements of Special Condition #10.

C. SCHEDULE OF COMPLIANCE

The facility shall attain compliance with final effluent limitations for Total Recoverable Copper and *E. coli* as soon as possible or no later than **January 1, 2024**.

1. The permittee shall submit interim progress reports detailing progress made in attaining compliance with the final effluent limits every 12 months from the effective date of this permit.
2. By **January 1, 2024**, the permittee shall attain compliance with the final effluent limits.

Please submit progress reports to the Missouri Department of Natural Resources via the Electronic Discharge Monitoring Report (eDMR) Submission System.

D. STANDARD CONDITIONS

In addition to specified conditions stated herein, this permit is subject to the attached Parts I, II, & III standard conditions dated August 1, 2014, May 1, 2013, and March 1, 2015, respectively, and hereby incorporated as though fully set forth herein. The permittee is required to conduct biosolids testing frequency in accordance with the monitoring frequency of Table D-1 below. Table D-1 supersedes the requirements in Standard Conditions Part III, Section I – Monitoring Frequency Table 5.

Table D-1: Biosolids Testing Monitoring Frequency (Notes 1, 2, and 3)			
Metals, Pathogens, and Vectors	Nitrogen TKN ¹	Nitrogen PAN ²	Priority Pollutants ³
once/year	once/year	1 per month	1 per permit cycle

1. Test total Kjeldahl nitrogen, if biosolids application is 2 dry tons per acre per year or less.
 2. Calculate plant available nitrogen (PAN) when either of the following occurs:
 - when biosolids are greater than 50,000 mg/kg TN; or
 - when biosolids are land applied at an application rate greater than two dry tons per acre per year.
 3. Priority pollutants (40 CFR 122.21, Appendix D, Tables II and III) and toxicity characteristic leaching procedure (40 CFR 261.24) is required only for permit holders that must have a pre-treatment program.
- Note 1: Total Solids: A grab sample of biosolids shall be tested once per day during land application periods for percent total solids. This data shall be used to calculate the dry tons of biosolids applied per acre.
- Note 2: Total Phosphorus and Total Potassium shall be tested twice per year.
- Note 3: This table is not applicable for incineration and permit holders that landfill their biosolids.

E. 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) Collection System Maintenance Annual Reports;
 - (2) Schedule of Compliance Progress Reports;
 - (3) Sludge/Biosolids Annual Reports; and
 - (4) 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) Other actions. The following shall be submitted electronically after such a system has been made available by the Department:
 - (1) Notices of Intent to discharge (NOIs);
 - (2) Notices of Termination (NOTs); and
 - (3) Bypass reporting, See Special Condition #9 for 24-hr. bypass reporting requirements.
 - (d) Electronic Submissions. To access the eDMR system, use the following link in your web browser: <https://edmr.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.
 - (b) To incorporate an approved pretreatment program or modification thereto pursuant to 40 CFR 403.8(c) or 40 CFR 403.18(e), respectively.

E. SPECIAL CONDITIONS (continued)

3. All outfalls must be clearly marked in the field. This does not include instream monitoring locations.
4. Report as no-discharge when a discharge does not occur during the report period. For instream samples, report as “no flow” if no stream flow occurs during the report period.
5. 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).
6. It is a violation of the Missouri Clean Water Law to fail to pay fees associated with this permit (644.055 RSMo).
7. 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.
8. The permittee shall develop and implement a program for maintenance and repair of the collection system. The permittee may compare collection system performance results and other data with the benchmarks used in the Departments’ Capacity, Management, Operation, And Maintenance (CMOM) Model located at <http://dnr.mo.gov/env/wpp/permits/docs/cmom-template.doc>. Additional information regarding the Departments’ CMOM Model is available at <http://dnr.mo.gov/pubs/pub2574.htm>.

The permittee shall also submit a report via the Electronic Discharge Monitoring Report (eDMR) Submission System annually, by January 28th, for the previous calendar year. The report shall contain the following information:

 - (a) A summary of the efforts to locate and eliminate sources of excessive infiltration and inflow into the collection system serving the facility for the previous year.
 - (b) A summary of the general maintenance and repairs to the collection system serving the facility for the previous year.
 - (c) A summary of any planned maintenance and repairs to the collection system serving the facility for the upcoming calendar year. This list shall include locations (GPS, 911 address, manhole number, etc.) and actions to be taken.
9. 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 Northeast Regional Office during normal business hours or by using the online Sanitary Sewer Overflow/Facility Bypass Application located at: <https://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 additional blending, the permittee shall file an application to modify this permit to facilitate the inclusion of appropriate monitoring conditions.
10. Monitoring for Biochemical Oxygen Demand, Total Suspended Solids, and Flow of the effluent discharged from Outfall #001 and of the influent wastewater shall occur daily when:
 - (a) flows from the surge basin are blended with fully treated effluent from the oxidation ditch and final clarifiers; or
 - (b) at any time that blending occurs due to reasons not listed in this condition.

The monitoring results and the dates in which blending occurred during the month shall be reported with the monthly Discharge Monitoring Reports submitted to the Department via the Electronic Discharge Monitoring Report (eDMR) Submission System.

E. SPECIAL CONDITIONS (continued)

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. 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.
13. An all-weather access road to the treatment facility shall be maintained.
14. 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.
15. Acute Whole Effluent Toxicity (WET) tests shall be conducted as follows:
 - (a) Freshwater Species and Test Methods: Species and short-term test methods for estimating the acute toxicity of NPDES effluents are found in the most recent edition of *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms* (EPA/821/R-02/012; Table IA, 40 CFR Part 136). The permittee shall concurrently conduct 48-hour, static, non-renewal toxicity tests with the following species:
 - o The fathead minnow, *Pimephales promelas* (Acute Toxicity EPA Test Method 2000.0).
 - o The daphnid, *Ceriodaphnia dubia* (Acute Toxicity EPA Test Method 2002.0).
 - (b) Chemical and physical analysis of the upstream control sample and effluent sample shall occur immediately upon being received by the laboratory, prior to any manipulation of the effluent sample beyond preservation methods consistent with federal guidelines for WET testing that are required to stabilize the sample during shipping. Where upstream receiving water is not available or known to be toxic, other approved control water may be used.
 - (c) Test conditions must meet all test acceptability criteria required by the EPA Method used in the analysis.
 - (d) The Allowable Effluent Concentration (AEC) is 100%; the dilution series is: 6.25%, 12.5%, 25%, 50%, and 100%.
 - (e) All chemical and physical analysis of the effluent sample performed in conjunction with the WET test shall be performed at the 100% effluent concentration.
 - (f) The facility must submit a full laboratory report for all toxicity testing. The report must include a quantification of acute toxic units ($TU_a = 100/LC_{50}$) reported according to the test methods manual chapter on report preparation and test review. The Lethal Concentration 50 Percent (LC_{50}) is the effluent concentration that would cause death in 50 percent of the test organisms at a specific time.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
FACT SHEET
FOR THE PURPOSE OF RENEWAL
OF
MO-0041092
SHELBINA WWTP

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 facility.

Part I – Facility Information

Facility Type: POTW

Facility Description: Influent wet well with two screw pumps / influent surge basin / bar screen / grit chamber / oxidation ditch / two final clarifiers / two sludge holding tanks / five sludge drying beds / sludge is land applied

Have any changes occurred at this facility or in the receiving water body that affects effluent limit derivation?

- ✓ The Tributary to Clear Creek (C) (3960) is now classified as EPA has approved the Department's new stream classifications. A schedule of compliance has been included in the permit to meet final effluent limitations for *E. coli* which are protective of the WBC - B use designation of the stream.

Application Date: 12/27/2017

Expiration Date: 06/30/2018

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE
#001	1.02	Secondary	Domestic

Facility Performance History:

No effluent violations have been reported from this facility since that last permit renewal. This facility was last inspected on October 31, 2016 and November 1, 2016. The inspection showed the following unsatisfactory features: failure to submit complete Discharge Monitoring Reports (failed to submit the in-plant operational monitoring data), failure to perform laboratory procedures in accordance with Standard Methods, and failure to provide an operable or maintained comminutor. The unsatisfactory features were addressed by the City and no further response was required by the Department.

Comments:

Changes in this permit include the addition of monitoring for Total Phosphorus, Total Kjeldahl Nitrogen, and Nitrate + Nitrite to Outfall #001, the addition of Temperature monitoring and *E. coli* limits to Outfall #001, and revised effluent limits for Total Recoverable Copper for Outfall #001, and the removal of Total Recoverable Zinc from Outfall #001. Total Hardness was removed from Permitted Feature SM3 and changed to Outfall #001. The Acute Whole Effluent Toxicity test was reduced to once per permit cycle. Outfall #003 and Permitted Feature SM3 were inactivated. Ammonia, Total Phosphorus, Total Kjeldahl Nitrogen, and Nitrate + Nitrite were included for Permitted Feature INF. See Part VI of the Fact Sheet for further information regarding the addition, revision, and removal of effluent parameters. Special conditions were updated to include the addition of inflow and infiltration reporting requirements, reporting of Non-detects, bypass reporting requirements, addition of instream monitoring requirements, and revised Acute Whole Effluent Toxicity requirements.

A Metal Translator Study for Copper and Zinc, and a Biotic Ligand Model (BLM) for Copper were submitted by the City. The Department's Watershed Protection Section approved the findings of the study and model, and recommended using the translators proposed by the report for calculating final effluent limits for Zinc, but recommended using the BLM final effluent limits for Copper as it is based upon the newer EPA approved 304(a) recommended criteria.

The City is in the process of constructing a new headworks building and installing piping that will allow blending to occur during high flow events where wastewater flows, that are greater than the maximized flows to the oxidation ditch, are diverted to the surge basin, which when full, would be diverted around the oxidation ditch and final clarifiers to the discharge pipe prior to Outfall #001, or would be pumped around the oxidation ditch and final clarifiers to the discharge pipe prior to Outfall #001. This permit contains additional sampling requirements for blending events.

Part II – Operator Certification Requirements

✓ This facility is required to have a certified operator.

As per [10 CSR 20-6.010(8) Terms and Conditions of a Permit], the permittee 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:

Owned or operated by or for a

☒ - Municipalities

☐ - Federal agency

☐ - County

☐ - Public Sewer District

☐ - State agency

☐ - Private Sewer Company regulated by the Public Service Commission

☐ - Public Water Supply Districts

Each of the above entities are only applicable if they have a Population Equivalent greater than two hundred (200)

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

Operator's Name: Robert G. Trivette

Certification Number: 370

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 Control Testing Requirements

Missouri Clean Water Commission regulation 10 CSR 20-9.010 requires certain publically owned treatment works and privately owned facilities regulated by the Public Service Commission to conduct internal operational control monitoring to further ensure proper operation of the facility and to be a safeguard or early warning for potential plant upsets that could affect effluent quality. This requirement is only applicable if the publically owned treatment works and privately owned facilities regulated by the Public Service Commission has a Population Equivalent greater than two hundred (200).

10 CSR 20-9.010(3) allows the Department to modify the monitoring frequency required in the rule based upon the Department's judgement of monitoring needs for process control at the specified facility

✓ 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 Clear Creek (8-20-13 MUDD V1.0)	C	3960	AQL, WBC-B, SCR, HHP, IRR, LWW	07110005- 0403	0

*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

10 CSR 20-7.031(1)(C)8-11.: Wetlands (10 CSR 20-7.031 Table A currently does not have corresponding habitat use criteria for these defined uses)

WSA = Storm- and flood-water storage and attenuation; **WHP** = Habitat for resident and migratory wildlife species;

WRC = Recreational, cultural, educational, scientific, and natural aesthetic values and uses; **WHC** = Hydrologic cycle maintenance.

10 CSR 20-7.031(6): **GRW** = Groundwater

RECEIVING STREAM(S) LOW-FLOW VALUES:

RECEIVING STREAM (C, E, P, P1)	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Tributary to Clear Creek (C) (8-20-13 MUDD V1.0)	0	0	0

MIXING CONSIDERATIONS

MIXING CONSIDERATIONS TABLE:

MIXING ZONE (CFS) [10 CSR 20-7.031(5)(A)4.B.(I)(a)]			ZONE OF INITIAL DILUTION (CFS) [10 CSR 20-7.031(5)(A)4.B.(I)(b)]		
1Q10	7Q10	30Q10	1Q10	7Q10	30Q10
0	0	0	0	0	N/A

RECEIVING STREAM MONITORING REQUIREMENTS:

No receiving water monitoring requirements recommended at this time.

Receiving Water Body's Water Quality

A stream survey was conducted on September 15, 2015 by the Department. No impacts were observed.

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

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(48)] & [10 CSR 20-7.031(1)(O)], 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 revised for Total Recoverable Copper based on the results of the City of Shelbina's 2017 Biotic Ligand Model. The newly established limitations are still protective of water quality.
 - Total Recoverable Zinc was removed from the permit as there was no reasonable potential to violate Water Quality Standards observed.
 - Oil & Grease was reduced to quarterly sampling and monitoring only as there was no reasonable potential to violate Water Quality Standards observed.
 - The Acute Whole Effluent Toxicity (WET) test was reduced to once per permit cycle as the facility has not failed an Acute WET test since the last permit renewal.
 - Outfall #003 was inactivated as there are no lake monitoring requirements necessary at the time of the drafting of the permit renewal.
 - Permitted Feature SM3 was inactivated as there are no instream monitoring requirements necessary at the time of the drafting of the permit renewal.
 - WET testing requirements were changed from pass/fail to monitoring only for toxic units. This change reflects modifications to Missouri's Effluent Regulation found at 10 CSR 20-7.015. 40 CFR 122.44(d)(1)(ii) requiring the Department to establish effluent limitations to control all parameters which have the reasonable potential to cause or contribute to an excursion above any state water quality standard, including state narrative criteria. The previous permit imposed a pass/fail limitation without collecting sufficient numerical data to conduct an analytical reasonable potential analysis. The permit writer has made a reasonable potential determination which concluded the facility does not have reasonable potential at this time but monitoring is required. Implementation of the toxic unit monitoring requirement will allow the Department to effect numeric criteria in accordance with water quality standards established under §303 of the CWA.
 - ✓ 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)], for domestic wastewater discharge with new, altered, or expanding discharges, the Department is to document by means of Antidegradation Review that the use of a water body's available assimilative capacity is justified. In accordance with Missouri's water quality regulations for antidegradation [10 CSR 20-7.031(3)], degradation may be justified by documenting the socio-economic importance of a discharge after determining the necessity of the discharge. Facilities must submit the antidegradation review request to the Department prior to establishing, altering, or expanding discharges. See <http://dnr.mo.gov/env/wpp/permits/antideg-implementation.htm>

- ✓ 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(2)(C)], ...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.

- ✓ Permittee is authorized to land apply biosolids in accordance with Standard Conditions III.

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 discharges into a lake watershed where numeric lake nutrient criteria are applicable. 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, 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)].

- ✓ 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.

- ✓ An 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 (BOD₅) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals.

- ✓ Secondary Treatment is 85% removal [40 CFR Part 133.102(a)(3) & (b)(3)].

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(12)] 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.

Missouri RSMo §644.026.1.(13) mandates that the Department issue permits for discharges of water contaminants into the waters of this state, and also for the operation of sewer systems. Such permit conditions shall ensure compliance with all requirements as established by sections 644.006 to 644.141. Standard Conditions Part I, referenced in the permit, contains provisions requiring proper operation and maintenance of all facilities and systems of treatment and control. Missouri RSMo §644.026.1.(15) instructs the Department to require proper maintenance and operation of treatment facilities and sewer systems and proper disposal of residual waste from all such facilities. To ensure that public health and the environment are protected, any noncompliance which may endanger public health or the environment must be reported to the Department within 24 hours of the time the permittee becomes aware of the noncompliance. Standard Conditions Part I, referenced in the permit, contains the reporting requirements for the permittee when bypasses and upsets occur. The permit also contains requirements for permittees to develop and implement a program for maintenance and repair of the collection system. The permit requires that the permittee submit an annual report to the Department for the previous calendar year that contains a summary of efforts taken by the permittee to locate and eliminate sources of excess I & I, a summary of general maintenance and repairs to the collection system, and a summary of any planned maintenance and repairs to the collection system for the upcoming calendar year.

- ✓ At this time, the Department recommends the US EPA's Guide for Evaluating Capacity, Management, Operation and Maintenance (CMOM) Programs at Sanitary Sewer Collection Systems (Document # EPA 305-B-05-002) or the Departments' CMOM Model located at <http://dnr.mo.gov/env/wpp/permits/docs/cmom-template.doc>. For additional information regarding the Departments' CMOM Model, see the CMOM Plan Model Guidance document at <http://dnr.mo.gov/pubs/pub2574.htm>. The CMOM identifies some of the criteria used to evaluate a collection system's management, operation, and maintenance and was intended for use by the EPA, state, regulated community, and/or third party entities. The CMOM is applicable to small, medium, and large systems; both public and privately owned; and both regional and satellite collection systems. The CMOM does not substitute for the Clean Water Act, the Missouri Clean Water Law, and both federal and state regulations, as it is not a regulation.

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 SOC's, and attain a greater level of consistency, on April 9, 2015 the Department issued an updated policy on development of SOC's. 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.

- ✓ The time given for effluent limitations of this permit listed under Interim Effluent Limitation and Final Effluent Limitations were established in accordance with [10 CSR 20-7.031(11)]. The facility was given a 10 year schedule of compliance to meet final effluent limits for Total Recoverable Copper in the previous permit issued in 2014. This permit renewal retains the existing schedule of compliance and now includes the requirement to meeting final effluent limitations for *E. coli*. The facility has approximately 5 years of the schedule remaining at the time of the development of this permit renewal. This should provide adequate time for the facility to evaluate operations, obtain an engineering report, hold a bond election if necessary, obtain a construction permit and implement upgrades required to meet the final effluent limits for *E. coli*.

SEWER EXTENSION AUTHORITY SUPERVISED PROGRAM:

In accordance with [10 CSR 20-6.010(6)(A)], the Department may grant approval of a permittee's Sewer Extension Authority Supervised Program. These approved permittees regulate and approve construction of sanitary sewers and pump stations, which are tributary to this wastewater treatment facility. The permittee shall act as the continuing authority for the operation, maintenance, and modernization of the constructed collection system. See <http://dnr.mo.gov/env/wpp/permits/sewer-extension.htm>.

- ✓ The permittee does not have a Department approved Sewer Extension Authority Supervised Program.

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.

- ✓ 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(86)], 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 not calculated.

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.

WHOLE EFFLUENT TOXICITY (WET) TEST:

- ✓ The permittee is required to conduct WET test for this facility.

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.

Under the federal Clean Water Act (CWA) §101(a)(3), requiring WET testing is reasonably appropriate for site-specific Missouri State Operating Permits for discharges to waters of the state issued under the National Pollutant Discharge Elimination System (NPDES). WET testing is also required by 40 CFR 122.44(d)(1). WET testing ensures that the provisions in the 10 CSR 20-6.010(8)(A)7. and the Water Quality Standards 10 CSR 20-7.031(4)(D),(F),(G),(J)2.A & B are being met. Under [10 CSR 20-6.010(8)(B)], the Department may require other terms and conditions that it deems necessary to assure compliance with the Clean Water Act and related regulations of the Missouri Clean Water Commission. In addition the following MCWL apply: §§644.051.3 requires the Department to set permit conditions that comply with the MCWL and CWA; 644.051.4 specifically references toxicity as an item we must consider in writing permits (along with water quality-based effluent limits, pretreatment, etc...); and 644.051.5 is the basic authority to require testing conditions. WET test will be required by facilities meeting the following criteria:

- ☐ Facility is a designated Major.
- ☐ Facility continuously or routinely exceeds its design flow.
- ☐ Facility that exceeds its design population equivalent (PE) for BOD₅ whether or not its design flow is being exceeded.
- ☐ Facility (whether primarily domestic or industrial) that alters its production process throughout the year.
- ☐ Facility handles large quantities of toxic substances, or substances that are toxic in large amounts.
- ☒ Facility has Water Quality-based Effluent Limitations for toxic substances (other than NH₃)
- ☒ Facility is a municipality with a Design Flow ≥ 22,500 gpd.
- ☐ Other – please justify.

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.

- ✓ Bypasses occur or have occurred at this facility.
- Outfall #002 is no longer authorized to discharge as it is a Bypass. The Department has developed a Voluntary Compliance Agreement (VCA) for communities that believe they need time to eliminate this discharge. The VCA requires communities to develop and submit bypass elimination plans, to make progress, and to report on this progress. The terms of the VCA is for five (5) years, and is renewable for another five (5) years assuming that adequate progress is being made. In return, the State of Missouri will not initiate enforcement actions for the terms contained in the VCA. The permittee has entered into a VCA.

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 does not discharge to a 303(d) listed stream or stream with a TMDL.

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

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/week-days	monthly	T
BOD ₅	mg/L	1		45	30	45/30	1/month	monthly	C
TSS	mg/L	1		45	30	45/30	1/month	monthly	C
<i>Escherichia coli</i> **	#/100mL	1, 3		1,030	206	***	1/week	monthly	G
Ammonia as N	mg/L	2, 3	*		*	*/	1/month	monthly	C
Total Recoverable Copper	µg/L	2, 3	29.5		19.4	28.7/10.6	1/month	monthly	C
Total Hardness	mg/L	2, 3	*		*	***	1/month	monthly	C
Oil & Grease	mg/L	1, 3	*		*	15/10	1/quarter	quarterly	G
Total Kjeldahl Nitrogen	mg/L	1	*		*	***	1/quarter	quarterly	C
Nitrate + Nitrite	mg/L	1	*		*	***	1/quarter	quarterly	C
Total Phosphorus	mg/L	1	*		*	***	1/quarter	quarterly	C
Acute Whole Effluent Toxicity	TUa	1, 9	*			Pass/Fail	1/permit cycle	1/permit cycle	C
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/month	monthly	G
Temperature	°C	2, 3	*		*	***	1/month	monthly	G
PARAMETER	Unit	Basis for Limits	Daily Minimum		Monthly Avg Min	Previous Permit Limit	Sampling Frequency	Reporting Frequency	Sample Type
BOD ₅ Percent Removal	%	1			85	85	1/month	monthly	M
TSS Percent Removal	%	1			85	85	1/month	monthly	M

* - Monitoring requirement only.

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

*** - Parameter not previously established in previous state operating permit.

**** - C = 24-hour composite

G = Grab

T = 24-hr. total

E = 24-hr. estimate

M = Measured/calculated

Basis for Limitations Codes:

- | | | |
|--|-----------------------------------|---|
| 1. State or Federal Regulation/Law | 5. Antidegradation Policy | 9. WET Test Policy |
| 2. Water Quality Standard (includes RPA) | 6. Water Quality Model | 10. Multiple Discharger Variance |
| 3. Water Quality Based Effluent Limits | 7. Best Professional Judgment | 11. Nutrient Criteria Implementation Plan |
| 4. Antidegradation Review | 8. TMDL or Permit in lieu of TMDL | |

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 (BOD₅)**. 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 Weekly Average of 1,030 per 100 mL as a geometric mean 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 weekly average 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 = 5th root of (1)(4)(6)(10)(5) = 5th root of 1,200 = 4.1 #/100mL.
- **Total Ammonia Nitrogen**. Monitoring requirement only. This data will be reviewed at the next permit renewal.

- **Oil & Grease.** Monitoring requirement only. This data will be reviewed at the next permit renewal.
- **Total Phosphorus and Total Nitrogen (Speciated).** Effluent monitoring for Total Phosphorus, Total Kjeldahl Nitrogen, and Nitrite + Nitrate is required per 10 CSR 20-7.015(9)(D)8.
- **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.
- **Temperature.** Monitoring requirement only. This data will be used during the next permit renewal along with effluent pH data to calculate Ammonia limits, as Ammonia toxicity is Temperature and pH dependent.
- **Biochemical Oxygen Demand (BOD₅) Percent Removal.** In accordance with 40 CFR Part 133, 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 (BOD₅) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals. This facility is required to meet 85% removal efficiency for BOD₅.
- **Total Suspended Solids (TSS) Percent Removal.** In accordance with 40 CFR Part 133, 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 (BOD₅) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals. This facility is required to meet 85% removal efficiency for TSS.

Metals

- **Copper, Total Recoverable.** Effluent limits were determined by the City of Shelbina's 2017 Biotic Ligand Model. A daily maximum effluent limit of 29.5 µg/L and monthly average limit of 19.4 µg/L were calculated. See Table 4 below.

Table 4 Outfall 001 Comparative Copper and Zinc Effluent Limitations

Parameter	Effluent Limitation	Biotic Ligand Model Value ¹	Geomean Translator Value ²	Geomean Translator and 50 th Percentile Hardness ³	Current MSOP Effluent Limitation
Copper	Maximum Daily (µg/L)	29.5	25.7	28.0	28.7
	Average Monthly (µg/L)	19.4	16.9	18.4	10.6
Zinc	Maximum Daily (µg/L)	NA	245	267	228
	Average Monthly (µg/L)	NA	141	153	81.4

Whole Effluent Toxicity

- **Acute Whole Effluent Toxicity.** Monitoring requirement only. Monitoring is required to determine if reasonable potential exists for this facility's discharge to exceed water quality standards.

Acute and/or Chronic Allowable Effluent Concentrations (AECs) for facilities that discharge to Waters of the State lacking designated uses, Class C, Class P (with default Mixing Considerations), or Lakes [10 CSR 20-7.031(5)(A)4.B.(IV)(b)] are 100%, 50%, 25%, 12.5%, & 6.25%.

- **Parameters Removed/Revised.**
 - Effluent limitations were revised for Total Recoverable Copper based on the results of the City of Shelbina's 2017 Biotic Ligand Model. The newly established limitations are still protective of water quality.
 - Total Recoverable Zinc was removed from the permit as there was no reasonable potential to violate Water Quality Standards observed.
 - Oil & Grease was reduced to quarterly sampling and monitoring only as there was no reasonable potential to violate Water Quality Standards observed.
 - The Acute Whole Effluent Toxicity (WET) test was reduced to once per permit cycle as the facility has not failed an Acute WET test since the last permit renewal.

Sampling Frequency Justification:

Sampling and Reporting Frequency was retained from previous permit, except that Oil & Grease was reduced to quarterly sampling and reporting. Weekly sampling is required for *E. coli*, per 10 CSR 20-7.015(9)(D)6.A. The sampling and reporting frequency for Total Hardness has been established to match the required sampling frequency of Total Recoverable Copper.

WET Test Sampling Frequency Justification. WET Testing schedules and intervals are established in accordance with the Department's Permit Manual; Section 5.2 *Effluent Limits / WET Testing for Compliance Bio-monitoring*. It is recommended that WET testing be conducted during the period of lowest stream flow.

Acute Whole Effluent Toxicity

- ✓ **No less than ONCE/PERMIT CYCLE:**
☒ -Municipality with a design flow $\geq$ 22,500 gpd, but less than 1.0 MGD.
☐ - Other, please justify.

Sampling Type Justification:

As per 10 CSR 20-7.015, samples collected for mechanical plants shall be a 24 hour composite sample. Grab samples, however, must be collected for pH, *E. coli*, and Oil & Grease, in accordance with recommended analytical methods. Total Hardness samples must be immediately preserved; these samples are to be collected as a grab. For further information on sampling and testing methods please review 10 CSR 20-7.015(9)(D) 2.

PERMITTED FEATURE INF – INFLUENT MONITORING

The monitoring requirements established in the below Monitoring Requirements 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 the monitoring requirements listed in this table.

INFLUENT MONITORING TABLE:

PARAMETER	Unit	Basis for Limits	Daily Maximum	Weekly Average	Monthly Average	Previous Permit Limit	Sampling Frequency	Reporting Frequency	Sample Type ****
BOD ₅	mg/L	1			*	*	1/month	monthly	C
TSS	mg/L	1			*	*	1/month	monthly	C
Ammonia as N	mg/L	1	*		*	***	1/quarter	quarterly	C
Total Phosphorus	mg/L	1	*		*	***	1/quarter	quarterly	C
Total Kjeldahl Nitrogen	mg/L	1	*		*	***	1/quarter	quarterly	C
Nitrite + Nitrate	mg/L	1	*		*	***	1/quarter	quarterly	C

* - Monitoring requirement only.

*** - Parameter not previously established in previous state operating permit.

**** - C = Composite

G = Grab

Basis for Limitations Codes:

- | | | |
|--|-----------------------------------|---|
| 1. State or Federal Regulation/Law | 5. Antidegradation Policy | 9. WET Test Policy |
| 2. Water Quality Standard (includes RPA) | 6. Water Quality Model | 10. Multiple Discharger Variance |
| 3. Water Quality Based Effluent Limits | 7. Best Professional Judgment | 11. Nutrient Criteria Implementation Plan |
| 4. Antidegradation Review | 8. TMDL or Permit in lieu of TMDL | |

Influent Parameters

- **Biochemical Oxygen Demand (BOD₅)**. An influent sample is required to determine the removal efficiency. In accordance with 40 CFR Part 133, 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 (BOD₅) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals.
- **Total Suspended Solids (TSS)**. An influent sample is required to determine the removal efficiency. In accordance with 40 CFR Part 133, 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 (BOD₅) and Total Suspended Solids (TSS) for Publicly Owned Treatment Works (POTWs)/municipals.

- **Total Phosphorus, Total Kjeldahl Nitrogen, Nitrite + Nitrate, and Ammonia.** Influent monitoring for Total Phosphorus, Total Kjeldahl Nitrogen, Nitrite + Nitrate, and Ammonia required per 10 CSR 20-7.015(9)(D)8.

Sampling Frequency Justification: The sampling and reporting frequency for Total Phosphorus and Total Nitrogen (speciated) parameters was established to match the required sampling frequency of these parameters in the effluent, per 10 CSR 20-7.015(9)(D)8.].

Sampling Type Justification: Sample types for Total Phosphorus and Nitrogen parameters were established to match the required sampling frequency of these parameters in the effluent. Samples should be analyzed as soon as possible after collection and/or properly preserved according to method requirements.

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 upon review of the recent Report of Compliance Inspection for the inspection conducted on October 31, 2016 and November 1, 2016, 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 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, when issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or publicly owned treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or [publicly owned] treatment works, the Department of Natural Resources shall make a “finding of affordability” on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control Act. This process is completed through a cost analysis for compliance. Permits that do not include new requirements may be deemed affordable.

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

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

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

The following table summarizes the results of the cost analysis. See **Appendix – Cost Analysis for Compliance** for detailed information.

Summary Table. Cost Analysis for Compliance Summary for the City of Shelbina

Annual Median Household Income (MHI)	Estimated Monthly User Rate	Residential Indicator (User Rate as a Percent of MHI)	Financial Capability Indicator	Financial Burden	Schedule of Compliance Length
\$33,955	\$48.59	1.7%	2.1	Medium Burden	~5 years remaining
Pollution Control Option Selected for Analysis: UV Disinfection					
Estimated Present Worth: \$578,000					

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.

WATER QUALITY STANDARD REVISION:

In accordance with section 644.058, RSMo, the Department is required to utilize an evaluation of the environmental and economic impacts of modifications to water quality standards of twenty-five percent or more when making individual site-specific permit decisions.

- ✓ This operating permit does not contain requirements for a water quality standard that has changed twenty-five percent or more since the previous operating permit.

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 2nd 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 May 24, 2019 to June 24, 2019. No responses received.

DATE OF FACT SHEET: SEPTEMBER 11, 2019

COMPLETED BY:

BRANT FARRIS, ENVIRONMENTAL SPECIALIST III
MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
OPERATING PERMITS SECTION - DOMESTIC WASTEWATER UNIT
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Appendices

APPENDIX - CLASSIFICATION WORKSHEET:

Item	Points Possible	Points Assigned
Maximum Population Equivalent (P.E.) served , peak day	1 pt./10,000 PE or major fraction thereof. (Max 10 pts.)	0.5
Design Flow (avg. day) or peak month's flow (avg. day) whichever is larger	1 pt. / MGD or major fraction thereof. (Max 10 pts.)	0.5
Effluent Discharge		
Missouri or Mississippi River	0	
All other stream discharges except to losing streams and stream reaches supporting whole body contact recreation	1	
Discharge to lake or reservoir outside of designated whole body contact recreational area	2	
Discharge to losing stream, or stream, lake or reservoir area supporting whole body contact recreation	3	3
Direct reuse or recycle of effluent	6	
Land Application/Irrigation		
Drip Irrigation	3	
Land application/irrigation	5	
Overland flow	4	
Variation in Raw Wastes (highest level only)		
Variations do not exceed those normally or typically expected	0	
Reoccurring deviations or excessive variations of 100 to 200 percent in strength and/or flow	2	2
Reoccurring deviations or excessive variations of more than 200 percent in strength and/or flow	4	
Department-approved pretreatment program	6	
Preliminary Treatment		
STEP systems (operated by the permittee)	3	
Screening and/or comminution	3	3
Grit removal	3	3
Plant pumping of main flow	3	3
Flow equalization	5	5
Primary Treatment		
Primary clarifiers	5	
Chemical addition (except chlorine, enzymes)	4	
Secondary Treatment		
Trickling filter and other fixed film media with or without secondary clarifiers	10	
Activated sludge (including aeration, oxidation ditches, sequencing batch reactors, membrane bioreactors, and contact stabilization)	15	15
Stabilization ponds without aeration	5	
Aerated lagoon	8	
Advanced Lagoon Treatment – Aerobic cells, anaerobic cells, covers, or fixed film	10	
Biological, physical, or chemical	12	
Carbon regeneration	4	
Total from page ONE (1)	----	35

APPENDIX - CLASSIFICATION WORKSHEET (CONTINUED):

ITEM	POINTS POSSIBLE	POINTS ASSIGNED
Solids Handling		
Sludge Holding	5	5
Anaerobic digestion	10	
Aerobic digestion	6	
Evaporative sludge drying	2	2
Mechanical dewatering	8	
Solids reduction (incineration, wet oxidation)	12	
Land application	6	6
Disinfection		
Chlorination or comparable	5	
On-site generation of disinfectant (except UV light)	5	
Dechlorination	2	
UV light	4	
Required Laboratory Control Performed by Plant Personnel (highest level only)		
Lab work done outside the plant	0	
Push – button or visual methods for simple test such as pH, settleable solids	3	
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	
Highly sophisticated instrumentation, such as atomic absorption and gas chromatograph	10	
Total from page TWO (2)	----	18
Total from page ONE (1)	---	35
Grand Total	---	53

- ☐ - 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	0.24	1.5	0.24	34.00	0.2/0.1	0.33	1.18	NO
Total Ammonia as Nitrogen (Winter) mg/L	12.1	1.89	3.1	1.89	34.00	2.4/0.1	2.03	0.79	NO
Copper, Total Recoverable	30.3	36.60	18.7	36.60	102.00	30/2.1	0.3	1.22	YES
Zinc, Total Recoverable	243.9	82.56	280.9	82.56	102.00	66/4.2	0.4	1.25	NO

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. If the number of samples is < 10, then the default 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 – COST ANALYSIS FOR COMPLIANCE:

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

**Shelbina WWTP, Permit Renewal
City of Shelbina
Missouri State Operating Permit #MO-0041092**

Section 644.145 RSMo requires the Department of Natural Resources (Department) to make a “finding of affordability” when “issuing permits under” or “enforcing provisions of” state or federal clean water laws “pertaining to any portion of a combined or separate sanitary sewer system for publicly-owned treatment works.” This cost analysis does not dictate that the permittee will upgrade their facility, or how the permittee will comply with new permit requirements. The results of this analysis are used to determine an adequate compliance schedule for the permit that may mitigate the financial burden of new permit requirements.

New Permit Requirements

The permit requires compliance with new effluent limitations for *E. coli*, which may require the design, construction, and operation of a different treatment technology. For this analysis, the Department has selected a disinfection system that could be the most practical solution to meet the new requirements for the community.

The permit also requires compliance with new monitoring requirements. For Outfall #001, this includes Total Kjeldahl Nitrogen, Nitrate + Nitrite, Phosphorus, Temperature, and *E. coli*. For Permitted Feature INF, this includes Total Kjeldahl Nitrogen, Nitrate + Nitrite, and Phosphorus.

Flow and Connections

The size of the facility evaluated for upgrades was chosen based on the permitted design flow. If significant population growth is expected in the community, or if a significant portion of the flow is due to inflow and infiltration, then the flows and resulting estimated costs used in a facility plan prepared by a consulting engineer may differ. The number of connections was reported by the permittee on the Financial Questionnaire.

Flow Evaluated: 662,000 gallons per day	
Connection Type	Number
Residential	672
Commercial	115
Industrial	1
Total	788

Data Collection for this Analysis

This cost analysis is based on data available to the Department as provided by the permittee and data obtained from readily available sources. For the most accurate analysis, it is essential that the permittee provides the Department with current information about the City’s financial and socioeconomic situation. The financial questionnaire available to permittees on the Department’s website (<http://dnr.mo.gov/forms/780-2511-f.pdf>) is a required attachment to the permit renewal application. If the financial questionnaire is not submitted with the renewal application, the Department sends a request to complete the form with the welcome correspondence. If certain data was not provided by the permittee to the Department and the data is not obtainable through readily available sources, this analysis will state that the information is “unknown”.

The Department used the cost estimate provided by City’s engineer for construction of a disinfection system

Eight Criteria of 644.145 RSMo

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

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

Criterion 1 Table. Current Financial Information for the City of Shelbina	
Current Monthly User Rates per 5,000 gallons*	\$44.27
Municipal Bond Rating (if applicable)	NA
Bonding Capacity**	\$3,962,498.40
Median Household Income (MHI) ²	\$33,955
Current Annual Operating Costs (excludes depreciation) †	\$953,788
Current Outstanding Debt for the Facility	\$0
Amount within the Current User Rate Used toward Payments on Outstanding Debt Related to the Current Wastewater Infrastructure	\$0

* User Rates were reported by the permittee on the Financial Questionnaire.

** General Obligation Bond capacity allowed by constitution: Cities = up to 20% of taxable tangible property; Sewer districts or villages = up to 5% of taxable tangible property

† - obtained from the 2012 permit renewal

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

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

Criterion 2A Table. Estimated Cost Breakdown of New Sampling Requirements					
Outfall/ Permitted Feature	New Requirement	Frequency	Total Annual Samples (New)	Estimated Cost	Estimated Annual Cost
001	Total Phosphorus	Quarterly	4	\$24	\$96
001	Total Kjeldahl Nitrogen	Quarterly	4	\$33	\$132
001	Nitrate + Nitrite	Quarterly	4	\$40	\$160
INF	Total Phosphorus	Quarterly	4	\$24	\$96
INF	Total Kjeldahl Nitrogen	Quarterly	4	\$33	\$132
INF	Nitrate + Nitrite	Quarterly	4	\$40	\$160
INF	Ammonia	Quarterly	4	\$20	\$80
Total Estimated Annual Cost of New Sampling Requirements					\$856

§ - only required during April - October

There is no new cost for Temperature as the facility already has the equipment to conduct this measurement. There is also no new cost for *E. coli* monitoring this permit cycle as sampling and limits do not go into effect until this permit has expired.

The addition cost estimates located within this document are for the construction of a disinfection system that is the most practical to facilitate compliance with new permit requirements.

Cost Estimate Assumptions:

- Total Present Worth includes a five percent interest rate to construct and perform annual operation and maintenance of the new disinfection over the term of the loan, which is 20 years.
- Capital Cost includes design, construction, inspection, and contingency costs from CapdetWorks.
- Operation and maintenance (O&M) includes operations, maintenance, materials, chemical, and electrical costs for the facility on an annual basis. It includes items that are expected to be replaced during operations, such as pumps and is estimated between 15% and 45% of the user rate.
- Estimated user costs per 5,000 gallons per month are calculated using equations that account for debt retirement and annualized operation and maintenance costs over the life of the disinfection system.

Disinfection Cost Estimates:

The Department has estimated costs for an ultraviolet (UV) disinfection system. New sampling costs are also included in the following cost estimations.

Criterion 2 Table. Estimated Costs for Disinfection		
(1)	Estimated Total Present Worth	\$578,000
	Estimated Capital Cost	\$449,000
	Estimated Annual Cost of Operation and Maintenance	\$4,000
	Estimated Annual Cost of New Sampling Requirements	\$856
(2)	Estimated Monthly User Cost for Disinfection + Sampling Costs	\$4.32
	Estimated Monthly User Cost for Disinfection + Sampling Costs as a Percent of MHI ³	0.15%
(3)	Total Monthly User Cost*	\$48.59
	Total Monthly User Cost as a Percent of MHI ⁴	1.7%

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

(3) An evaluation of the overall costs and environmental benefits of the control technologies;

An investment in wastewater treatment will provide several social, environmental, and economic benefits. Improved wastewater provides benefits such as avoided health costs due to water-related illness, enhanced environmental ecosystem quality, and improved natural resources. The preservation of natural resources has been proven to increase the economic value and sustainability of the surrounding communities. Maintaining Missouri's water quality standards fulfills the goal of **restoring** and **maintaining** the chemical, physical, and biological integrity of **the receiving stream**; and, where attainable, it achieves a level of water quality that provides for the protection and propagation of fish, shellfish, wildlife, and recreation in and on the water.

Disinfection

E. coli is a species of bacteria that normally live in the intestines of humans and warm-blooded animals. While some strains of *E. coli* are harmless, there are several strains that can cause severe diarrhea, abdominal cramps, and severe kidney failure. The people most susceptible to these consequences are young children, the elderly, and those with weakened immune systems. The receiving stream that this facility discharges to contains the WBC-B designated use to protect human health in accordance with Water Quality Standards (10 CSR 20-7.031) and the Clean Water Act. The disinfection of wastewater effluent benefits human health by reducing exposure to disease-causing bacteria, such as *E. coli*, and viruses and reducing health care costs to those infected by contaminated water. The construction and installation of a disinfection system at the treatment facility will protect human health as well as meet water quality standards.

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

The community has reported that they have no outstanding debt for the current wastewater collection and treatment systems.

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

- Allowing adequate time in implementation schedules to mitigate potential adverse impacts on distressed populations resulting from the costs of the improvements and taking into consideration local community economic considerations.

- A schedule of compliance will be provided based on the results of this cost analysis. The schedule of compliance is provided to ensure that the entity has time to reasonably plan for compliance with the new permit requirements. The time provided ensures the entity has time to hire an engineer, develop facility plans, hold community meetings, seek an appropriate funding source, and construct the facility. If it is determined by the permittee that a longer schedule of compliance is necessary due to financial reasons, please contact the Department and request modification of the compliance schedule.
 - An integrated plan may be an appropriate option if the community needs to meet other environmental obligations as well as the new requirements within this permit. The integrated plan needs to be well thought out with specific timeframes built into the management plan in which the municipality can reasonably commit. The plan should be designed to allow the municipality to meet Clean Water Act obligations by maximizing infrastructure improvement dollars through the appropriate sequencing of work. For further information on how to develop an integrated plan, please see the Department publication, “Missouri Integrated Planning Framework,” at <http://dnr.mo.gov/pubs/pub2684.htm>.
- (b) Allowing for reasonable accommodations for regulated entities when inflexible standards and fines would impose a disproportionate financial hardship in light of the environmental benefits to be gained.
- The permittee may apply for State Revolving Fund (SRF) financial support in order to help fund a capital improvements plan. Other loans and grants also exist for which the facility may be eligible. More information can be found on the Department’s FAC website at <http://dnr.mo.gov/env/wpp/srf/wastewater-assistance.htm>.

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

Criterion 5 Table. Socioeconomic Data ^{2, 5-9} for the City of Shelbina

No.	Administrative Unit	Shelbina City	Missouri State
1	Population (2017)	1,537	6,075,300
2	Percent Change in Population (2000-2017)	-20.9%	8.6%
3	2017 Median Household Income (in 2018 Dollars)	\$33,955	\$52,801
4	Percent Change in Median Household Income (2000-2017)	-12.7%	-7.7%
5	Median Age (2017)	45.9	38.4
6	Change in Median Age in Years (2000-2017)	3.0	2.3
7	Unemployment Rate (2017)	5.9%	5.8%
8	Percent of Population Below Poverty Level (2017)	23.5%	14.6%
9	Percent of Household Received Food Stamps (2017)	19.3%	12.2%
10	(Primary) County Where the Community Is Located	Shelby County	

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

The community submitted a Facility Plan in 2016 that outlined future proposed projects. These included construction of a new headworks system, construction of a disinfection system, continuation of the sanitary sewer rehabilitation, continuation of the WWTP rehabilitation and upgrades from the 2010 Wastewater System Engineering Report and updated in the 2016 Facility Plan. The City is in the preliminary process of obtaining a construction permit for constructing a new headworks system and a blending line for high influent flow events.

- (7) An assessment of factors set forth in the United States Environmental Protection Agency's guidance, including but not limited to the "Combined Sewer Overflow Guidance for Financial Capability Assessment and Schedule Development" that may ease the cost burdens of implementing wet weather control plans, including but not limited to small system considerations, the attainability of water quality standards, and the development of wet weather standards;

The following table characterizes the community's overall financial capability to raise the necessary funds to meet the new permit requirements.

Criterion 7A Table. Financial Capability Indicator

Indicators	Strong (3 points)	Mid-Range (2 points)	Weak (1 point)	Score
Bond Rating Indicator	Above BBB or Baa	BBB or Baa	Below BBB or Baa	NA
Overall Net Debt as a % of Full Market Property Value	Below 2%	2% - 5%	Above 5%	3
Unemployment Rate (2017)	Beyond 1% below Missouri average of 5.8%	± 1% of Missouri average of 5.8%	Beyond 1% above Missouri average of 5.8%	2
2017 Median Household Income (in 2018 Dollar)	Beyond 25% above Missouri MHI (\$52,801)	± 25% of Missouri MHI (\$52,801)	Beyond 25% below Missouri MHI (\$52,801)	1
Percent of Population Below Poverty Level (2017)	Beyond 10% below Missouri average of 14.6%	± 10% of Missouri average of 14.6%	Beyond 10% above Missouri average of 14.6%	2
Percent of Household Received Food Stamps (2017)	Beyond 5% below Missouri average of 12.2%	± 5% of Missouri average of 12.2%	Beyond 5% above Missouri average of 12.2%	1
Property Tax Revenues as a % of Full Market Property Value	Below 2%	2% - 4%	Above 4%	3
Property Tax Collection Rate	Above 98%	94% - 98%	Below 94%	3
Total Average Score (Financial Capability Indicator)	--	--	--	2.1

The **Financial Capability Indicator** and the **Residential Indicator** are considered jointly in the Financial Capability Matrix to determine the financial burden that could occur from compliance with the new requirements of the permit.

- Financial Capability Indicator (from Criterion 7): 2.1
- Residential Indicator (from Criterion 2): 1.7

Criterion 7B Table. Financial Capability Matrix

Financial Capability Indicator	Residential Indicator (User Rate as a % of MHI)		
	Low (Below 1%)	Mid-Range (1.0% to 2.0%)	High (Above 2.0%)
Weak (Below 1.5)	Medium Burden	High Burden	High Burden
Mid-Range (1.5 – 2.5)	Low Burden	Medium Burden	High Burden
Strong (Above 2.5)	Low Burden	Medium Burden	High Burden

- Resulting Financial Burden for Disinfection: Medium Burden

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

The City reported that there is a continued decrease and aging population base that has been trending for the past 20 years with no changes in the foreseeable future.

The Department contracted with Wichita State University to complete an assessment tool that would allow for predictions on rural Missouri community populations and future sustainability. The purpose of the study is to use a statistical modeling analysis in order to determine factors associated with each rural Missouri community that would predict the future population changes that could occur in

each community. A stepwise regression model was applied to 19 factors which were determined as predictors of rural population change in Missouri. The model established a hierarchy of the predicting factors which allowed the model to place a weighted value on each of the factors. A total of 745 rural towns and villages in Missouri received a weighted value for each of the predicting factors. The weighted values for each town / village were then added together to determine an overall decision score. The overall decision scores were then divided into five categories and each town was assigned to a different categorical group based on the overall decision score. The categorical groups were developed from the range of overall scores across all rural towns and villages within Missouri.

Based on the assessment tool, the City of Shelbina has been determined to be a category 1 community. This means that the City of Shelbina could potentially face more challenging socioeconomic circumstances over time and may have significant declines in population in the future. The Department has determined an adequate schedule of compliance that will alleviate the potential financial burdens that the City of Shelbina may face due to the necessary upgrades required to meet the new permit requirements. If this community experiences a decline in population, which results in the inability to secure the necessary funding for an upgrade to meet the new requirements within this permit, a modification to the schedule of compliance may be necessary. The community may contact the Department and send an application for a modification to the schedule of compliance with justification for the time necessary to comply with this permit.

Conclusion and Finding

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

The Department finds that a UV disinfection system is the most practical and affordable option for the City of Shelbina. The construction and operation of a UV disinfection system will ensure that the individuals within the community will not be required to make unreasonable sacrifices in their essential lifestyle or spending patterns or undergo hardships in order to make the projected monthly payments for sewer connections.

In accordance with 40 CFR 122.47(a)(1) and 10 CSR 20-7.031(11), compliance must occur as soon as possible; therefore, based on this analysis, the permit holder has received an approximate **five (5)** year schedule of compliance for the design and construction of a UV disinfection system (January 1, 2024). The following suggested milestones can be used by the permittee as a timeline toward compliance with new permit requirements. Once the permit holder's engineer has completed facility design with actual costs associated with permit compliance, it may be necessary for the permit holder to request additional time within the schedule of compliance. The Department is committed to review all requests for additional time in the schedule of compliance where adequate justification is provided.

Suggested Milestones during the ~5 Year Schedule of Compliance

Year	Milestone(s)
1	Hire engineer and evaluate rate structure and treatment plant
2	Hold bond election, apply for State Revolving Fund loans and /or grants, submit facility plan
3	Apply for construction permit and close on loan
4	Construction
5	Construction and complete project

The Department is committed to reassessing the cost analysis for compliance at renewal to determine if the initial schedule of compliance will accommodate the socioeconomic data and financial capability of the community at that time. Because each community is unique, the Department wants to make sure that each community has the opportunity to consider all options and tailor solutions to best meet their needs. The Department understands the economic challenges associated with achieving compliance, and is committed to using all available tools to make an accurate and practical finding of affordability for Missouri communities. If the community is interested in the funding options available to them, please contact the Financial Assistance Center for more information. <http://www.dnr.mo.gov/env/Wpp/srf/index.html>

This determination is based on readily available data and may overestimate the financial impact on the community. The community's facility plan that is submitted as a part of the construction permit process includes a discussion of community details, what the community can afford, existing obligations, future growth potential, an evaluation of options available to the community with cost information, and a discussion on no-discharge alternatives. The cost information provided through the facility plan process, which is developed by the community and their engineer, is more comprehensive of the community's individual factors in relation to selected treatment technology and costing information.

References

1. <http://www.hydromantis.com/>
2. (A) 2017 MHI in 2017 Dollar: United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, Table B19013: Median Household Income in the Past 12 Months (in 2017 Inflation-Adjusted Dollars). http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B19013&prodType=table.
(B) 2000 MHI in 1999 Dollar: (1) For United States, United States Census Bureau (2003) 2000 Census of Population and Housing, Summary Social, Economic, and Housing Characteristics, PHC-2-1 Part 1. United States Summary, Table 5. Work Status and Income in 1999: 2000, Washington, DC. <https://www.census.gov/prod/cen2000/phc-2-1-pt1.pdf>. (2) For Missouri State, United States Census Bureau (2003) 2000 Census of Population and Housing, Summary Social, Economic, and Housing Characteristics, PHC-2-27, Missouri, Table 10. Work Status and Income in 1999: 2000, Washington, DC. <https://www.census.gov/prod/cen2000/phc-2-27-pt1.pdf>.
(C) 2018 CPI, 2017 CPI and 1999 CPI: U.S. Department of Labor Bureau of Labor Statistics (2018) Consumer Price Index - All Urban Consumers, U.S. City Average. All Items. 1982-84=100. http://data.bls.gov/timeseries/CUUR0000SA0?data_tool=Xgtable.
(D) 2017 MHI in 2018 Dollar = 2017 MHI in 2017 Dollar x 2018 CPI / 2017 CPI; 2000 MHI in 2018 Dollar = 2000 MHI in 1999 Dollar x 2018 CPI / 1999 CPI.
(E) Percent Change in Median Household Income (2000-2017) = (2017 MHI in 2018 Dollar - 2000 MHI in 2018 Dollar) / (2000 MHI in 2018 Dollar).
3. $(\$4.32/(\$33,955/12))100\% = 0.15\%$ (Disinfection + Sampling Costs)
4. $(\$48.59/(\$33,955/12))100\% = 1.7\%$ (Total User Cost)
5. (A) Total Population in 2017: United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, Table B01003: Total Population - Universe: Total Population. http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B01003&prodType=table. (B) Total Population in 2000: (1) For United States, United States Census Bureau (2002) 2000 Census of Population and Housing, Summary Social, Economic, and Housing Characteristics, PHC-1-1 Part 1. United States Summary, Table 1. Age and Sex: 2000, Washington, DC. <https://www.census.gov/prod/cen2000/phc-1-1-pt1.pdf>. (2) For Missouri State, United States Census Bureau (2002) 2000 Census of Population and Housing, Summary Population and Housing Characteristics, PHC-1-27, Missouri, Table 2. Age and Sex: 2000, Washington, DC. <http://www.census.gov/prod/cen2000/phc-2-27-pt1.pdf>.
(C) Percent Change in Population (2000-2017) = (Total Population in 2017 - Total Population in 2000) / (Total Population in 2000).
6. (A) Median Age in 2017: United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, Table B01002: Median Age by Sex - Universe: Total population. http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B01002&prodType=table.
(B) Median Age in 2000: (1) For United States, United States Census Bureau (2002) 2000 Census of Population and Housing, Summary Social, Economic, and Housing Characteristics, PHC-1-1 Part 1. United States Summary, Table 1. Age and Sex: 2000, Washington, DC., Page 2. <https://www.census.gov/prod/cen2000/phc-1-1-pt1.pdf>. (2) For Missouri State, United States Census Bureau (2002) 2000 Census of Population and Housing, Summary Population and Housing Characteristics, PHC-1-27, Missouri, Table 2. Age and Sex: 2000, Washington, DC., Pages 64-92. <http://www.census.gov/prod/cen2000/phc-2-27-pt1.pdf>.
(C) Change in Median Age in Years (2000-2017) = (Median Age in 2017 - Median Age in 2000).
7. United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, B23025: Employment Status for the Population 16 Years and Over - Universe: Population 16 years and Over. http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B23025&prodType=table.
8. United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, Table S1701: Poverty Status in the Past 12 Months. http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_S1701&prodType=table.
9. United States Census Bureau. 2013-2017 American Community Survey 5-Year Estimates, Table B22003: Receipt of Food Stamps/SNAP in the Past 12 Months by Poverty Status in the Past 12 Months for Households - Universe: Households. http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_17_5YR_B22003&prodType=table.



STANDARD CONDITIONS FOR NPDES PERMITS
ISSUED BY
THE MISSOURI DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION
REVISED
AUGUST 1, 2014

These Standard Conditions incorporate permit conditions as required by 40 CFR 122.41 or other applicable state statutes or regulations. These minimum conditions apply unless superseded by requirements specified in the permit.

Part I – General Conditions

Section A – Sampling, Monitoring, and Recording

1. **Sampling Requirements.**
 - a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.
 - b. All samples shall be taken at the outfall(s) or Missouri Department of Natural Resources (Department) approved sampling location(s), and unless specified, before the effluent joins or is diluted by any other body of water or substance.
2. **Monitoring Requirements.**
 - a. Records of monitoring information shall include:
 - i. The date, exact place, and time of sampling or measurements;
 - ii. The individual(s) who performed the sampling or measurements;
 - iii. The date(s) analyses were performed;
 - iv. The individual(s) who performed the analyses;
 - v. The analytical techniques or methods used; and
 - vi. The results of such analyses.
 - b. If the permittee monitors any pollutant more frequently than required by the permit at the location specified in the permit using test procedures approved under 40 CFR Part 136, or another method required for an industry-specific waste stream under 40 CFR subchapters N or O, the results of such monitoring shall be included in the calculation and reported to the Department with the discharge monitoring report data (DMR) submitted to the Department pursuant to Section B, paragraph 7.
3. **Sample and Monitoring Calculations.** Calculations for all sample and monitoring results which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in the permit.
4. **Test Procedures.** The analytical and sampling methods used shall conform to the reference methods listed in 10 CSR 20-7.015 unless alternates are approved by the Department. The facility shall use sufficiently sensitive analytical methods for detecting, identifying, and measuring the concentrations of pollutants. The facility shall ensure that the selected methods are able to quantify the presence of pollutants in a given discharge at concentrations that are low enough to determine compliance with Water Quality Standards in 10 CSR 20-7.031 or effluent limitations unless provisions in the permit allow for other alternatives. A method is “sufficiently sensitive” when; 1) the method minimum level is at or below the level of the applicable water quality criterion for the pollutant or; 2) the method minimum level is above the applicable water quality criterion, but the amount of pollutant in a facility’s discharge is high enough that the method detects and quantifies the level of pollutant in the discharge, or 3) the method has the lowest minimum level of the analytical methods approved under 10 CSR 20-7.015. These methods are also required for parameters that are listed as monitoring only, as the data collected may be used to determine if limitations need to be established. A permittee is responsible for working with their contractors to ensure that the analysis performed is sufficiently sensitive.
5. **Record Retention.** Except for records of monitoring information required by the permit related to the permittee’s sewage sludge use and disposal activities, which shall be retained for a period of at least five (5) years (or longer as required by 40 CFR part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended by request of the Department at any time.

6. **Illegal Activities.**
 - a. The Federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under the permit shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than two (2) years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than \$20,000 per day of violation, or by imprisonment of not more than four (4) years, or both.
 - b. The Missouri Clean Water Law provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained pursuant to sections 644.006 to 644.141 shall, upon conviction, be punished by a fine of not more than \$10,000, or by imprisonment for not more than six (6) months, or by both. Second and successive convictions for violation under this paragraph by any person shall be punished by a fine of not more than \$50,000 per day of violation, or by imprisonment for not more than two (2) years, or both.

Section B – Reporting Requirements

1. **Planned Changes.**
 - a. The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility when:
 - i. The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR 122.29(b); or
 - ii. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations in the permit, nor to notification requirements under 40 CFR 122.42;
 - iii. The alteration or addition results in a significant change in the permittee’s sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan;
 - iv. Any facility expansions, production increases, or process modifications which will result in a new or substantially different discharge or sludge characteristics must be reported to the Department 60 days before the facility or process modification begins. Notification may be accomplished by application for a new permit. If the discharge does not violate effluent limitations specified in the permit, the facility is to submit a notice to the Department of the changed discharge at least 30 days before such changes. The Department may require a construction permit and/or permit modification as a result of the proposed changes at the facility.
2. **Non-compliance Reporting.**
 - a. The permittee shall report any noncompliance which may endanger health or the environment. Relevant information shall be provided orally or via the current electronic method approved by the Department, within 24 hours from the time the permittee becomes aware of the circumstances, and shall be reported to the appropriate Regional Office during normal business hours or the Environmental Emergency Response hotline at 573-634-2436 outside of normal business hours. A written submission shall also be provided within five (5) business days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.



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- b. The following shall be included as information which must be reported within 24 hours under this paragraph.
 - i. Any unanticipated bypass which exceeds any effluent limitation in the permit.
 - ii. Any upset which exceeds any effluent limitation in the permit.
 - iii. Violation of a maximum daily discharge limitation for any of the pollutants listed by the Department in the permit required to be reported within 24 hours.
 - c. The Department may waive the written report on a case-by-case basis for reports under paragraph 2. b. of this section if the oral report has been received within 24 hours.
3. **Anticipated Noncompliance.** The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements. The notice shall be submitted to the Department 60 days prior to such changes or activity.
 4. **Compliance Schedules.** Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of the permit shall be submitted no later than 14 days following each schedule date. The report shall provide an explanation for the instance of noncompliance and a proposed schedule or anticipated date, for achieving compliance with the compliance schedule requirement.
 5. **Other Noncompliance.** The permittee shall report all instances of noncompliance not reported under paragraphs 2, 3, and 6 of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph 2. a. of this section.
 6. **Other Information.** Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or information.
 7. **Discharge Monitoring Reports.**
 - a. Monitoring results shall be reported at the intervals specified in the permit.
 - b. Monitoring results must be reported to the Department via the current method approved by the Department, unless the permittee has been granted a waiver from using the method. If the permittee has been granted a waiver, the permittee must use forms provided by the Department.
 - c. Monitoring results shall be reported to the Department no later than the 28th day of the month following the end of the reporting period.
- b. Notice.
 - i. Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least 10 days before the date of the bypass.
 - ii. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Section B – Reporting Requirements, paragraph 5 (24-hour notice).
 - c. Prohibition of bypass.
 - i. Bypass is prohibited, and the Department may take enforcement action against a permittee for bypass, unless:
 1. Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
 2. There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and
 3. The permittee submitted notices as required under paragraph 2. b. of this section.
 - ii. The Department may approve an anticipated bypass, after considering its adverse effects, if the Department determines that it will meet the three (3) conditions listed above in paragraph 2. c. i. of this section.
3. **Upset Requirements.**
 - a. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology based permit effluent limitations if the requirements of paragraph 3. b. of this section are met. No determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.
 - b. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:
 - i. An upset occurred and that the permittee can identify the cause(s) of the upset;
 - ii. The permitted facility was at the time being properly operated; and
 - iii. The permittee submitted notice of the upset as required in Section B – Reporting Requirements, paragraph 2. b. ii. (24-hour notice).
 - iv. The permittee complied with any remedial measures required under Section D – Administrative Requirements, paragraph 4.
 - c. Burden of proof. In any enforcement proceeding, the permittee seeking to establish the occurrence of an upset has the burden of proof.

Section C – Bypass/Upset Requirements

1. **Definitions.**
 - a. *Bypass*: the intentional diversion of waste streams from any portion of a treatment facility, except in the case of blending.
 - b. *Severe Property Damage*: substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.
 - c. *Upset*: an exceptional incident in which there is unintentional and temporary noncompliance with technology based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.
2. **Bypass Requirements.**
 - a. Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of paragraphs 2. b. and 2. c. of this section.

Section D – Administrative Requirements

1. **Duty to Comply.** The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Missouri Clean Water Law and Federal Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.
 - a. The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Federal Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.
 - b. The Federal Clean Water Act provides that any person who violates section 301, 302, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any such sections in a permit issued under section 402, or any requirement imposed in a pretreatment program approved under sections 402(a)(3) or 402(b)(8) of the Act, is subject to a civil penalty not to exceed \$25,000 per day for each violation. The Federal Clean Water Act provides that any person who negligently violates sections 301, 302, 306, 307, 308, 318, or 405 of the Act, or any condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, or any requirement



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- imposed in a pretreatment program approved under section 402(a)(3) or 402(b)(8) of the Act, is subject to criminal penalties of \$2,500 to \$25,000 per day of violation, or imprisonment of not more than one (1) year, or both. In the case of a second or subsequent conviction for a negligent violation, a person shall be subject to criminal penalties of not more than \$50,000 per day of violation, or by imprisonment of not more than two (2) years, or both. Any person who knowingly violates such sections, or such conditions or limitations is subject to criminal penalties of \$5,000 to \$50,000 per day of violation, or imprisonment for not more than three (3) years, or both. In the case of a second or subsequent conviction for a knowing violation, a person shall be subject to criminal penalties of not more than \$100,000 per day of violation, or imprisonment of not more than six (6) years, or both. Any person who knowingly violates section 301, 302, 303, 306, 307, 308, 318 or 405 of the Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of the Act, and who knows at that time that he thereby places another person in imminent danger of death or serious bodily injury, shall, upon conviction, be subject to a fine of not more than \$250,000 or imprisonment of not more than 15 years, or both. In the case of a second or subsequent conviction for a knowing endangerment violation, a person shall be subject to a fine of not more than \$500,000 or by imprisonment of not more than 30 years, or both. An organization, as defined in section 309(c)(3)(B)(iii) of the CWA, shall, upon conviction of violating the imminent danger provision, be subject to a fine of not more than \$1,000,000 and can be fined up to \$2,000,000 for second or subsequent convictions.
- c. Any person may be assessed an administrative penalty by the EPA Director for violating section 301, 302, 306, 307, 308, 318 or 405 of this Act, or any permit condition or limitation implementing any of such sections in a permit issued under section 402 of this Act. Administrative penalties for Class I violations are not to exceed \$10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed \$25,000. Penalties for Class II violations are not to exceed \$10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed \$125,000.
- d. It is unlawful for any person to cause or permit any discharge of water contaminants from any water contaminant or point source located in Missouri 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. In the event the commission or the director determines that any provision of sections 644.006 to 644.141 of the Missouri Clean Water Law or standard, rules, limitations or regulations promulgated pursuant thereto, or permits issued by, or any final abatement order, other order, or determination made by the commission or the director, or any filing requirement pursuant to sections 644.006 to 644.141 of the Missouri Clean Water Law or any other provision which this state is required to enforce pursuant to any federal water pollution control act, is being, was, or is in imminent danger of being violated, the commission or director may cause to have instituted a civil action in any court of competent jurisdiction for the injunctive relief to prevent any such violation or further violation or for the assessment of a penalty not to exceed \$10,000 per day for each day, or part thereof, the violation occurred and continues to occur, or both, as the court deems proper. Any person who willfully or negligently commits any violation in this paragraph shall, upon conviction, be punished by a fine of not less than \$2,500 nor more than \$25,000 per day of violation, or by imprisonment for not more than one year, or both. Second and successive convictions for violation of the same provision of this paragraph by any person shall be punished by a fine of not more than \$50,000 per day of violation, or by imprisonment for not more than two (2) years, or both.
2. **Duty to Reapply.**
- a. If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit.
- b. A permittee with a currently effective site-specific permit shall submit an application for renewal at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Department. (The Department shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)
- c. A permittee with currently effective general permit shall submit an application for renewal at least 30 days before the existing permit expires, unless the permittee has been notified by the Department that an earlier application must be made. The Department may grant permission for a later submission date. (The Department shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)
3. **Need to Halt or Reduce Activity Not a Defense.** It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
4. **Duty to Mitigate.** The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.
5. **Proper Operation and Maintenance.** The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by a permittee only when the operation is necessary to achieve compliance with the conditions of the permit.
6. **Permit Actions.**
- a. Subject to compliance with statutory requirements of the Law and Regulations and applicable Court Order, this permit may be modified, suspended, or revoked in whole or in part during its term for cause including, but not limited to, the following:
- i. Violations of any terms or conditions of this permit or the law;
- ii. Having obtained this permit by misrepresentation or failure to disclose fully any relevant facts;
- iii. A change in any circumstances or conditions that requires either a temporary or permanent reduction or elimination of the authorized discharge; or
- iv. Any reason set forth in the Law or Regulations.
- b. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.
7. **Permit Transfer.**
- a. Subject to 10 CSR 20-6.010, an operating permit may be transferred upon submission to the Department of an application to transfer signed by the existing owner and the new owner, unless prohibited by the terms of the permit. Until such time the permit is officially transferred, the original permittee remains responsible for complying with the terms and conditions of the existing permit.
- b. The Department may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the Missouri Clean Water Law or the Federal Clean Water Act.
- c. The Department, within 30 days of receipt of the application, shall notify the new permittee of its intent to revoke or reissue or transfer the permit.
8. **Toxic Pollutants.** The permittee shall comply with effluent standards or prohibitions established under section 307(a) of the Federal Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under section 405(d) of the Federal Clean Water Act within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if the permit has not yet been modified to incorporate the requirement.
9. **Property Rights.** This permit does not convey any property rights of any sort, or any exclusive privilege.



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10. **Duty to Provide Information.** The permittee shall furnish to the Department, within a reasonable time, any information which the Department may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The permittee shall also furnish to the Department upon request, copies of records required to be kept by this permit.
11. **Inspection and Entry.** The permittee shall allow the Department, or an authorized representative (including an authorized contractor acting as a representative of the Department), upon presentation of credentials and other documents as may be required by law, to:
 - a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of the permit;
 - b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
 - c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
 - d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Federal Clean Water Act or Missouri Clean Water Law, any substances or parameters at any location.
12. **Closure of Treatment Facilities.**
 - a. Persons who cease operation or plan to cease operation of waste, wastewater, and sludge handling and treatment facilities shall close the facilities in accordance with a closure plan approved by the Department.
 - b. Operating Permits under 10 CSR 20-6.010 or under 10 CSR 20-6.015 are required until all waste, wastewater, and sludges have been disposed of in accordance with the closure plan approved by the Department and any disturbed areas have been properly stabilized. Disturbed areas will be considered stabilized when perennial vegetation, pavement, or structures using permanent materials cover all areas that have been disturbed. Vegetative cover, if used, shall be at least 70% plant density over 100% of the disturbed area.
13. **Signatory Requirement.**
 - a. All permit applications, reports required by the permit, or information requested by the Department shall be signed and certified. (See 40 CFR 122.22 and 10 CSR 20-6.010)
 - b. The Federal Clean Water Act provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or non-compliance shall, upon conviction, be punished by a fine of not more than \$10,000 per violation, or by imprisonment for not more than six (6) months per violation, or by both.
 - c. The Missouri Clean Water Law provides that any person who knowingly makes any false statement, representation or certification in any application, record, report, plan, or other document filed or required to be maintained pursuant to sections 644.006 to 644.141 shall, upon conviction, be punished by a fine of not more than ten thousand dollars, or by imprisonment for not more than six months, or by both.
14. **Severability.** The provisions of the permit are severable, and if any provision of the permit, or the application of any provision of the permit to any circumstance, is held invalid, the application of such provision to other circumstances, and the remainder of the permit, shall not be affected thereby.



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PART II - SPECIAL CONDITIONS – PUBLICLY OWNED
TREATMENT WORKS
SECTION A – INDUSTRIAL USERS

1. Definitions

Definitions as set forth in the Missouri Clean Water Laws and approved by the Missouri Clean Water Commission shall apply to terms used herein.

Significant Industrial User (SIU). Except as provided in the *General Pretreatment Regulation* 10 CSR 20-6.100, the term Significant Industrial User means:

1. All Industrial Users subject to Categorical Pretreatment Standards; and
2. Any other Industrial User that: discharges an average of 25,000 gallons per day or more of process wastewater to the Publicly-Owned Treatment Works (POTW) (excluding sanitary, noncontact cooling and boiler blowdown wastewater); contributes a process wastestream which makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority on the basis that the Industrial User has a reasonable potential for adversely affecting the POTW's or for violating any Pretreatment Standard or requirement.

Clean Water Act (CWA) is the the federal Clean Water Act of 1972, 33 U.S.C. § 1251 et seq. (2002).

2. Identification of Industrial Discharges

Pursuant to 40 CFR 122.44(j)(1), all POTWs shall identify, in terms of character and volume of pollutants, any Significant Industrial Users discharging to the POTW subject to Pretreatment Standards under section 307(b) of the CWA and 40 CFR 403.

3. Application Information

Applications for renewal or modification of this permit must contain the information about industrial discharges to the POTW pursuant to 40 CFR 122.21(j)(6)

4. Notice to the Department

Pursuant to 40 CFR 122.42(b), all POTWs must provide adequate notice of the following:

1. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of CWA if it were directly discharging these pollutants; and
2. Any substantial change into the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
3. For purposes of this paragraph, adequate notice shall include information on:
 - i. the quality and quantity of effluent introduced into the POTW, and
 - ii. any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

For POTWs without an approved pretreatment program, the notice of industrial discharges which was not included in the permit application shall be made as soon as practicable. For POTWs with an approved pretreatment program, notice is to be included in the annual pretreatment report required in the special conditions of this permit. Notice may be sent to:

Missouri Department of Natural Resources
Water Protection Program
Attn: Pretreatment Coordinator
P.O. Box 176
Jefferson City, MO 65102

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**PART III – SLUDGE AND BIOSOLIDS FROM DOMESTIC AND INDUSTRIAL WASTEWATER
TREATMENT FACILITIES**

SECTION A – GENERAL REQUIREMENTS

1. This permit pertains to sludge requirements under the Missouri Clean Water Law and regulation for domestic wastewater and industrial process wastewater. This permit also incorporates applicable federal sludge disposal requirements under 40 CFR 503 for domestic wastewater. The Environmental Protection Agency (EPA) has principal authority for permitting and enforcement of the federal sludge regulations under 40 CFR 503 for domestic wastewater. EPA has reviewed and accepted these standard sludge conditions. EPA may choose to issue a separate sludge addendum to this permit or a separate federal sludge permit at their discretion to further address the federal requirements.
2. These PART III Standard Conditions apply only to sludge and biosolids generated at domestic wastewater treatment facilities, including public owned treatment works (POTW), privately owned facilities and sludge or biosolids generated at industrial facilities.
3. Sludge and Biosolids Use and Disposal Practices:
 - a. The permittee is authorized to operate the sludge and biosolids treatment, storage, use, and disposal facilities listed in the facility description of this permit.
 - b. The permittee shall not exceed the design sludge volume listed in the facility description and shall not use sludge disposal methods that are not listed in the facility description, without prior approval of the permitting authority.
 - c. The permittee is authorized to operate the storage, treatment or generating sites listed in the Facility Description section of this permit.
4. Sludge Received from other Facilities:
 - a. Permittees may accept domestic wastewater sludge from other facilities including septic tank pumpings from residential sources as long as the design sludge volume is not exceeded and the treatment facility performance is not impaired.
 - b. The permittee shall obtain a signed statement from the sludge generator or hauler that certifies the type and source of the sludge
5. These permit requirements do not supersede nor remove liability for compliance with county and other local ordinances.
6. These permit requirements do not supersede nor remove liability for compliance with other environmental regulations such as odor emissions under the Missouri Air Pollution Control Law and regulations.
7. This permit may (after due process) be modified, or alternatively revoked and reissued, to comply with any applicable sludge disposal standard or limitation issued or approved under Section 405(d) of the Clean Water Act under Chapter 644 RSMo.
8. In addition to STANDARD CONDITIONS, the Department may include sludge limitations in the special conditions portion or other sections of a site specific permit.
9. Alternate Limits in the Site Specific Permit.

Where deemed appropriate, the Department may require an individual site specific permit in order to authorize alternate limitations:

 - a. A site specific permit must be obtained for each operating location, including application sites.
 - b. To request a site specific permit, an individual permit application, permit fee, and supporting documents shall be submitted for each operating location. This shall include a detailed sludge/biosolids management plan or engineering report.
10. Exceptions to these Standard Conditions may be authorized on a case-by-case basis by the Department, as follows:
 - a. The Department will prepare a permit modification and follow permit notice provisions as applicable under 10 CSR 20-6.020, 40 CFR 124.10, and 40 CFR 501.15(a)(2)(ix)(E). This includes notification of the owner of the property located adjacent to each land application site, where appropriate.
 - b. Exceptions cannot be granted where prohibited by the federal sludge regulations under 40 CFR 503.

SECTION B – DEFINITIONS

1. Best Management Practices include agronomic loading rates, soil conservation practices and other site restrictions.
2. Biosolids means organic fertilizer or soil amendment produced by the treatment of domestic wastewater sludge.
3. Biosolids land application facility is a facility where biosolids are spread onto the land at agronomic rates for production of food or fiber. The facility includes any structures necessary to store the biosolids until soil, weather, and crop conditions are favorable for land application.
4. Class A biosolids means a material that has met the Class A pathogen reduction requirements or equivalent treatment by a Process to Further Reduce Pathogens (PFRP) in accordance with 40 CFR 503.
5. Class B biosolids means a material that has met the Class B pathogen reduction requirements or equivalent treatment by a Process to Significantly Reduce Pathogens (PFRP) in accordance with 40 CFR 503.
6. Domestic wastewater means wastewater originating from the sanitary conveniences of residences, commercial buildings, factories and institutions; or co-mingled sanitary and industrial wastewater processed by a (POTW) or a privately owned facility.
7. Industrial wastewater means any wastewater, also known as process water, not defined as domestic wastewater. Per 40 CFR Part 122, process water means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.
8. Mechanical treatment plants are wastewater treatment facilities that use mechanical devices to treat wastewater, including septic tanks, sand filters, extended aeration, activated sludge, contact stabilization, trickling filters, rotating biological discs, and other similar facilities. It does not include wastewater treatment lagoons and constructed wetlands for wastewater treatment.
9. Operating location as defined in 10 CSR 20-2.010 is all contiguous lands owned, operated or controlled by one (1) person or by two (2) or more persons jointly or as tenants in common.
10. Plant Available Nitrogen (PAN) is the nitrogen that will be available to plants during the growing seasons after biosolids application.
11. Public contact site is land with a high potential for contact by the public. This includes, but is not limited to, public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.
12. Sludge is the solid, semisolid, or liquid residue removed during the treatment of wastewater. Sludge includes septage removed from septic tanks or equivalent facilities. Sludge does not include carbon coal byproducts (CCBs)
13. Sludge lagoon is part of a mechanical wastewater treatment facility. A sludge lagoon is an earthen basin that receives sludge that has been removed from a wastewater treatment facility. It does not include a wastewater treatment lagoon or sludge treatment units that are not a part of a mechanical wastewater treatment facility.
14. Septage is the material pumped from residential septic tanks and similar treatment works (with a design population of less than 150 people). The standard for biosolids from septage is different from other sludges.

SECTION C – MECHANICAL WASTEWATER TREATMENT FACILITIES

1. Sludge shall be routinely removed from wastewater treatment facilities and handled according to the permit facility description and sludge conditions of this permit.
2. The permittee shall operate the facility so that there is no sludge discharged to waters of the state.
3. Mechanical treatment plants shall have separate sludge storage compartments in accordance with 10 CSR 20, Chapter 8. Failure to remove sludge from these storage compartments on the required design schedule is a violation of this permit.

SECTION D – SLUDGE DISPOSED AT OTHER TREATMENT FACILITY OR CONTRACT HAULER

1. This section applies to permittees that haul sludge to another treatment facility for disposal or use contract haulers to remove and dispose of sludge.
2. Permittees that use contract haulers are responsible for compliance with all the terms of this permit including final disposal, unless the hauler has a separate permit for sludge or biosolids disposal issued by the Department; or the hauler transports the sludge to another permitted treatment facility.
3. Haulers who land apply septage must obtain a state permit.
4. Testing of sludge, other than total solids content, is not required if sludge is hauled to a municipal wastewater treatment facility or other permitted wastewater treatment facility, unless it is required by the accepting facility.

SECTION E – INCINERATION OF SLUDGE

1. Sludge incineration facilities shall comply with the requirements of 40 CFR 503 Subpart E; air pollution control regulations under 10 CSR 10; and solid waste management regulations under 10 CSR 80.
2. Permittee may be authorized under the facility description of this permit to store incineration ash in lagoons or ash ponds. This permit does not authorize the disposal of incineration ash. Incineration ash shall be disposed in accordance with 10 CSR 80; or if the ash is determined to be hazardous with 10 CSR 25.
3. In addition to normal sludge monitoring, incineration facilities shall report the following as part of the annual report, quantity of sludge incinerated, quantity of ash generated, quantity of ash stored, and ash used or disposal method, quantity, and location. Permittee shall also provide the name of the disposal facility and the applicable permit number.

SECTION F – SURFACE DISPOSAL SITES AND SLUDGE LAGOONS

1. Surface disposal sites of domestic facilities shall comply with the requirements in 40 CFR 503 Subpart C; air pollution control regulations under 10 CSR 10; and solid waste management regulations under 10 CSR 80.
2. Sludge storage lagoons are temporary facilities and are not required to obtain a permit as a solid waste management facility under 10 CSR 80. In order to maintain sludge storage lagoons as storage facilities, accumulated sludge must be removed routinely, but not less than once every two years unless an alternate schedule is approved in the permit. The amount of sludge removed will be dependent on sludge generation and accumulation in the facility. Enough sludge must be removed to maintain adequate storage capacity in the facility.
 - a. In order to avoid damage to the lagoon seal during cleaning, the permittee may leave a layer of sludge on the bottom of the lagoon, upon prior approval of the Department; or
 - b. Permittee shall close the lagoon in accordance with Section H.

SECTION G – LAND APPLICATION

1. The permittee shall not land apply sludge or biosolids unless land application is authorized in the facility description or the special conditions of the issued NPDES permit.
2. Land application sites within a 20 miles radius of the wastewater treatment facility are authorized under this permit when biosolids are applied for beneficial use in accordance with these standard conditions unless otherwise specified in a site specific permit. If the permittee's land application site is greater than a 20 mile radius of the wastewater treatment facility, approval must be granted from the Department.
3. Land application shall not adversely affect a threatened or endangered species or its designated critical habitat.
4. Biosolids shall not be applied unless authorized in this permit or exempted under 10 CSR 20, Chapter 6.
 - a. This permit does not authorize the land application of domestic sludge except for when sludge meets the definition of biosolids.
 - b. This permit authorizes "Class A or B" biosolids derived from domestic wastewater and/or process water sludge to be land applied onto grass land, crop land, timber or other similar agricultural or silviculture lands at rates suitable for beneficial use as organic fertilizer and soil conditioner.
5. Public Contact Sites:

Permittees who wish to apply Class A biosolids to public contact sites must obtain approval from the Department after two years of proper operation with acceptable testing documentation that shows the biosolids meet Class A criteria. A shorter length of testing will be allowed with prior approval from the Department. Authorization for land applications must be provided in the special conditions section of this permit or in a separate site specific permit.

 - a. After Class B biosolids have been land applied, public access must be restricted for 12 months.
 - b. Class B biosolids are only land applied to root crops, home gardens or vegetable crops whose edible parts will not be for human consumption.
6. Agricultural and Silvicultural Sites:

Septage – Based on Water Quality guide 422 (WQ422) published by the University of Missouri

 - a. Haulers that land apply septage must obtain a state permit
 - b. Do not apply more than 30,000 gallons of septage per acre per year.
 - c. Septage tanks are designed to retain sludge for one to three years which will allow for a larger reduction in pathogens and vectors, as compared to other mechanical type treatment facilities.
 - d. To meet Class B sludge requirements, maintain septage at 12 pH for at least thirty (30) minutes before land application. 50 pounds of hydrated lime shall be added to each 1,000 gallons of septage in order to meet pathogen and vector stabilization for septage biosolids applied to crops, pastures or timberland.
 - e. Lime is to be added to the pump truck and not directly to the septic tanks, as lime would harm the beneficial bacteria of the septic tank.

Biosolids - Based on Water Quality guide 423, 424, and 425 (WQ423, WQ424, WQ425) published by the University of Missouri;

- a. Biosolids shall be monitored to determine the quality for regulated pollutants
- b. The number of samples taken is directly related to the amount of sludge produced by the facility (See Section I of these Standard Conditions). Report as dry weight unless otherwise specified in the site specific permit. Samples should be taken only during land application periods. When necessary, it is permissible to mix biosolids with lower concentrations of biosolids as well as other suitable Department approved material to reach the maximum concentration of pollutants allowed.
- c. Table 1 gives the maximum concentration allowable to protect water quality standards

TABLE 1

Biosolids ceiling concentration ¹	
Pollutant	Milligrams per kilogram dry weight
Arsenic	75
Cadmium	85
Copper	4,300
Lead	840
Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7,500

¹ Land application is not allowed if the sludge concentration exceeds the maximum limits for any of these pollutants

- d. The low metal concentration biosolids has reduced requirements because of its higher quality and can safely be applied for 100 years or longer at typical agronomic loading rates. (See Table 2)

TABLE 2

Biosolids Low Metal Concentration ¹	
Pollutant	Milligrams per kilogram dry weight
Arsenic	41
Cadmium	39
Copper	1,500
Lead	300
Mercury	17
Nickel	420
Selenium	36
Zinc	2,800

¹ You may apply low metal biosolids without tracking cumulative metal limits, provided the cumulative application of biosolids does not exceed 500 dry tons per acre.

- e. Each pollutant in Table 3 has an annual and a total cumulative loading limit, based on the allowable pounds per acre for various soil categories.

TABLE 3

Pollutant	CEC 15+		CEC 5 to 15		CEC 0 to 5	
	Annual	Total ¹	Annual	Total ¹	Annual	Total ¹
Arsenic	1.8	36.0	1.8	36.0	1.8	36.0
Cadmium	1.7	35.0	0.9	9.0	0.4	4.5
Copper	66.0	1,335.0	25.0	250.0	12.0	125.0
Lead	13.0	267.0	13.0	267.0	13.0	133.0
Mercury	0.7	15.0	0.7	15.0	0.7	15.0
Nickel	19.0	347.0	19.0	250.0	12.0	125.0
Selenium	4.5	89.0	4.5	44.0	1.6	16.0
Zinc	124.0	2,492.0	50.0	500.0	25.0	250.0

¹ Total cumulative loading limits for soils with equal or greater than 6.0 pH (salt based test) or 6.5 pH (water based test)

TABLE 4 - Guidelines for land application of other trace substances ¹

Cumulative Loading	
Pollutant	Pounds per acre
Aluminum	4,000 ²
Beryllium	100
Cobalt	50
Fluoride	800
Manganese	500
Silver	200
Tin	1,000
Dioxin	(10 ppt in soil) ³
Other	⁴

¹ Design of land treatment systems for Industrial Waste, 1979. Michael Ray Overcash, North Carolina State University and Land Treatment of Municipal Wastewater, EPA 1981.)

² This applies for a soil with a pH between 6.0 and 7.0 (salt based test) or a pH between 6.5 to 7.5 (water based test). Case-by-case review is required for higher pH soils.

³ Total Dioxin Toxicity Equivalents (TEQ) in soils, based on a risk assessment under 40 CFR 744, May 1998.

⁴ Case by case review. Concentrations in sludge should not exceed the 95th percentile of the National Sewage Sludge Survey, EPA, January 2009.

Best Management Practices – Based on Water Quality guide 426 (WQ426) published by the University of Missouri

- a. Use best management practices when applying biosolids.
- b. Biosolids cannot discharge from the land application site
- c. Biosolid application is subject to the Missouri Department of Agriculture State Milk Board concerning grazing restrictions of lactating dairy cattle.
- d. Biosolid application must be in accordance with section 4 of the Endangered Species Act.
- e. Do not apply more than the agronomic rate of nitrogen needed.
- f. The applicator must document the Plant Available Nitrogen (PAN) loadings, available nitrogen in the soil, and crop removal when either of the following occurs: 1) When biosolids are greater than 50,000 mg/kg TN; or 2) When biosolids are land applied at an application rate greater than two dry tons per acre per year.
 - i. PAN can be determined as follows and is in accordance with WQ426
(Nitrate + nitrite nitrogen) + (organic nitrogen x 0.2) + (ammonia nitrogen x volatilization factor¹).
- g. Buffer zones are as follows:
 - i. 300 feet of a water supply well, sinkhole, lake, pond, water supply reservoir or water supply intake in a stream;
 - ii. 300 feet of a losing stream, no discharge stream, stream stretches designated for whole body contact recreation, wild and scenic rivers, Ozark National Scenic Riverways or outstanding state resource waters as listed in the Water Quality Standards, 10 CSR 20-7.031;
 - iii. 150 feet if dwellings;
 - iv. 100 feet of wetlands or permanent flowing streams;
 - v. 50 feet of a property line or other waters of the state, including intermittent flowing streams.
- h. Slope limitation for application sites are as follows;
 - i. A slope 0 to 6 percent has no rate limitation
 - ii. Applied to a slope 7 to 12 percent, the applicator may apply biosolids when soil conservation practices are used to meet the minimum erosion levels
 - iii. Slopes > 12 percent, apply biosolids only when grass is vegetated and maintained with at least 80 percent ground cover at a rate of two dry tons per acre per year or less.
- i. No biosolids may be land applied in an area that it is reasonably certain that pollutants will be transported into waters of the state.
- j. Do not apply biosolids to sites with soil that is snow covered, frozen or saturated with liquid without prior approval by the Department.
- k. Biosolids / sludge applicators must keep detailed records up to five years.

SECTION H – CLOSURE REQUIREMENTS

1. This section applies to all wastewater facilities (mechanical, industrial, and lagoons) and sludge or biosolids storage and treatment facilities and incineration ash ponds. It does not apply to land application sites.
2. Permittees of a domestic wastewater facility who plan to cease operation must obtain Department approval of a closure plan which addresses proper removal and disposal of all residues, including sludge, biosolids. Mechanical plants, sludge lagoons, ash ponds and other storage structures must obtain approval of a closure plan from the Department. Permittee must maintain this permit until the facility is closed in accordance with the approved closure plan per 10 CSR 20 – 6. 010 and 10 CSR 20 – 6.015.
3. Residuals that are left in place during closure of a lagoon or earthen structure or ash pond shall not exceed the agricultural loading rates as follows:
 - a. Residuals shall meet the monitoring and land application limits for agricultural rates as referenced in Section H of these standard conditions.
 - b. If a wastewater treatment lagoon has been in operation for 15 years or more without sludge removal, the sludge in the lagoon qualifies as a Class B biosolids with respect to pathogens due to anaerobic digestion, and testing for fecal coliform is not required. For other lagoons, testing for fecal coliform is required to show compliance with Class B biosolids limitations. In order to reach Class B biosolids requirements, fecal coliform must be less than 2,000,000 colony forming units or 2,000,000 most probable number. All fecal samples must be presented as geometric mean per gram.
 - c. The allowable nitrogen loading that may be left in the lagoon shall be based on the plant available nitrogen (PAN) loading. For a grass cover crop, the allowable PAN is 300 pounds/acre.
 - i. PAN can be determined as follows:
$$(\text{Nitrate} + \text{nitrite nitrogen}) + (\text{organic nitrogen} \times 0.2) + (\text{ammonia nitrogen} \times \text{volatilization factor}^1).$$
¹ Volatilization factor is 0.7 for surface application and 1 for subsurface application.
4. When closing a domestic wastewater treatment lagoon with a design treatment capacity equal or less than 150 persons, the residuals are considered “septage” under the similar treatment works definition. See Section B of these standard conditions. Under the septage category, residuals may be left in place as follows:
 - a. Testing for metals or fecal coliform is not required
 - b. If the wastewater treatment lagoon has been in use for less than 15 years, mix lime with the sludge at a rate of 50 pounds of hydrated lime per 1000 gallons (134 cubic feet) of sludge.
 - c. The amount of sludge that may be left in the lagoon shall be based on the plant available nitrogen (PAN) loading. 100 dry tons/acre of sludge may be left in the basin without testing for nitrogen. If 100 dry tons/acre or more will be left in the lagoon, test for nitrogen and determine the PAN using the calculation above. Allowable PAN loading is 300 pounds/acre.
5. Residuals left within the domestic lagoon shall be mixed with soil on at least a 1 to 1 ratio, the lagoon berm shall be demolished, and the site shall be graded and contain $\geq 70\%$ vegetative density over 100% of the site so as to avoid ponding of storm water and provide adequate surface water drainage without creating erosion.
6. Lagoons and/or earthen structure and/or ash pond closure activities shall obtain a storm water permit for land disturbance activities that equal or exceed one acre in accordance with 10 CSR 20-6.200
7. When closing a mechanical wastewater and/or industrial process wastewater plant; all sludge must be cleaned out and disposed of in accordance with the Department approved closure plan before the permit for the facility can be terminated.
 - a. Land must be stabilized which includes any grading, alternate use or fate upon approval by the Department, remediation, or other work that exposes sediment to stormwater per 10 CSR 20-6.200. The site shall be graded and contain $\geq 70\%$ vegetative density over 100% of the site, so as to avoid ponding of storm water and provide adequate surface water drainage without creating erosion.
 - b. Per 10 CSR 20-6.015(4)(B)6, Hazardous Waste shall not be land applied or disposed during industrial and mechanical plant closures unless in accordance with Missouri Hazardous Waste Management Law and Regulations under 10 CSR 25.
 - c. After demolition of the mechanical plant / industrial plant, the site must only contain clean fill defined in RSMo 260.200 (5) as uncontaminated soil, rock, sand, gravel, concrete, asphaltic concrete, cinderblocks, brick, minimal amounts of wood and metal, and inert solids as approved by rule or policy of the Department for fill or other beneficial use. Other solid wastes must be removed.
8. If sludge from the domestic lagoon or mechanical treatment plant exceeds agricultural rates under Section G and/or H, a landfill permit or solid waste disposal permit must be obtained if the permittee chooses to seek authorization for on-site sludge disposal under the Missouri Solid Waste Management Law and regulations per 10 CSR 80, and the permittee must comply with the surface disposal requirements under 40 CFR 503, Subpart C.

SECTION I – MONITORING FREQUENCY

- At a minimum, sludge or biosolids shall be tested for volume and percent total solids on a frequency that will accurately represent sludge quantities produced and disposed. Please see the table below.

TABLE 5

Design Sludge Production (dry tons per year)	Monitoring Frequency (See Notes 1, 2, and 3)			
	Metals, Pathogens and Vectors	Nitrogen TKN ¹	Nitrogen PAN ²	Priority Pollutants and TCLP ³
0 to 100	1 per year	1 per year	1 per month	1 per year
101 to 200	biannual	biannual	1 per month	1 per year
201 to 1,000	quarterly	quarterly	1 per month	1 per year
1,001 to 10,000	1 per month	1 per month	1 per week	-- ⁴
10,001 +	1 per week	1 per week	1 per day	-- ⁴

¹ Test total Kjeldahl nitrogen, if biosolids application is 2 dry tons per acre per year or less.

² Calculate plant available nitrogen (PAN) when either of the following occurs: 1) when biosolids are greater than 50,000 mg/kg TN; or 2) when biosolids are land applied at an application rate greater than two dry tons per acre per year.

³ Priority pollutants (40 CFR 122.21, Appendix D, Tables II and III) and toxicity characteristic leaching procedure (40 CFR 261.24) is required only for permit holders that must have a pre-treatment program.

⁴ One sample for each 1,000 dry tons of sludge.

Note 1: Total solids: A grab sample of sludge shall be tested one per day during land application periods for percent total solids.

This data shall be used to calculate the dry tons of sludge applied per acre.

Note 2: Total Phosphorus: Total phosphorus and total potassium shall be tested at the same monitoring frequency as metals.

Note 3: Table 5 is not applicable for incineration and permit holders that landfill their sludge.

- If you own a wastewater treatment lagoon or sludge lagoon that is cleaned out once a year or less, you may choose to sample only when the sludge is removed or the lagoon is closed. Test one composite sample for each 100 dry tons of sludge or biosolids removed from the lagoon during the year within the lagoon at closing. Composite sample must represent various areas at one-foot depth.
- Additional testing may be required in the special conditions or other sections of the permit. Permittees receiving industrial wastewater may be required to conduct additional testing upon request from the Department.
- At this time, the Department recommends monitoring requirements shall be performed in accordance with, "POTW Sludge Sampling and Analysis Guidance Document," United States Environmental Protection Agency, August 1989, and the subsequent revisions.

SECTION J – RECORD KEEPING AND REPORTING REQUIREMENTS

- The permittee shall maintain records on file at the facility for at least five years for the items listed in these standard conditions and any additional items in the Special Conditions section of this permit. This shall include dates when the sludge facility is checked for proper operation, records of maintenance and repairs and other relevant information.
- Reporting period
 - By January 28th of each year, an annual report shall be submitted for the previous calendar year period for all mechanical wastewater treatment facilities, sludge lagoons, and sludge or biosolids disposal facilities.
 - Permittees with wastewater treatment lagoons shall submit the above annual report only when sludge or biosolids are removed from the lagoon during the report period or when the lagoon is closed.
- Report Forms. The annual report shall be submitted on report forms provided by the Department or equivalent forms approved by the Department.
- Reports shall be submitted as follows:

Major facilities (those serving 10,000 persons or 1 million gallons per day) shall report to both the Department and EPA. Other facilities need to report only to the Department. Reports shall be submitted to the addresses listed as follows:

DNR regional office listed in your permit
(see cover letter of permit)
ATTN: Sludge Coordinator

EPA Region VII
Water Compliance Branch (WACM)
Sludge Coordinator
11201 Renner Blvd.
Lenexa, KS 66219

5. Annual report contents. The annual report shall include the following:
- a. Sludge and biosolids testing performed. Include a copy or summary of all test results, even if not required by the permit.
 - b. Sludge or biosolids quantity shall be reported as dry tons for quantity generated by the wastewater treatment facility, the quantity stored on site at the end of the year, and the quantity used or disposed.
 - c. Gallons and % solids data used to calculate the dry ton amounts.
 - d. Description of any unusual operating conditions.
 - e. Final disposal method, dates, and location, and person responsible for hauling and disposal.
 - i. This must include the name, address for the hauler and sludge facility. If hauled to a municipal wastewater treatment facility, sanitary landfill, or other approved treatment facility, give the name of that facility.
 - ii. Include a description of the type of hauling equipment used and the capacity in tons, gallons, or cubic feet.
 - f. Contract Hauler Activities:
If contract hauler, provide a copy of a signed contract from the contractor. Permittee shall require the contractor to supply information required under this permit for which the contractor is responsible. The permittee shall submit a signed statement from the contractor that he has complied with the standards contained in this permit, unless the contract hauler has a separate sludge or biosolids use permit.
 - g. Land Application Sites:
 - i. Report the location of each application site, the annual and cumulative dry tons/acre for each site, and the landowners name and address. The location for each spreading site shall be given as a legal description for nearest ¼, ¼, Section, Township, Range, and county, or UTM coordinates. The facility shall report PAN when either of the following occurs: 1) When biosolids are greater than 50,000 mg/kg TN; or 2) when biosolids are land applied at an application rate greater than two dry tons per acre per year.
 - ii. If the "Low Metals" criteria are exceeded, report the annual and cumulative pollutant loading rates in pounds per acre for each applicable pollutant, and report the percent of cumulative pollutant loading which has been reached at each site.
 - iii. Report the method used for compliance with pathogen and vector attraction requirements.
 - iv. Report soil test results for pH, CEC, and phosphorus. If none was tested during the year, report the last date when tested and results.

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MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

Water Protection Program

**FORM B2 – APPLICATION FOR OPERATING PERMIT FOR FACILITIES THAT
RECEIVE PRIMARILY DOMESTIC WASTE AND HAVE A DESIGN FLOW MORE THAN
100,000 GALLONS PER DAY**

FACILITY NAME

Shelbina Wastewater Treatment Facility

PERMIT NO.

MO 0041092

COUNTY

Shelby

APPLICATION OVERVIEW

Form B2 has been developed in a modular format and consists of Parts A, B and C and a Supplemental Application Information (Parts D, E, F and G) packet. All applicants must complete Parts A, B and C. Some applicants must also complete parts of the Supplemental Application Information packet. The following items explain which parts of Form B2 you must complete. Submittal of an incomplete application may result in the application being returned.

BASIC APPLICATION INFORMATION

- A. Basic application information for all applicants. All applicants must complete Part A.
- B. Additional application information for all applicants. All applicants must complete Part B.
- C. Certification. All applicants must complete Part C.

SUPPLEMENTAL APPLICATION INFORMATION

- D. Expanded Effluent Testing Data. A treatment works that discharges effluent to surface water of the United States and meets one or more of the following criteria must complete *Part D - Expanded Effluent Testing Data*:
 - 1. Has a design flow rate greater than or equal to 1 million gallons per day.
 - 2. Is required to have or currently has a pretreatment program.
 - 3. Is otherwise required by the permitting authority to provide the information.
- E. Toxicity Testing Data. A treatment works that meets one or more of the following criteria must complete *Part E - Toxicity Testing Data*:
 - 1. Has a design flow rate greater than or equal to 1 million gallons per day.
 - 2. Is required to have or currently has a pretreatment program.
 - 3. Is otherwise required by the permitting authority to provide the information.
- F. Industrial User Discharges and Resource Conservation and Recovery Act / Comprehensive Environmental Response, Compensation and Liability Act Wastes. A treatment works that accepts process wastewater from any significant industrial users, also known as SIUs, or receives a Resource Conservation and Recovery Act or CERCLA wastes must complete *Part F - Industrial User Discharges and Resource Conservation and Recovery Act /CERCLA Wastes*.
SIUs are defined as:
 - 1. All Categorical Industrial Users, or CIUs, subject to Categorical Pretreatment Standards under 40 Code of Federal Regulations 403.6 and 40 Code of Federal Regulations 403.6 and 40 CFR Chapter 1, Subchapter N.
 - 2. Any other industrial user that meets one or more of the following:
 - i. Discharges an average of 25,000 gallons per day or more of process wastewater to the treatment works (with certain exclusions).
 - ii. Contributes a process waste stream that makes up five percent or more of the average dry weather hydraulic or organic capacity of the treatment plant.
 - iii. Is designated as an SIU by the control authority.
 - iv. Is otherwise required by the permitting authority to provide the information.
- G. Combined Sewer Systems. A treatment works that has a combined sewer system must complete *Part G - Combined Sewer Systems*.

ALL APPLICANTS MUST COMPLETE PARTS A, B and C

DEC 27 2017



MISSOURI DEPARTMENT OF NATURAL RESOURCES **Water Protection Program**
WATER PROTECTION PROGRAM
FORM B2 – APPLICATION FOR AN OPERATING PERMIT FOR
FACILITIES THAT RECEIVE PRIMARILY DOMESTIC WASTE AND
HAVE A DESIGN FLOW MORE THAN 100,000 GALLONS PER DAY

FOR AGENCY USE ONLY

CHECK NUMBER

DATE RECEIVED

FEE SUBMITTED

12-27-17

A 83

PART A – BASIC APPLICATION INFORMATION**1. THIS APPLICATION IS FOR:**

- ☐ An operating permit for a new or unpermitted facility. Construction Permit # _____
 (Include completed Antidegradation Review or request to conduct an Antidegradation Review, see instructions)
- ☒ An operating permit renewal: Permit #MO- 0041092 Expiration Date 6/30/2018
- ☐ An operating permit modification: Permit #MO- _____ Reason: _____

1.1 Is the appropriate fee included with the application (see instructions for appropriate fee)? ☐ YES ☐ NO

2. FACILITY

NAME: Shelbina WWTF TELEPHONE NUMBER WITH AREA CODE: 573-588-4104

ADDRESS (PHYSICAL): 206 W. Shelbina Ave CITY: Shelbina STATE: MO ZIP CODE: 63468

2.1 LEGAL DESCRIPTION (Facility Site): SE ¼, N ¼, ¼, Sec. 5, T 56, R 10W COUNTY: Shelby

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

2.3 Name of receiving stream: Unnamed Tributary to Clear Creek

2.4 Number of Outfalls: 2 wastewater outfalls, stormwater outfalls, instream monitoring sites

3. OWNER

NAME: City of Shelbina EMAIL ADDRESS: administrator@cityofshelbina.c TELEPHONE NUMBER WITH AREA CODE: 573-588-4104

ADDRESS: 116 E. Walnut, PO Box 646, CITY: Shelbina STATE: MO ZIP CODE: 63468

- 3.1 Request review of draft permit prior to Public Notice? ☒ YES ☐ NO
- 3.2 Are you a Publically Owned Treatment Works (POTW)? ☒ YES ☐ NO
 If yes, is the Financial Questionnaire attached? ☒ YES ☐ NO
- 3.3 Are you a Privately Owned Treatment Facility? ☐ YES ☒ NO
- 3.4 Are you a Privately Owned Treatment Facility regulated by the Public Service Commission (PSC)? ☐ YES ☒ NO

4. CONTINUING AUTHORITY: Permanent organization which will serve as the continuing authority for the operation, maintenance and modernization of the facility.

NAME: City of Shelbina EMAIL ADDRESS: administrator@cityofshelbina.c TELEPHONE NUMBER WITH AREA CODE: 573-588-4104

ADDRESS: 116 E. Walnut, PO Box 646 CITY: Shelbina STATE: MO ZIP CODE: 63468

If the Continuing Authority is different than the Owner, include a copy of the contract agreement between the two parties and a description of the responsibilities of both parties within the agreement.

5. OPERATOR

NAME: City of Shelbina TITLE: Owner CERTIFICATE NUMBER (IF APPLICABLE):

EMAIL ADDRESS: 116 E. Walnut, PO Box 646 TELEPHONE NUMBER WITH AREA CODE: 573-588-4104

6. FACILITY CONTACT

NAME: Rob Trivette TITLE: Utility Supervisor

EMAIL ADDRESS: wastewater@cityofshelbina.com TELEPHONE NUMBER WITH AREA CODE: 573-588-4104

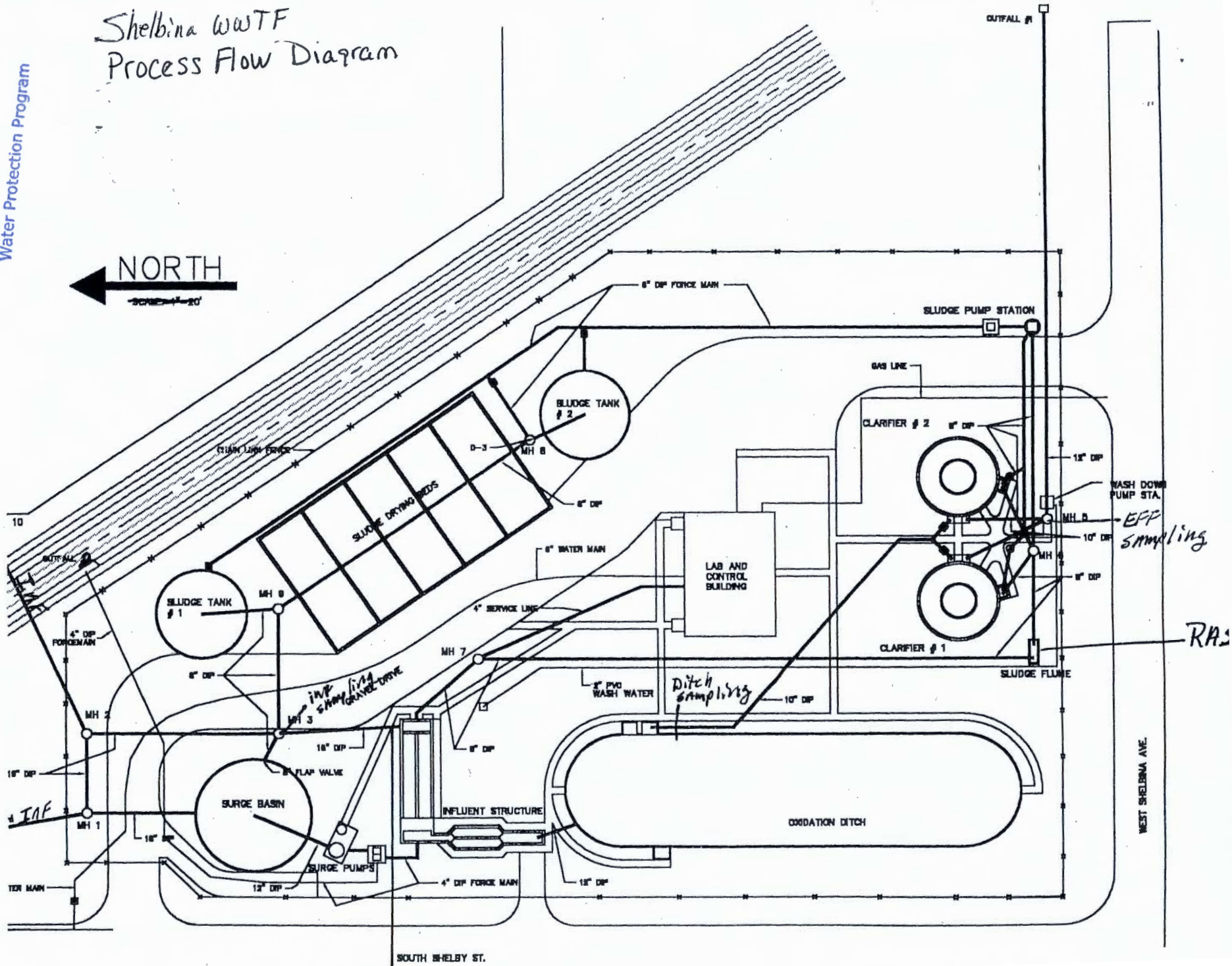
ADDRESS: 116 E. Walnut, PO Box 646 CITY: Shelbina STATE: MO ZIP CODE: 63468

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Shelbina WWTF Process Flow Diagram



FACILITY NAME Shelbina WWTF	PERMIT NO. MO-0041092	OUTFALL NO. 1
PART A – BASIC APPLICATION INFORMATION		
7. FACILITY INFORMATION (continued)		
7.2 Topographic Map. Attach to this application a topographic map of the area extending at least one mile beyond facility property boundaries. This map must show the outline of the facility and the following information. a. The area surrounding the treatment plant, including all unit processes. b. The location of the downstream landowner(s). (See Item 10.) c. The major pipes or other structures through which wastewater enters the treatment works and the pipes or other structures through which treated wastewater is discharged from the treatment plant. Include outfalls from bypass piping, if applicable. d. The actual point of discharge. e. Wells, springs, other surface water bodies and drinking water wells that are: 1) within ¼ mile of the property boundaries of the treatment works, and 2) listed in public record or otherwise known to the applicant. f. Any areas where the sewage sludge produced by the treatment works is stored, treated, or disposed. g. If the treatment works receives waste that is classified as hazardous under the Resource Conservation and Recovery Act (RCRA) by truck, rail, or special pipe, show on the map where that hazardous waste enters the treatment works and where it is treated, stored, or disposed.		
7.3 Facility SIC Code: 4952	Discharge SIC Code: 4952	
7.4 Number of people presently connected or population equivalent (P.E.): 784 Design P.E. 6620		
7.5 Connections to the facility: Number of units presently connected: Homes 672 Trailers _____ Apartments _____ Other (including industrial) _____ Number of Commercial Establishments: 116		
7.6 Design Flow .6620	Actual Flow .3560	
7.7 Will discharge be continuous through the year? Yes ☒ No ☐ Discharge will occur during the following months: How many days of the week will discharge occur?		
7.8 Is industrial wastewater discharged to the facility? Yes ☒ No ☐ If yes, describe the number and types of industries that discharge to your facility. Attach sheets as necessary Cerro Copper Tubing-Quench tank run off from extrusion press. Flow rate 240 gallons per day, 4 days per week, day shift only. Refer to the APPLICATION OVERVIEW to determine whether additional information is needed for Part F.		
7.9 Does the facility accept or process leachate from landfills?	Yes ☐	No ☒
7.10 Is wastewater land applied? If yes, is Form I attached?	Yes ☐ Yes ☐	No ☒ No ☐
7.11 Does the facility discharge to a losing stream or sinkhole?	Yes ☐	No ☒
7.12 Has a wasteload allocation study been completed for this facility?	Yes ☐	No ☒
8. LABORATORY CONTROL INFORMATION		
LABORATORY WORK CONDUCTED BY PLANT PERSONNEL		
Lab work conducted outside of plant.	Yes ☒	No ☐
Push-button or visual methods for simple test such as pH, settleable solids.	Yes ☒	No ☐
Additional procedures such as Dissolved Oxygen, Chemical Oxygen Demand, Biological Oxygen Demand, titrations, solids, volatile content.	Yes ☒	No ☐
More advanced determinations such as BOD seeding procedures, fecal coliform, nutrients, total oils, phenols, etc.	Yes ☐	No ☒
Highly sophisticated instrumentation, such as atomic absorption and gas chromatograph.	Yes ☐	No ☒

FACILITY NAME Shelbina WWTF		PERMIT NO. MO- 0041092		OUTFALL NO. 1	
PART A – BASIC APPLICATION INFORMATION					
9. SLUDGE HANDLING, USE AND DISPOSAL					
9.1 Is the sludge a hazardous waste as defined by 10 CSR 25? Yes ☐ No ☒					
9.2 Sludge production (Including sludge received from others): Design Dry Tons/Year 106 Actual Dry Tons/Year 24.5					
9.3 Sludge storage provided: <u>24062.5 cu.ft</u> Cubic feet; <u>365</u> Days of storage; <u>3.25</u> Average percent solids of sludge; ☐ No sludge storage is provided. ☐ Sludge is stored in lagoon.					
9.4 Type of storage: ☒ Holding Tank ☐ Building ☐ Basin ☐ Lagoon ☐ Concrete Pad ☒ Other (Describe) <u>drying beds</u>					
9.5 Sludge Treatment: ☐ Anaerobic Digester ☒ Storage Tank ☐ Lime Stabilization ☐ Lagoon ☐ Aerobic Digester ☐ Air or Heat Drying ☐ Composting ☐ Other (Attach Description)					
9.6 Sludge use or disposal: ☒ Land Application ☐ Contract Hauler ☐ Hauled to Another Treatment Facility ☐ Solid Waste Landfill ☐ Surface Disposal (Sludge Disposal Lagoon, Sludge Held For More Than Two Years) ☐ Incineration ☐ Other (Attach Explanation Sheet) _____					
9.7 Person responsible for hauling sludge to disposal facility: ☒ By Applicant ☐ By Others (complete below)					
NAME City of Shelbina personnel				EMAIL ADDRESS wastewater@cityofshelbina.com	
ADDRESS 116 E. Walnut, PO Box 646		CITY Shelbina		STATE MO	ZIP CODE 63468
CONTACT PERSON Rob Trivette		TELEPHONE NUMBER WITH AREA CODE 573-588-4104		PERMIT NO. MO- 0041092	
9.8 Sludge use or disposal facility: ☒ By Applicant ☐ By Others (Complete below)					
NAME City of Shelbina				EMAIL ADDRESS wastewater@cityofshelbina.com	
ADDRESS 116 E. Walnut, PO Box 646		CITY Shelbina		STATE MO	ZIP CODE 63468
CONTACT PERSON Rob Trivette		TELEPHONE NUMBER WITH AREA CODE 573-588-4104		PERMIT NO. MO- 0041092	
9.9 Does the sludge or biosolids disposal comply with Federal Sludge Regulation 40 CFR 503? ☒ Yes ☐ No (Explain)					
END OF PART A					

FACILITY NAME Shelbina WWTF	PERMIT NO. MO-0041092	OUTFALL NO. 1
PART B – ADDITIONAL APPLICATION INFORMATION		
10. COLLECTION SYSTEM		
10.1 Length of sanitary sewer collection system in miles <u>16.99</u>		
10.2 Does significant infiltration occur in the collection system? ☒ Yes ☐ No If yes, briefly explain any steps underway or planned to minimize inflow and infiltration: The City has bypass elimination plan and CMOM, that has been submitted and approved by DNR. The City is following outlined scopes of work as outlined as financing will allow.		
11. BYPASSING		
Does any bypassing occur anywhere in the collection system or at the treatment facility? Yes ☒ No ☐ If yes, explain: During heavy rain inflow hydraulically overloads WWTF, outfall #2 is utilized to take the pressure off oxidation ditch and clarifier as to not overload them and wash solids out. Outfall #2 is a valuable asset to maintain the integrity of Shelbina WWTF during rainfall events, and keep flow from backing up into the collection system.		
12. OPERATION AND MAINTENANCE PERFORMED BY CONTRACTOR(S)		
Are any operational or maintenance aspects (related to wastewater treatment and effluent quality) of the treatment works the responsibility of the contractor? Yes ☐ No ☒ If Yes, list the name, address, telephone number and status of each contractor and describe the contractor's responsibilities. (Attach additional pages if necessary.)		
NAME		
MAILING ADDRESS		
TELEPHONE NUMBER WITH AREA CODE	EMAIL ADDRESS	
RESPONSIBILITIES OF CONTRACTOR		
13. SCHEDULED IMPROVEMENTS AND SCHEDULES OF IMPLEMENTATION		
Provide information about any uncompleted implementation schedule or uncompleted plans for improvements that will affect the wastewater treatment, effluent quality, or design capacity of the treatment works. If the treatment works has several different implementation schedules or is planning several improvements, submit separate responses for each. The City of Shelbina is following the scope(s) of work outlined in Shelbina's WWTF Plan and CMOM and the Bypass Elimination plan to improve the treatment facility and collection system.		

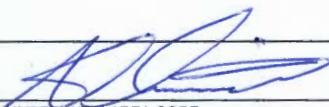
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FACILITY NAME Shelbina WWTF		PERMIT NO. MO- 0041092		OUTFALL NO. 1			
PART B – ADDITIONAL APPLICATION INFORMATION							
14. EFFLUENT TESTING DATA							
Applicants must provide effluent testing data for the following parameters. Provide the indicated effluent data for each outfall through which effluent is discharged . Do not include information of combined sewer overflows in this section. All information reported must be based on data collected through analysis conducted using 40 CFR Part 136 methods. In addition, this data must comply with QA/QC requirements of 40 CFR Part 136 and other appropriate QA/QC requirements for standard methods for analytes not addressed by 40 CFR Part 136. At a minimum, effluent testing data must be based on at least three samples and must be no more than four and one-half years apart.							
Outfall Number							
PARAMETER		MAXIMUM DAILY VALUE		AVERAGE DAILY VALUE			
		Value	Units	Value	Units Number of Samples		
pH (Minimum)		6.6 mg/L	S.U.	7.3	S.U. 1275		
pH (Maximum)		9.0 mg/L	S.U.	7.5	S.U. 1275		
Flow Rate		2.8460	MGD	.3560	MGD 1825		
*For pH report a minimum and a maximum daily value							
POLLUTANT		MAXIMUM DAILY DISCHARGE		AVERAGE DAILY DISCHARGE		ANALYTICAL METHOD	ML/MDL
		Conc.	Units	Conc.	Units Number of Samples		
Conventional and Nonconventional Compounds							
BIOCHEMICAL OXYGEN DEMAND (Report One)	BOD ₅	7.0	mg/L	2.77	mg/L	240	
	CBOD ₅	N/A	mg/L	N/A	mg/L	N/A	
E. COLI		N/A	#/100 mL	N/A	#/100 mL	N/A	
TOTAL SUSPENDED SOLIDS (TSS)		17.6	mg/L	3.78	mg/L	1270	
AMMONIA (as N)		1.3	mg/L	<.12	mg/L	60	
CHLORINE* (TOTAL RESIDUAL, TRC)		N/A	mg/L	N/A	mg/L	N/A	
DISSOLVED OXYGEN		12.0	mg/L	8.66	mg/L	1270	
OIL and GREASE		<8.8	mg/L	<5.79	mg/L	60	
OTHER			mg/L		mg/L		
*Report only if facility chlorinates							
END OF PART B							

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Water Protection Program

FACILITY NAME Shelbina WWTF	PERMIT NO. MO- 0041092	OUTFALL NO. 1
PART C – CERTIFICATION		
15. ELECTRONIC DISCHARGE MONITORING REPORT (eDMR) SUBMISSION SYSTEM		
Per 40 CFR Part 127 National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule, reporting of effluent limits and monitoring shall be submitted by the permittee via an electronic system to ensure timely, complete, accurate, and nationally-consistent set of data. One of the following must be checked in order for this application to be considered complete. Please visit http://dnr.mo.gov/env/wpp/edmr.htm to access the Facility Participation Package. ☐ - You have completed and submitted with this permit application the required documentation to participate in the eDMR system. ☒ - You have previously submitted the required documentation to participate in the eDMR system and/or you are currently using the eDMR system. ☐ - You have submitted a written request for a waiver from electronic reporting. See instructions for further information regarding waivers.		
16. CERTIFICATION		
All applicants must complete the Certification Section. This certification must be signed by an officer of the company or city official. All applicants must complete all applicable sections as explained in the Application Overview. By signing this certification statement, applicants confirm that they have reviewed the entire form and have completed all sections that apply to the facility for which this application is submitted.		
ALL APPLICANTS MUST COMPLETE THE FOLLOWING CERTIFICATION.		
I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.		
PRINTED NAME Al Dimmitt	OFFICIAL TITLE (MUST BE AN OFFICER OF THE COMPANY OR CITY OFFICIAL) Mayor	
SIGNATURE 		
TELEPHONE NUMBER WITH AREA CODE 573-588-4104		
DATE SIGNED 12/19/2017		
Upon request of the permitting authority, you must submit any other information necessary to assess wastewater treatment practices at the treatment works or identify appropriate permitting requirements.		
Send Completed Form to: Department of Natural Resources Water Protection Program ATTN: NPDES Permits and Engineering Section P.O. Box 176 Jefferson City, MO 65102-0176		
END OF PART C		
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH PARTS OF FORM B2 YOU MUST COMPLETE.		
Do not complete the remainder of this application, unless at least one of the following statements applies to your facility: 1. Your facility design flow is equal to or greater than 1,000,000 gallons per day. 2. Your facility is a pretreatment treatment works. 3. Your facility is a combined sewer system.		
Submittal of an incomplete application may result in the application being returned. Permit fees for returned applications shall be forfeited. Permit fees for applications being processed by the department that are withdrawn by the applicant shall be forfeited.		

MAKE ADDITIONAL COPIES OF THIS FORM FOR EACH OUTFALL

FACILITY NAME

Shelbina WWTF

PERMIT NO.

MO- 0041092

OUTFALL NO.

1

PART F – INDUSTRIAL USER DISCHARGES AND RCRA/CERCLA WASTES

Refer to the APPLICATION OVERVIEW to determine whether Part F applies to the treatment works.

19. GENERAL INFORMATION**19.1** Does the treatment works have, or is it subject to, an approved pretreatment program?☐ Yes☒ No**19.2** Number of Significant Industrial Users (SIUs) and Categorical Industrial Users (CIUs). Provide the number of each of the following types of industrial users that discharge to the treatment works:Number of non-categorical SIUs 0Number of CIUs 1**20. INDUSTRIES CONTRIBUTING MORE THAN 5 PERCENT OF THE ACTUAL FLOW TO THE FACILITY OR OTHER SIGNIFICANT INDUSTRIAL USERS INFORMATION**

Supply the following information for each SIU. If more than one SIU discharges to the treatment works, provide the information requested for each. Submit additional pages as necessary.

NAME

Cerro Copper Flow

MAILING ADDRESS

101 S Douglas

CITY

Shelbina

STATE

MO

ZIP CODE

63468

20.1 Describe all of the industrial processes that affect or contribute to the SIU's discharge
Quench tank for extrusion process**20.2** Describe all of the principle processes and raw materials that affect or contribute to the SIU's discharge.

Principal Product(s): Copper tubing and fittings

Raw Material(s): Copper

20.3 Flow Rate**a. PROCESS WASTEWATER FLOW RATE.** Indicate the average daily volume of process wastewater discharged into the collection system in gallons per day, or gpd, and whether the discharge is continuous or intermittent.240 gpd☐ Continuous☒ Intermittent**b. NON-PROCESS WASTEWATER FLOW RATE.** Indicate the average daily volume of non-process wastewater discharged into the collection system in gallons per day, or gpd, and whether the discharge is continuous or intermittent.

gpd

☐ Continuous☒ Intermittent**20.4** Pretreatment Standards. Indicate whether the SIU is subject to the following:**a. Local Limits**☐ Yes☒ No**b. Categorical Pretreatment Standards**☒ Yes☐ No

If subject to categorical pretreatment standards, which category and subcategory?

468.15(d) copper forming point sources

20.5 Problems at the treatment works attributed to waste discharged by the SIU. Has the SIU caused or contributed to any problems (e.g., upsets, interference) at the treatment works in the past three years?☐ Yes☒ No

If Yes, describe each episode

MAKE ADDITIONAL COPIES OF THIS FORM FOR EACH OUTFALLFACILITY NAME
Shelbina WWTFPERMIT NO.
MO- 0041092OUTFALL NO.
1**PART F – INDUSTRIAL USER DISCHARGES AND RCRA/CERCLA WASTES****21. RCRA HAZARDOUS WASTE RECEIVED BY TRUCK, RAIL, OR DEDICATED PIPELINE****21.1** Does the treatment works receive or has it in the past three years received RCRA hazardous waste by truck, rail or dedicated pipe?
☐ Yes ☒ No**21.2** Method by which RCRA waste is received. (Check all that apply)
☐ Truck ☐ Rail ☐ Dedicated Pipe**21.3** Waste Description

EPA Hazardous Waste Number	Amount (volume or mass)	Units

22. CERCLA (SUPERFUND) WASTEWATER, RCRA REMEDIATION/CORRECTIVE ACTION WASTEWATER, AND OTHER REMEDIAL ACTIVITY WASTEWATER**22.1** Does the treatment works currently (or has it been notified that it will) receive waste from remedial activities?
☐ Yes ☒ No

Provide a list of sites and the requested information for each current and future site.

22.2 Waste Origin. Describe the site and type of facility at which the CERCLA/RCRA/or other remedial waste originates (or is expected to originate in the next five years).**22.3** List the hazardous constituents that are received (or are expected to be received). Included data on volume and concentration, if known. (Attach additional sheets if necessary)**22.4** Waste Treatment**a.** Is this waste treated (or will it be treated) prior to entering the treatment works?
☐ Yes ☐ No

If Yes, describe the treatment (provide information about the removal efficiency):

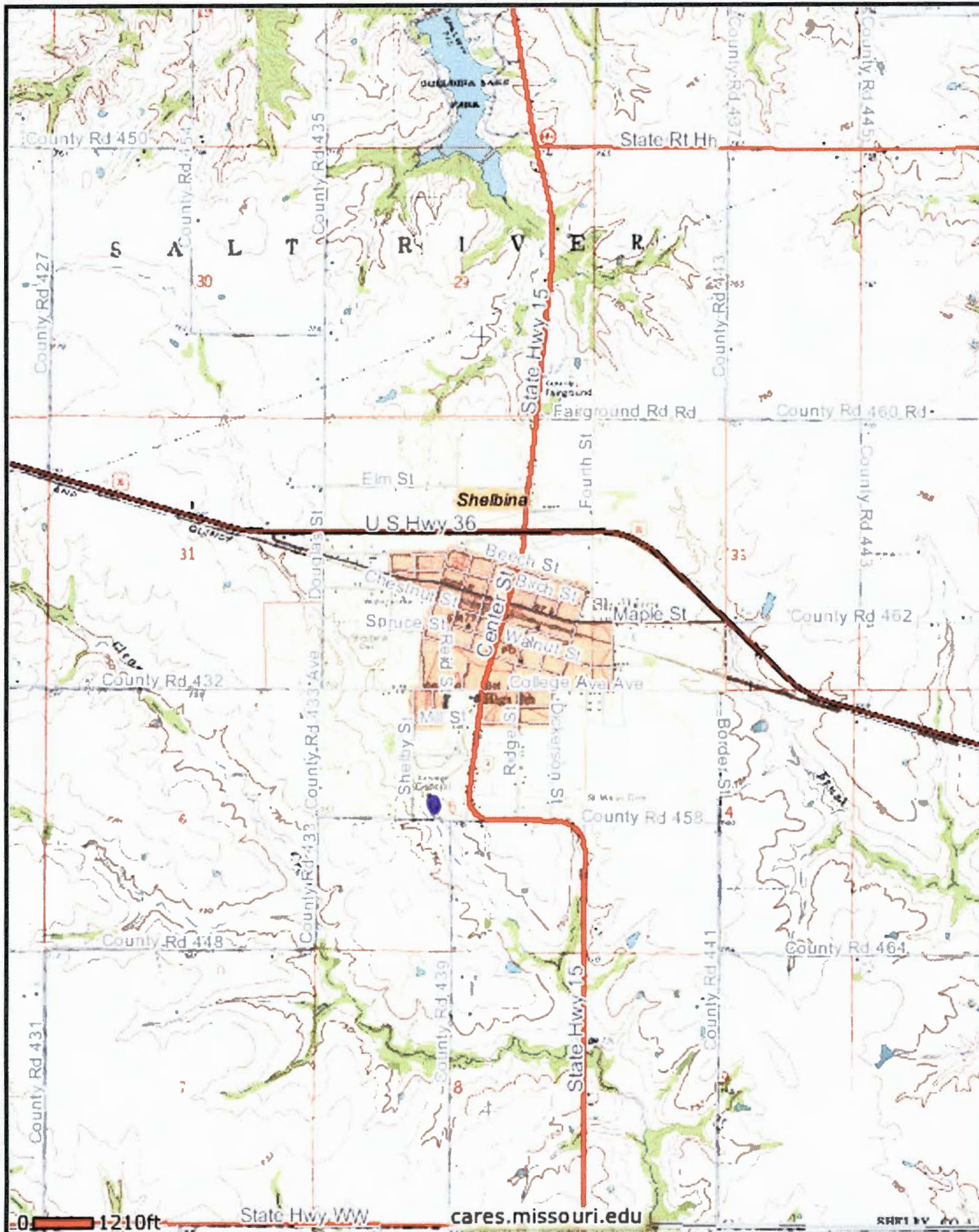
b. Is the discharge (or will the discharge be) continuous or intermittent?
☐ Continuous ☐ Intermittent

If intermittent, describe the discharge schedule:

END OF PART F**REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHICH OTHER PARTS OF FORM B2 YOU MUST COMPLETE.**

Shelbina Waste Water Plant

Water Protection Program

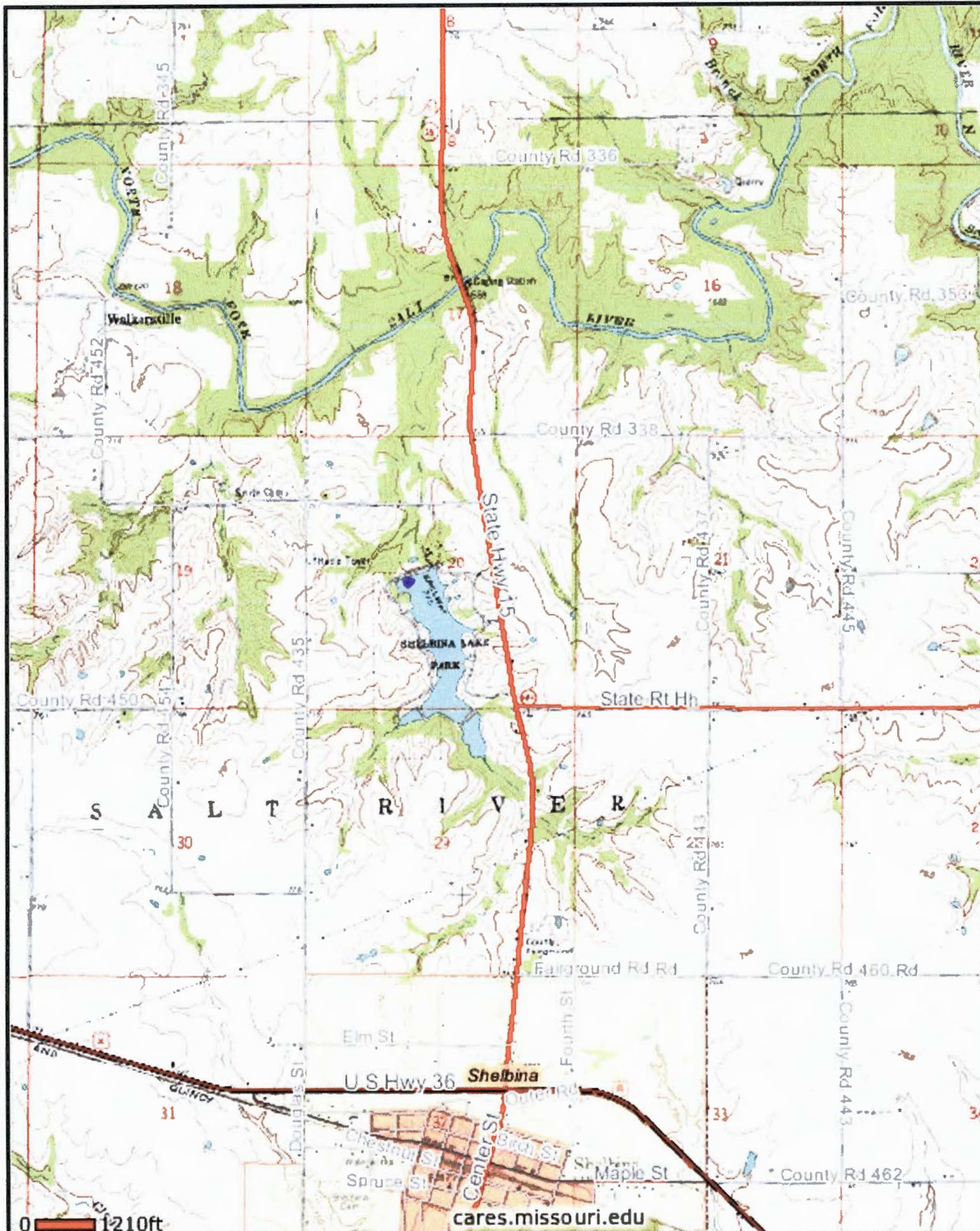


● Shelbina WWTF Outfall #1 & #2

DEC 27 2017

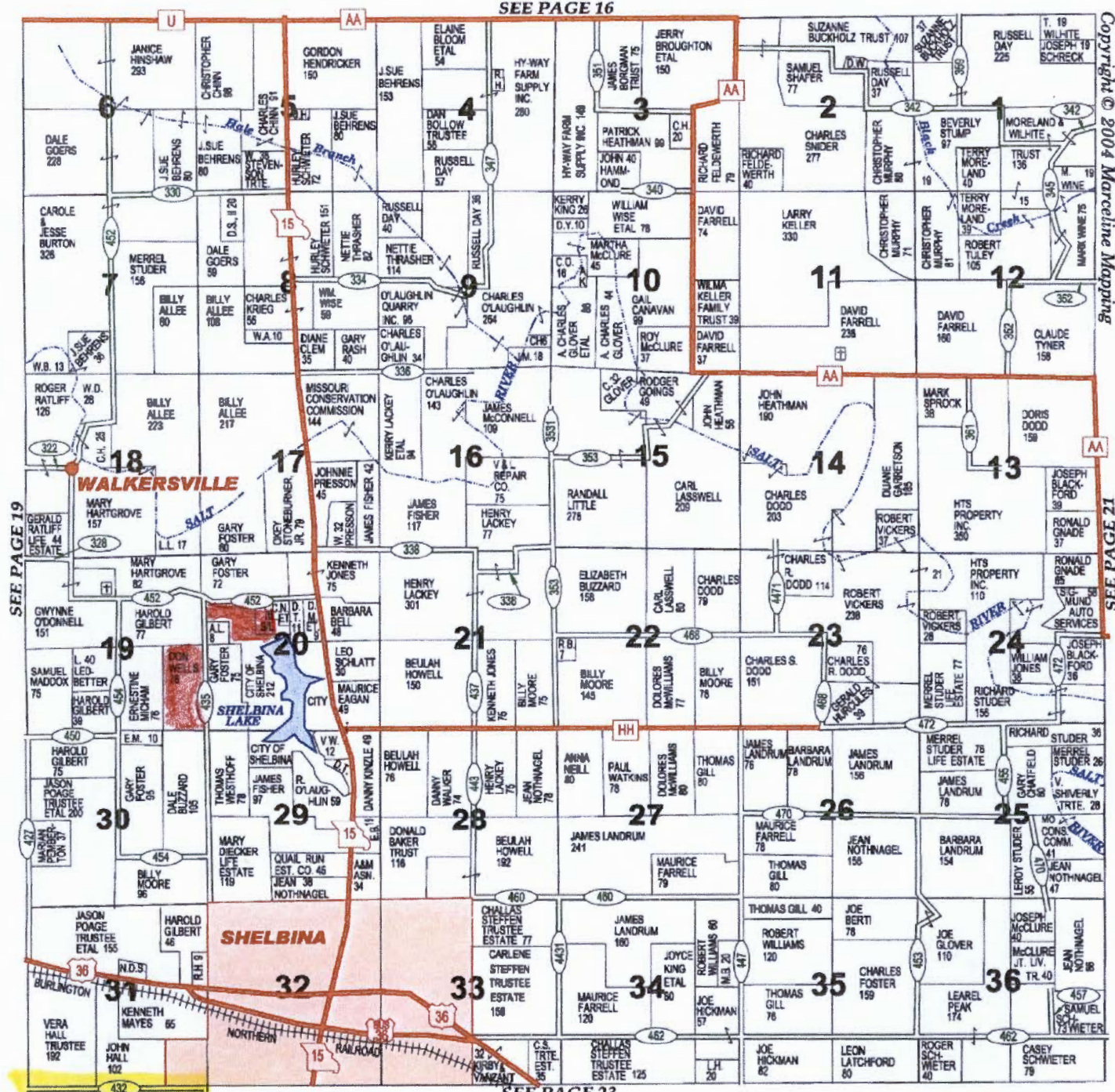
Water Protection Program

Shelbina Lake - 54 surface acres



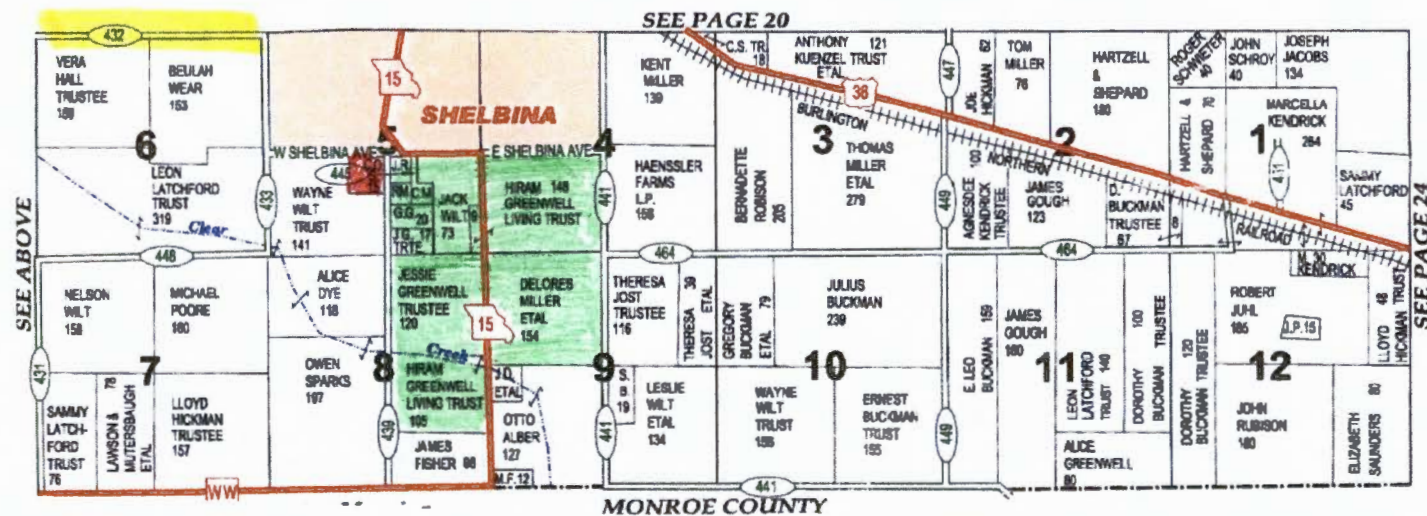
● Shelbina Lake Drinking Water Intake

SEE PAGE 16



Hand application Sites

TOWNSHIP 56N • RANGE 10W



 Land application Sites

 Down Stream Landowners

July 1, 2018, so there is plenty of time to work on incorporation these significant items into the renewed permit.

We look forward to working on the permit with the Department. If you have any questions, please contact Philip Wilson, P.E., with Shafer, Kline & Warren, Inc. He may be reached at 660.385.6441 or by email at philip.wilson@skw-inc.com.

Sincerely,



Dennis Klusmeyer
City Superintendent
CITY OF SHELBYNA

Enclosures

cc: Philip Wilson, P.E., Shafer, Kline & Warren, Inc.
Irene Crawford, Missouri Department of Natural Resources



MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
FINANCIAL QUESTIONNAIRE

RECEIVED

DEC 27 2017

Water Protection Program

NOTE ► FINANCIAL INFORMATION THAT IS NOT PROVIDED THROUGH THIS FORM WILL BE OBTAINED BY THE DEPARTMENT FROM READILY AVAILABLE SOURCES.	
1. GENERAL INFORMATION	
FACILITY NAME Shelbina WWTF	PERMIT NUMBER #MO-0041092
CITY Shelbina	COUNTY Shelby
☒ PERMIT RENEWAL/MODIFICATION ☐ STATE REVOLVING FUND APPLICATION	SRF PROJECT NUMBER (IF APPLICABLE) C295
2. GENERAL FINANCIAL INFORMATION (ALL FACILITIES)	
2.1 Number of connections to the facility: Residential <u>672</u> Commercial <u>116</u> Industrial _____	
2.2 Current sewer user rate: Based on a 5,000 gallon per month usage \$ <u>44.27</u>	The sewer user rate is (check one): ☐ Rate Capacity (set rate) ☒ Pay as You Go
2.3 Current operating costs for the facility (excludes depreciation):	
2.4 Bond Rating (if applicable):	N/A
2.5 Bonding Capacity: General obligation bond capacity allowed by constitution: cities=up to 20% of taxable tangible property; sewer districts=up to 5% of taxable tangible property	\$3,962,498.40
2.6 Current outstanding debt relating to wastewater collection and treatment: Debt information is typically available from your community's annual financial statements	N/A
2.7 Amount of current user rate per household per month used toward payments on wastewater debt:	N/A
2.8 Net direct debt: Net direct debt is the total amount of outstanding general obligation debt, including notes and short-term financing.	N/A
2.9 Overlapping debt: Overlapping debt is the financial obligations of one political jurisdiction that also falls partly on a nearby jurisdiction.	N/A
2.10 Overall net debt: Overall net debt is defined as debt repaid by property taxes within a utility/municipality's service area. It excludes debt that is repaid by special user fees (e.g. revenue bonds). Overall net debt = Net direct debt + Overlapping debt. Debt information is typically available from your community's annual financial statements	N/A
2.11 Attach any relevant financial statements.	
3. FINANCIAL INFORMATION SPECIFIC TO MUNICIPALITIES	
3.1 Municipality's Full Market Property Value (FMPV): FMPV data is typically available through your community or state assessor's office	\$19,812,492
3.2 Municipality's property tax revenues: Property tax revenues are typically available from your community's annual financial statements	\$241,748.00
3.3 Municipality's property tax collection rate: To determine the collection rate, you will need to divide property tax revenues by the property taxes levied. To calculate property taxes levied, multiply the assessed value of real property within your community/service area by the property tax rate. This information is typically available through your community or state assessor's office. Property tax revenues are typically available in your community's annual financial statements.	.9897

4. FINANCIAL INFORMATION SPECIFIC TO SEWER DISTRICTS

4.1 Total connections to the sewer district: Residential 672 Commercial 116 Industrial _____

4.2 When facilities require upgrades, how are the costs divided? Will the homes connected to the upgraded facility bear the costs? Will the costs be divided across the sewer district?

Costs will be divided across the entire customer base.

5. OTHER CONSIDERATIONS (ALL FACILITIES)

5.1 Provide a list of major infrastructure or other investments in environmental projects. Include project timing and costs and indicate any possible overlap or complications (attach sheets as necessary):

All major infrastructure and distribution upgrades listed in the Shelbina's Wastewater Facility Plan that was approved in February 2016 scope of work and time lines will be completed as financing allows.

5.2 Provide a list of any other relevant local community economic conditions that may impact the ability to afford new permit requirements or the proposed SRF project. (See Community Supplemental Survey on the following page):

The continued decrease and aging population base has been trending for the past 20 years with no changes in the foreseeable future.

6. CERTIFICATION

FINANCIAL CONTACT

Dennis Klusmeyer

OFFICIAL TITLE

City Superintendent

EMAIL ADDRESS

administrator@cityofshelbina.com

TELEPHONE NUMBER WITH AREA CODE

(573) 588-4104

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this application and all attachments and that based on my inquiry of those individuals immediately responsible for obtaining this information, I believe that the information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine or imprisonment.

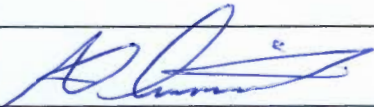
OWNER OR AUTHORIZED REPRESENTATIVE

Al Dimmitt

OFFICIAL TITLE

Mayor

SIGNATURE



DATE SIGNED

12/19/2017

For additional guidance, see <http://usmayors.org/urbanwater/media/2013/0529-report-WaterAffordability.pdf>.

For more information regarding your Missouri State Operating Permit, contact the department's Water Protection Program at 573-751-1300, to speak with a permit writer in the domestic wastewater unit.

For more information regarding your State Revolving Fund Application, contact the department's Water Protection Program at 573-751-1300, to speak with a project coordinator in the Financial Assistance Center.

This completed form and any attachments should be submitted to one of the following:

For Submittal of Permit Renewal/Modification:

Department of Natural Resources
Water Protection Program
ATTN: NPDES Operating Permits Section
P.O. Box 176
Jefferson City, MO 65102

For Submittal of SRF Applications:

Department of Natural Resources
Water Protection Program
ATTN: Financial Assistance Center
P.O. Box 176
Jefferson City, MO 65102



MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
Community Supplemental Survey

RECEIVED

DEC 27 2017

Water Protection Program

PLEASE ANSWER THE FOLLOWING APPLICABLE QUESTIONS. (ATTACH ADDITIONAL SHEETS AS NECESSARY)

1. Are there any significant transportation corridors within 20 miles of your community?

If yes, please explain. (Example: major interstate, railroad center)

Hwy 36-110, 4 Lane

2. Are there any significant manufacturing or employment centers within 20 miles of your community?

If yes, please explain. (Example: commercial farming, manufacturing, government operation, big box store)

Cerro Flow Products LLC

3. Where do the majority of children in your community receive their education?

(Please check appropriate box for each education level)

Elementary	☒ Within your community	☐ Within 20 miles	☐ Farther than 20 miles
Middle School	☐ Within your community	☒ Within 20 miles	☐ Farther than 20 miles
High School	☐ Within your community	☒ Within 20 miles	☐ Farther than 20 miles

4. Considering your community's tax base, debt level, ability to bond capital improvement projects, or repay loans, how likely is it that your community could afford to pay for the following:

4.1 An upgrade or replacements to your wastewater system costing \$50,000

4.2 An upgrade or replacements to your wastewater system costing \$250,000

4.3 An upgrade or replacements to your wastewater system costing \$1 million

Very Unlikely	Unlikely	Likely	Very Likely
☐	☐	☒	☐
☐	☐	☒	☐
☒	☐	☐	☐

5. Which of the following best describes anticipated population change for your community over the next ten years?

☐ Significant Decrease ☒ Decrease ☐ Remain the Same ☐ Increase ☐ Significant Increase

6. Check the appropriate boxes in the following statements as it relates to the population change you predicted in questions 5.

6.1 Over the past 20 years the population has:

☒ Significantly Decreased ☐ Decreased ☐ Remained the Same ☐ Increased ☐ Significantly Increased

6.2 The majority of the population in the community is retired or is near retirement.

☐ Definitely False ☐ Probably False ☒ Probably True ☐ True ☐ Unknown

6.3 The majority of young people leave the community in search of employment or education elsewhere.

☐ Definitely False ☐ Probably False ☐ Probably True ☒ True ☐ Unknown

6.4 In the foreseeable future, the employment opportunity in or around the community will:

☐ Significantly Decrease ☒ Decrease ☐ Remain the Same ☐ Increase ☐ Significantly Increase

6.5 In the foreseeable future the economic activity in or around the community will:

☐ Significantly Decrease ☒ Decrease ☐ Remain the Same ☐ Increase ☐ Significantly Increase

6.6 In the foreseeable future the tax base of the community will:

☐ Significantly Decrease ☒ Decrease ☐ Remain the Same ☐ Increase ☐ Significantly Increase

6.7 It is _____ for the community to meet its debt obligations.

☐ Difficult ☒ Somewhat Difficult ☐ Somewhat Easy ☐ Easy ☐ No Debt

7. What other issues or information should be considered when determining population stability or the financial ability for your community to pay for significant capital investments? Attach sheets as necessary.

(Example: Seasonal population changes, natural resources (lakes, rivers), age of infrastructure, significant employment changes, etc.)

Job base is minimal at best and depleting.

8. Should an existing or proposed regional wastewater district be willing to connect, own, or operate your current facility, how likely would you be to consider this as an option?

Very Unlikely	Unlikely	Likely	Very Likely
☒	☐	☐	☐



Metals Translator Study

Shelbina Wastewater Treatment Plant

Prepared for
City of Shelbina, Missouri

December 2017

Metals Translator Study Shelbina Wastewater Treatment Plant

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Certifications



Allison L. Pearson

Allison L. Pearson

PE #: 2014016993

12/18/17

Date

1.0 Introduction/Background

The Shelbina Wastewater Treatment Plant (WWTP), located at 206 West Shelbina Avenue, Shelbina, Missouri, operates under Missouri State Operating Permit (MSOP) MO-0041092. The WWTP discharges treated effluent from Outfall 001 to an unnamed tributary of Clear Creek (WBID 117). The design flow of the WWTP is 662,000 gallons per day (gpd) and the actual flow is approximately 490,000 gpd.

The Missouri Department of Natural Resources (MDNR) has determined that water-quality-based effluent limitations for copper and zinc are appropriate for the Shelbina WWTP with final effluent limitations becoming effective January 1, 2024. Monitoring of total recoverable copper and zinc is required in the interim before final effluent limitations become effective. Federal Regulation 40 CFR 122.45(c) requires that the permit effluent limitations for metals be expressed as total recoverable metals. Discharge monitoring report (DMR) data for the WWTP indicates that the discharge from Outfall 001 may have difficulty meeting the final permit effluent limits for total recoverable copper and zinc given the concentrations currently contained in the final effluent limits of the permit.

United States Environmental Protection Agency (USEPA) guidance indicates that the primary toxicity to organisms that live in the water column is by adsorption to or uptake across the gills. This physiological process requires metal to be in the dissolved form (USEPA, 1996a). The City of Shelbina and their consultant, Shafer, Kline and Warren (SKW), proposed the use of a metals translator study to more accurately define the partitioning of particulate and dissolved metals in the receiving water body. Barr Engineering Co. (Barr) assisted the City and SKW with development of the sampling plan, as well as final analysis of collected data. This report outlines the results of the study and associated calculations, which were performed in accordance with USEPA metals translator guidance titled *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (USEPA, 1996a).

The following sections provide more detail on the purpose of the study as well as the existing discharge conditions at the site.

1.1 Purpose of Study

Discharges from Outfall 001 have periodically exceeded the future final effluent limitation for total recoverable copper during the monitoring period. USEPA guidance indicates that the primary toxicity to organisms that live in the water column is by adsorption to or uptake across the gills; this physiological process requires metal to be in the dissolved form (USEPA, 1996). However, 40 CFR 122.45(c) requires that the permit effluent limitations for metals be expressed as total recoverable metals. The use of a metals translator study was proposed to more accurately define the partitioning of particulate and dissolved copper in the receiving water body (unclassified tributary to Clear Creek). The ultimate goal of the study was to develop a metals translator for copper that is used to recalculate the copper effluent limitation of the permit in accordance with USEPA metals translator guidance titled, *The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (USEPA, 1996).

During this study, data was also collected to prepare a biotic ligand model (BLM) in additional support of a potential site-specific adjustment of the water quality criteria (i.e. acute and chronic) for copper the unnamed tributary to Clear Creek. A BLM simulates metal speciation and the protective effects of competing cations into predictions of metal bioavailability and toxicity (Windward, 2017). In this situation a BLM was developed from the data collected and utilized to evaluate the bioavailability of copper in the stream and the potential implications with regard to the receiving water quality criteria. It should be noted that Missouri's current water quality criteria for copper are based upon the USEPA's 1996 criteria document that uses the hardness of the waterbody to determine toxic concentration threshold levels. The 2007 USEPA criteria document for copper revised the method to establish toxicity levels from a hardness approach to the bioavailability of the metal based upon a number of water quality parameters and biological uptake considerations and allows the site specific adjustment of the criteria through the development of a BLM that incorporates site specific data.

1.2 Receiving Water Description

The receiving water body for Outfall 001 is an unnamed tributary to Clear Creek located within the Crooked Creek – North Fork Salt River watershed (Hydrologic Unit Code 071100050404). The receiving water body is identified in the Missouri Use Designation Dataset and flows in a southeast direction from the site. Approximately 1.2 miles downstream, the receiving water enters the nearest classified portion of Clear Creek (WBID 3960). The receiving water is assigned presumed designated uses and subject to acute and chronic toxicity criteria in accordance with 10 CSR 20-7.031(2)(A)3. Additionally, for the purposes of determining water quality-based effluent limitations, since the 7Q10 flow is less than 0.1 cubic foot per second (cfs), there is no mixing zone or zone of initial dilution (ZID) allowed (10 CSR 20-7.031(4)(A)4.B.(I)).

1.3 Current Permit Effluent Limitations

Current permit effluent limitations are included in Tables A-1 and A-2 of MSOP MO-0041092. Interim effluent limits outlined in Table A-1 apply to the facility through December 31, 2023. Final effluent limitations, included in Table A-2 are effective thereafter. Of primary interest to this study is total recoverable copper, which is monitoring only in the interim period, but will ultimately have a maximum daily effluent limitation of 28.7 µg/L and a monthly average of 10.6 µg/L. Table 1 outlines final permitted effluent limitations. In addition, monitoring only is required for flow and ammonia.

Table 1 Permitted Effluent Limitations, Outfall 001 (MSOP MO-0041092)

Parameter	Units	Interim Limits		Final Limits	
		Max Daily	Monthly Avg	Max Daily	Monthly Avg
Biochemical Oxygen Demands	mg/L	45, weekly avg.	30	45, weekly avg.	30
Total Suspended Solids (TSS)	mg/L	45, weekly avg.	30	45, weekly avg.	30
pH	SU	6.5-9.0		6.5-9.0	
Oil and Grease	mg/L	15	10	15	10
Copper, Total Recoverable	µg/L	Monitoring Only	Monitoring Only	28.7	10.6
Zinc, Total Recoverable	µg/L	Monitoring Only	Monitoring Only	228.3	81.4

2.0 Study Design/Data Collection

A site-specific sampling plan for the metals translator study titled, *Clear Creek Tributary Sampling Plan, Metals Translator Study*, was prepared by Barr in January 2017. A final submittal of the report was made to MDNR on January 26, 2017, and was subsequently approved on February 2, 2017. The sampling plan outlined in detail sampling locations, sampling frequency/duration, sampling methods, analytical methods, data management, and data quality objectives and criteria for measurement data. The following subsections will provide a brief overview of this information and outline any noted deviations from the sampling plan for the metals translator study and BLM.

2.1 Metals Translator Study

Design of the metals translator study was based on the USEPA guidance document, *Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion* (USEPA, 1996). The following subsections detail the study design and data collection for the metals translator study.

2.1.1 Sampling Locations and Frequency

Samples for the metals translator study were collected from the effluent of Outfall 001 and one downstream location. The downstream sampling point was located approximately 1.2 miles downstream from the WWTP, near the Highway 15 Bridge. A map including the sampling locations is included as Figure 1

The sampling plan recommended collection of 20 sampling events, with the goal of a minimum of 10 uncensored data sets. Nineteen samples in total were collected beginning May 30, 2017 and concluding October 24, 2017. All samples were collected during low flow conditions, meaning they were not collected any sooner than 48 hours following storm events that produced more than 0.1 inch of precipitation. Samples were collected no less than seven days apart. All samples were collected by City of Shelbina personnel using grab sampling techniques.

2.1.2 Parameters of Concern

Field measurements and observations were noted during each sampling event to have a record of basic conditions at the time of sample collection. Field measurements were collected for pH, temperature, dissolved oxygen, and specific conductance. Portable, handheld meters were used for the measurement of field parameters. Flow data from the outfalls and in-stream field flow estimates were also collected.

Laboratory analysis for general chemistry parameters was performed for each sampling event in order to gain a better understanding of receiving stream conditions. The parameters analyzed and the methods used are as follows:

- Total hardness as CaCO₃ (Standard Method 2340 B)
- Chloride (EPA 300.0)
- Sulfate (EPA 300.0)

- Total alkalinity as CaCO₃ (Standard Method 2320 B)
- TSS (Standard Method 2540 D)
- Particulate organic carbon (Standard Method 5310 C)
- Dissolved organic carbon (Standard Method 5310 C)

In addition to general chemistry parameters, all samples were analyzed for the following metals:

- Calcium, total (EPA 200.7)
- Copper, dissolved and total recoverable (EPA 200.8)
- Magnesium, total (EPA 200.7)
- Potassium, total (EPA 200.7)
- Sodium, total (EPA 200.7)
- Zinc, dissolved and total recoverable (EPA 200.8)

The metals translator laboratory reports are included as Appendix F.

2.1.3 Quality Assurance/Quality Control

As specified in the approved sampling plan, field duplicates were collected for each sampling event. Field blanks were also used at every sampling event. In addition to the quality control requirements specified in the approved sampling plan, the City also had all laboratory reports reviewed by a senior data quality specialist from Barr. Lab reports for each sampling event can be found in Appendix F.

Quality assurance and quality control reviews were conducted by Barr to assess the integrity of the field procedures and the validity of the analytical results from the metals translator study. This review was performed in accordance with the quality control aspects of the published analytical methods. The quality control procedures conducted at the laboratory included the use of approved methodologies, analysis of method (laboratory) blanks, laboratory control samples (LCS), duplicate samples, matrix spike (MS) samples and matrix spike duplicate (MSD) samples. Quality control procedures conducted in the field consisted of masked duplicate samples. The laboratory and field quality control data, where presented in the laboratory report, met the applicable acceptance limits for accuracy and precision. The quality assurance and quality control review determined the data is acceptable, as qualified.

2.2 Biotic Ligand Modeling

A BLM was completed to assess the bioavailability of copper in the receiving stream. Calculations were completed using the program Biotic Ligand Model 3.16.2.41, distributed by Windward Environmental LLC.

2.2.1 Sampling Locations and Frequency

A total of 16 samples from Outfall 001 and 16 samples from the downstream sampling location were analyzed using the BLM. Samples were collected beginning late May 2013 through late October 2017.

2.2.2 Parameters of Concern

Samples collected for the BLM were analyzed for the following parameters:

- Temperature (Field Measurement)
- pH (Field Measurement)
- Dissolved Copper (EPA 200.8)
- Dissolved Organic Carbon (Standard Method 5310C)
- Calcium (EPA 200.7)
- Magnesium (EPA 200.7)
- Sodium (EPA 200.7)
- Potassium (EPA 200.7)
- Sulfate (EPA 300.0)
- Chloride (EPA 300.0)
- Total Alkalinity as CaCO_3 (Standard Method 2320B)

3.0 Data Analysis and Results

3.1 Development of Metals Translator

The metals translator value is the fraction of the total recoverable copper in dissolved form, often referred to as f_d , within the receiving water body. The metals translator value accounts for the site-specific conditions of the receiving stream that impact what portion of discharged copper will be in dissolved form. The calculated translator value can be substituted for the default translator value assigned to the metal for calculations of site-specific effluent limitations that better fit site conditions.

3.1.1 Censoring of Data

There were no instances of non-detects in the copper or zinc data sets; however, there were some instances of the dissolved concentration exceeding the total recoverable concentration. This was attributed to normal analytical variability and the data points were excluded. Following censoring of the data, there were 17 copper data points and 17 zinc data points from the downstream sampling location. The original, uncensored data set is included as Appendix A.

3.1.2 Calculation of Metals Translator

The metals translator value can be calculated directly from the individual ratios of the dissolved metal to the total recoverable metal. Direct calculation of the translator value is not appropriate when there is an established relationship between the partitioning of metal and the presence of binding conditions in the water body, such as TSS or total organic carbon (TOC). If the metal concentration downstream is found to be dependent on the concentrations of TSS or TOC, a partitioning coefficient must be incorporated into the calculation of the metals translator value.

In order to determine whether there was a statistical relationship, the copper and zinc translator values (f_d) were plotted versus concentration of TSS and TOC. The plots are included as Appendix B. A trendline was created and the correlation coefficient (R^2) of the trendline was determined. The R^2 value gives an indication of how well the trendline fits the data set, or goodness of fit. An R^2 value close to 1.0 indicates that the data closely fits the linear trendline, which indicates a potential relationship between the fraction of dissolved copper or zinc and the concentration of TSS or TOC. The highest R^2 value found was 0.1811 for the copper translator and TOC at Outfall 001. This value does not definitively indicate a statistical relationship between TOC and the dissolved fraction of the zinc, nor does it definitively rule out a relationship. However, due to the size of the data sets, and in an effort to limit the amount of assumptions made in the development of a translator value, it is assumed that there is no relationship between TOC or TSS and the dissolved metals concentrations at the Outfall 001 or downstream locations; therefore, the translator value for copper and zinc can be calculated directly.

Tables 2 and 3 outline the calculations of the copper and zinc translator values, respectively, for acute conditions (Outfall 001) and chronic conditions (downstream). The data sets had relatively low coefficient of variations, meaning the data was not highly variable.

Table 2 **Copper Translator Calculation**

Sample Date	Acute – Outfall 001			Chronic - Downstream		
	Copper, Dissolved (µg/L)	Copper, Total Recoverable (µg/L)	fd (Cd/Ct), Copper	Copper, Dissolved (µg/L)	Copper, Total Recoverable (µg/L)	fd (Cd/Ct), Copper
5/30/17	16.3	17.1	0.95	5.65 ¹	5.48 ¹	-
6/9/17	19.2	20.3	0.95	8.22	8.86	0.93
6/21/17	10.5	11.3	0.93	4.38	5.47	0.80
6/28/17	11.6	13.4	0.87	7.48 ¹	6.29 ¹	-
7/10/17	14.3	15.5	0.92	5.93	6.21	0.95
7/17/17	14.2	16.0	0.89	6.04	6.66	0.91
7/26/17	12.2	14.3	0.85	7.04	7.54	0.93
8/1/17	15.6	17.8	0.88	5.80	6.37	0.91
8/8/17	19.1	20.8	0.92	7.66	8.06	0.95
8/15/17	20.4	22.9	0.89	7.93	8.53	0.93
8/21/17	19.7	21.9	0.90	7.21	8.16	0.88
9/5/17	15.8	18.2	0.87	7.33	8.21	0.89
9/12/17	23.5	24.8	0.95	8.27	8.48	0.98
9/18/17	18.4	18.9	0.97	8.67	9.20	0.94
9/25/17	20.8	23.1	0.90	8.41	9.17	0.92
10/2/17	18.5	20.4	0.91	8.31	8.88	0.94
10/9/17	14.2	16.2	0.88	5.99	6.71	0.89
10/17/17	12.0	13.8	0.87	5.64	6.18	0.91
10/24/17	17.0	18.7	0.91	6.29	7.21	0.87
Average			0.90			
Standard Deviation			0.03			
Geometric Mean			0.90			
Coefficient of Variation			0.04			

Notes:

1. Values where dissolved exceeded total are attributed to normal analytical variability and were removed from the data set.

Table 3 Zinc Translator Calculation

Sample Date	Acute – Outfall 001			Chronic - Downstream		
	Zinc, Dissolved (µg/L)	Zinc, Total Recoverable (µg/L)	fd (Cd/Ct), Zinc	Zinc, Dissolved (µg/L)	Zinc, Total Recoverable (µg/L)	fd (Cd/Ct), Zinc
5/30/17	21.0	21.5	0.98	-	-	-
6/9/17	23.5 ¹	22.4 ¹	-	10.6	11.9	0.89
6/21/17	12.8	13.3	0.96	2.5	5	0.50
6/28/17	16.6	18.4	0.90	-	-	-
7/10/17	19.1	19.7	0.97	7.5	8.1	0.93
7/17/17	12.5	13.4	0.93	4.9	6.8	0.72
7/26/17	12.2	13.8	0.88	5.3	6.0	0.88
8/1/17	11.2	13.9	0.81	3.3	4.2	0.79
8/8/17	11.6	12.7	0.91	4.6	5.4	0.85
8/15/17	11.4	13.5	0.84	4.9	5.8	0.84
8/21/17	11.1	13.1	0.85	3.7	4.8	0.77
9/5/17	13.0	14.4	0.90	4.6	5.5	0.84
9/12/17	16.3	17.6	0.93	4.7	5.5	0.85
9/18/17	14.8	15.0	0.99	6.1	6.9	0.88
9/25/17	14.8	17.0	0.87	6.4	8.2	0.78
10/2/17	18.6	20.5	0.91	7.2	7.8	0.92
10/9/17	17.5	19.2	0.91	5.6	7.3	0.77
10/17/17	13.1	15.1	0.87	3.8	5.5	0.69
10/24/17	15.4	17.8	0.87	3.9	5.5	0.71
Average			0.90			
Standard Deviation			0.05			
Geometric Mean			0.90			
Coefficient of Variation			0.06			

Notes:

1. Values where dissolved exceeded total are attributed to normal analytical variability and were removed from the data set.

3.2 Biotic Ligand Data Analysis

As described in detail in the USEPA document, *Aquatic Life Ambient Freshwater Quality Criteria – Copper*, the output of the BLM is a chronic and acute water quality criteria reflective of the bioavailability of copper in the receiving stream (USEPA, 2007). The chronic criteria for copper calculated by the BLM was 19.7 µg/L at the downstream sampling point. The acute criteria for copper was 31.7 µg/L at the downstream sampling point. Output from the BLM can be found in Appendix D.

Site specific aquatic life use water quality criteria for copper may be calculated and promulgated for the receiving stream in accordance with 10 CSR 20-7.031(5)(S)2.A(IV). The BLM is the method prescribed in the previously mentioned USEPA guidance document and would serve as the basis for preparing a modification to the State of Missouri's water quality criteria.

4.0 Proposed Effluent Limit Modification

Site-specific metals translator values can be calculated and used in place of the default USEPA values in the calculation of effluent limitations. The result is an effluent limitation that more accurately reflects the site conditions and the partitioning of copper and zinc in the receiving water body.

A Reasonable Potential Analysis (RPA) was performed for copper and zinc at Outfall 001. The RPA was performed using Outfall 001 data collected during the metals translator study, as well as the DMR data from 2007 through 2017. Prior to performing the RPA calculations, the background data set was assessed for potential errors and/or outliers. Unit errors were corrected in the copper data set as indicated in Appendix C. Two outliers were identified and censored from the zinc data set. The average zinc concentration recorded in the uncensored dataset was 31.2 µg/L, with a standard deviation of 52.0 µg/L. Concentrations of 360 µg/L (2/29/2008) and 550 µg/L (7/31/2008) were six times and ten times the standard deviation from the mean, respectively. RPA calculations performed on the censored data indicate it has reasonable potential to exceed water quality criteria; however, zinc does not have reasonable potential to exceed water quality criteria. As a result, it is recommended that the effluent limitation for zinc be removed from the permit.

Water quality-based effluent limitation (WQBEL) calculations were performed for copper and zinc at Outfall 001. To begin, protection of aquatic life-based water quality standards (WQS) were calculated for Outfall 001 using 226 mg/L, which was the 25th percentile of the downstream hardness. The aquatic life WQS is then divided by the conversion factor to determine the total recoverable WQS. If no site-specific data is available, a default copper translator of 0.960 and default zinc translator of 0.986 would be used based on USEPA guidance (USEPA, 1996). However, the default translator values were substituted with the geometric mean translator values, f_d , calculated for copper and zinc at Outfall 001, yielding a total recoverable WQS for each metal. The use of the geometric mean for the translator is consistent with the USEPA guidance (USEPA 1996) and was deemed appropriate for the data set due to the low standard deviation of the data, as seen in Tables 2 and 3.

WQBELs were also performed using the criteria for copper based on the BLM, as detailed in Section 3.2 of this report. The chronic and acute criteria for copper calculated by the BLM was 19.7 µg/L and 31.7 µg/L, respectively. Once adjusted using the calculated metals translator value, the total recoverable water quality criteria for chronic and acute were 35.2 µg/L and 21.6 µg/L, respectively. WQBELs were then calculated using the new copper criteria.

Finally, WQBELs were calculated using the 50th percentile hardness with the site-specific metals translator. MDNR is currently in the process of promulgating a rulemaking that will allow the use of 50th percentile hardness, as opposed to 25th percentile hardness. This value is included for comparative purposes to show the impacts of the change in allowable hardness.

Note, WQBELs calculated for the metals translator and BLM differ from the current MSOP effluent limitations for a number of technical reasons beyond the incorporation of study results. The coefficient of variation (CV) used by MDNR in calculating the multipliers for copper and zinc was much larger. This is

likely due to outliers in the background data set, which were screened as described earlier in Section 4.0. It also may be due to the incorporation of new data collected as part of this study. In addition, the number value (n), which is used to calculate the chronic long-term average multiplier and the average monthly limit multiplier, was incorrect in the MDNR fact sheet, which listed n-values of 145 and 146 for copper and zinc, respectively. In accordance with USEPA's *Technical Support Document for Water Quality-based Toxics Control*, the n-value is the number of samples collected per month, as opposed to the total number of samples. WQBEL calculations associated with this report were performed using an n-value of four for copper and zinc.

The newly calculated average monthly limits (AMLs) and maximum daily limits (MDLs) for Outfall 001 are outlined in Table 4. Results of the RPA and further detail on the effluent limitation calculations are included in Appendix C of this report.

Table 4 Outfall 001 Comparative Copper and Zinc Effluent Limitations

Parameter	Effluent Limitation	Biotic Ligand Model Value ¹	Geomean Translator Value ²	Geomean Translator and 50 th Percentile Hardness ³	Current MSOP Effluent Limitation
Copper	Maximum Daily (µg/L)	29.5	25.7	28.0	28.7
	Average Monthly (µg/L)	19.4	16.9	18.4	10.6
Zinc	Maximum Daily (µg/L)	NA	245	267	228
	Average Monthly (µg/L)	NA	141	153	81.4

Notes:

1. Value for BLM is included for comparative purposes only. Results cannot be incorporated into the permit without being promulgated through the rulemaking process to adjust the water quality criteria for the receiving stream in accordance with 10 CSR 20-7.031(5)(S)2.A.(IV).

2. Value in table is reflective of WQBEL calculations in Appendix C, which were performed using the geometric mean translator values (Tables 2 and 3 of this report).

3. Value in table is reflective of WQBEL calculations in Appendix C, which were performed using the geometric mean translator values and the 50th percentile of instream hardness data.

5.0 Conclusions

A metals translator study was conducted for the unnamed tributary to Clear Creek with the approval of MDNR. The goal was to better understand the partitioning of copper and zinc in the stream since DMR monitoring data indicates the existing discharge may have difficulty meeting the final permitted effluent limits for total recoverable copper and zinc. Based on the data collected during site sampling events, site-specific metals translators were calculated for both chronic and acute conditions for copper and zinc. The site-specific translators were then used to calculate new effluent limitations for copper and zinc, which are detailed in Section 4.0 of this report. As previously noted, it was shown that there was no reasonable potential to exceed water quality criteria for zinc. As such, the application of an effluent limitation for zinc is not appropriate. Modification of the permit is proposed to remove the zinc effluent limitation and adjust the copper effluent limitation to reflect the application of a site-specific translator for copper and the 50th percentile of instream hardness.

In addition to the metals translator study, BLM was performed to further assess the bioavailability of metals in the receiving water. Although the effluent limitations for copper using the BLM are higher, or less stringent, than the limits calculated using the metals translator, the results of the BLM cannot be incorporated into the permit without being promulgated through the rulemaking process to adjust the water quality criteria for the receiving stream in accordance with 10 CSR 20-7.031(5)(S)2.A.(IV).

6.0 References

- Barr, 2017. *Clear Creek Tributary Sampling Plan, Metals Translator Study*. Barr Engineering Co. January 2017.
- USEPA, 2007. *Aquatic Life Ambient Freshwater Quality Criteria – Copper, 2007 Revision (EPA-822-R-07-001)*. United States Environmental Protection Agency. Office of Water. Washington, D.C., February 2007.
- USEPA, 1996. *Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion (EPA 823-B-96-007)*. United States Environmental Protection Agency. Office of Water. Washington, D.C., June 1996. < <https://nepis.epa.gov/> >.
- Windward, 2017. *The Biotic Ligand Model Windows Interface, Research Version 3.16.2.41: User's Guide and Reference Manual*. Windward Environmental LLC. Seattle, Washington. November 2017.

Figures

Appendix A

Metals Translator Sampling Results

Location	Date	Alkalinity, Total as CaCO3 (mg/L)	Dissolved Organic Carbon (mg/L)	Total Organic Carbon (mg/L)	Chloride (mg/L)	Cd, Pb, Zn (unitless)	pH, Field (SU)	DO, Field (mg/L)	Spec Cond., Field (µS/cm)	Temp, Field (°C)	Flow (MGD)
downstream	5/30/2017	205		5.85	45.0		7.27	6.35	671	17.5	0.269
downstream	6/09/2017	168	6.52	6.52	70.0	0.89	7.66	6.80	810	18.3	0.266
downstream	6/21/2017	182	7.04	6.88	26.0	0.5	7.55	5.82	526		0.467
downstream	6/28/2017	179	5.97	5.79	56.0		7.02	6.80	701	19.1	0.403
downstream	7/10/2017	179	5.21	5.25	54.0	0.93	7.42	9.04	664	25.0	0.681
downstream	7/17/2017	164	5.23	5.3	64.0	0.72	7.69	8.06	768	27.0	0.465
downstream	7/26/2017		6.27	6.78	66.0	0.88	7.06	5.58	722	24.0	0.534
downstream	8/01/2017	166	5.55	5.7	51.0	0.79	7.25	8.45	655	23.0	0.293
downstream	8/08/2017	154	5.18	5.62	63.0	0.85	7.80	8.50	723	21.0	0.149
downstream	8/15/2017	150	5.38	5.64	60.0	0.84	7.70	6.70	674	23.0	0.222
downstream	8/21/2017	164	5.51	5.5	54.0	0.77	7.54	6.11	683	22.0	0.199
downstream	9/05/2017	167	5.54	5.52	57.0	0.84	7.70	8.60	706	21.0	0.248
downstream	9/12/2017	158	4.95	5.34	85.0	0.85	7.75	9.52	809	18.0	0.247
downstream	9/18/2017	170	5.21	5.14	73.0	0.88	7.41	6.97	780	19.0	0.227
downstream	9/25/2017	158	5.6	5.84	70.0	0.78	7.60	7.10	766	22.0	0.200
downstream	10/02/2017	155	5.42	5.61	63.0	0.92	7.70	7.20	694	20.0	0.254
downstream	10/09/2017	156	4.96	5.53	44.0	0.77	7.34	6.59	591	18.7	0.287
downstream	10/17/2017	137	6.68	6.82	31.0	0.69	7.69	8.80	365	20.0	0.198
downstream	10/24/2017	153	4.96	5.29	41.0	0.71	7.60	8.99	512	13.0	0.226
outfall 001	5/30/2017	131		7.29	61.0	0.98	7.52	8.11	622	20.8	-
outfall 001	6/09/2017	97	7.23	7.4	81.0		7.35	7.06	810	20.3	-
outfall 001	6/21/2017	139	7.13	6.98	37.0	0.96	7.50	6.70	603		-
outfall 001	6/28/2017	132	7.05	5.55	73.0	0.90	7.53	7.44	733	20.0	-
outfall 001	7/10/2017	107	5.94	5.84	72.0	0.97	7.38	6.53	750	25.0	-
outfall 001	7/17/2017	78	5.9	5.92	82.0	0.93	7.05	6.34	782	24.2	-
outfall 001	7/26/2017		5.84	6.38	73.0	0.88	7.33	6.23		24.0	-
outfall 001	8/01/2017	95	6.06	6.49	68.0	0.81	7.50	7.32	689	22.0	-
outfall 001	8/08/2017	81	5.64	6.13	73.0	0.91	7.40	6.80	716	22.0	-
outfall 001	8/15/2017	73	6.44	6.73	74.0	0.84	7.20	6.30	744	22.0	-
outfall 001	8/21/2017	92	6.31	6.46	65.0	0.85	7.50	6.37	681	23.0	-
outfall 001	9/05/2017	131	5.61	5.65	74.0	0.90	7.70	7.40	764	21.0	-
outfall 001	9/12/2017	89	5.89	6.45	94.0	0.93	7.31	7.70	804	28.0	-
outfall 001	9/18/2017	98	5.69	5.88	80.0	0.99	7.61	6.76	768	20.0	-
outfall 001	9/25/2017	77	5.81	6.11	86.0	0.87	7.30	6.50	744	22.0	-
outfall 001	10/02/2017	88	5.74	6.04	74.0	0.91	7.34	7.20	696	19.0	-
outfall 001	10/09/2017	100	5.20	6.14	60.0	0.91	6.90	7.71	730	20.5	-
outfall 001	10/17/2017	127	5.16	5.66	42.0	0.87	7.49	7.79	516	17.0	-
outfall 001	10/24/2017	123	5.30	5.60	63.0	0.87	7.60	7.90	647	16.0	-

note -

- Cells shown with gray fill indicate data that did not meet quality control standards.
- Cells filled with red indicate that the total metal concentration was less than the detection limit.
- Values shown in bold, red, underlined font indicate a non-detect, which has been reported as less than the detection limit.

Appendix B

Correlation Coefficient Charts

Appendix C

Effluent Limitation Calculations

City of Shelbina
Pollutants of Concern Waste Load Allocations

Outfall 001	Flows:	Equations:
Facility Name: City of Shelbina	Effluent Flow, Q_e (cfs) = 1.024	Allowable Effluent Concentration (C_e) = $(Q_e + Q_s)C_{wq} - (Q_s * C_s) / Q_e$
Permit Number: MO-0041092		Wasteload Allocation, Acute (WLA_a) = C_e using the acute WQS
Stream Name: Unnamed Tributary to Clear Creek	Receiving Stream Flows (cfs)	Wasteload Allocation, Chronic (WLA_c) = C_e using the chronic WQS
	Q_s acute (1Q10)= 0	Long Term Avg, Acute (LTA_a) = WLA_a acute * LTA_a multiplier
	Q_s chronic (1/4 7Q10)= 0	Long Term Avg, Chronic (LTA_c) = WLA_c chronic * LTA_c multiplier
		Max Daily Limit (MDL) = the more protective LTA (LTA_a or LTA_c) * MDL multiplier
		Avg Monthly Limit (AML) = the more protective LTA (LTA_a or LTA_c) * AML multiplier

Pollutant		Water Quality Criteria			Receiving Stream Concentration (C_s) ¹	Wasteload Allocation		Long Term Average		Effluent Limits	
		Aquatic Life Acute (Cwq)	Aquatic Life Chronic (Cwq)	Chronic Drinking Water Criteria		WLAa ($\mu\text{g/L}$)	WLAc ($\mu\text{g/L}$)	LTAa ($\mu\text{g/L}$)	LTAc ($\mu\text{g/L}$)	Maximum Daily ($\mu\text{g/L}$)	Average Monthly ($\mu\text{g/L}$)
Copper, Total	Default Translator	28.5	17.8	1,300	0.0	28.5	17.8	14.7	12.6	24.4	16.0
	Site Specific Translator	30.4	18.8	1,300	0.0	30.4	18.8	15.7	13.3	25.7	16.9
	Biotic Ligand Model and Site Specific Translator	35.2	21.6	1,300	0.0	35.2	21.6	18.2	15.3	29.5	19.4
	50th Percentile Hardness and Site Specific Translator	33.6	20.5	1,300	0.0	33.6	20.5	17.3	14.5	28.0	18.4
Zinc, Total	Default Translator	228	226	5,000	0.0	228	226	94.0	140	228	131
	Site Specific Translator	245	282	5,000	0.0	245	282	101	175	245	141
	50th Percentile Hardness and Site Specific Translator	267	308	5,000	0.0	267	308	110	191	267	153

Notes:

1. No USGS water quality is available for the unnamed tributary to Clear Creek; therefore, all receiving stream concentrations were assumed to be zero.
2. 25th percentile of downstream hardness from the Metals Translator Study was used for hardness variable pollutants
3. Mixing Zone (MZ): One-quarter (1/4) of the stream volume of flow; length one-quarter (1/4) mile. [10 CSR 20-7.031(5)(A)4.B.(III)(a)].
4. Zone of Initial Dilution (ZID): One-tenth (0.1) of the mixing zone volume of flow, not to exceed ten times the effluent design flow. [10 CSR 20-7.031(5)(A)4.B.(III)(b)].
5. For sample sets with $n < 10$, CV was assumed to be 0.6.
6. LTA multipliers and the MDL multiplier are based upon the 99th percentile.
7. The AML multiplier is based upon the 95th percentile.

City of Shelbina
Multipliers, Outfall 001 - Copper

Multiplier Calculations for Toxics

STDEV	4.911
MEAN	15.770
CV	0.311

Acute LTA: 0.516

$e^{[0.5\sigma^2 - z\sigma]}$ where $\sigma^2 = \ln(CV^2 + 1)$, $z = 2.326$ for 99th percentile

σ^2 0.093
 σ 0.304

Chronic LTA: 0.706

$e^{[0.5\sigma_4^2 - z\sigma_4]}$ where $\sigma_4^2 = \ln(CV^2/4 + 1)$, $z = 2.326$ for 99th percentile

σ_4^2 0.024
 σ_4 0.155

MDL: 1.94

$e^{[z\sigma - 0.5\sigma^2]}$ where $\sigma^2 = \ln(CV^2 + 1)$, $z = 2.326$ for 99th percentile

σ^2 0.093
 σ 0.304

AML: 1.27

$e^{[z\sigma_4 - 0.5\sigma_4^2]}$ where $\sigma_4^2 = \ln(CV^2/4 + 1)$, $z = 1.645$ for 95th percentile

σ_4^2 0.024
 σ_4 0.155

City of Shelbina
Multipliers, Outfall 001 - Zinc

Multiplier Calculations for Toxics

STDEV	11.13
MEAN	25.45
CV	0.44

Acute LTA: 0.412

$e^{[0.5\sigma^2 - z\sigma]}$ where $\sigma^2 = \ln(CV^2 + 1)$, $z = 2.326$ for 99th percentile

σ^2 0.175
 σ 0.419

Chronic LTA: 0.619

$e^{[0.5\sigma_4^2 - z\sigma_4]}$ where $\sigma_4^2 = \ln(CV^2/4 + 1)$, $z = 2.326$ for 99th percentile

σ_4^2 0.047
 σ_4 0.216

MDL: 2.43

$e^{[z\sigma - 0.5\sigma^2]}$ where $\sigma^2 = \ln(CV^2 + 1)$, $z = 2.326$ for 99th percentile

σ^2 0.175
 σ 0.419

AML: 1.39

$e^{[z\sigma_4 - 0.5\sigma_4^2]}$ where $\sigma_4^2 = \ln(CV^2/4 + 1)$, $z = 1.645$ for 95th percentile

σ_4^2 0.047
 σ_4 0.216

**City of Shelbina
Water Quality Standards
Hardness Variable Parameters**

Hardness 25th percentile = 213 mg/L
Hardness 50th percentile = 236 mg/L

**Conversion Factors for
Hardness Variable**

Parameter (µg/L)	Protection of Aquatic Life		Parameter		Total Recoverable WQS	
	Acute WQS	Chronic WQS	Acute	Chronic	Acute	Chronic
Aluminum	750	N.A.	N.A.	N.A.	750	N.A.
Arsenic	N.A.	20.0	N.A.	N.A.	N.A.	20
Cadmium	9.9	0.4	0.912	0.877	10.9	0.5
Chromium III	1058	138	0.316	0.860	3348	160
Chromium VI	15.0	10.0	0.982	0.962	15.3	10.4
Copper - Default Translator			0.960	0.960	28.5	17.8
Copper - Site Specific Translator	27.4	17.1	0.900	0.910	30.4	18.8
Copper - Biotic Ligand Model	31.7	19.7	0.900	0.910	35.2	21.6
Copper - 50th Percentile Hardness	30.2	18.7	0.900	0.910	33.6	20.5
Iron	N.A.	1000	N.A.	N.A.	N.A.	1000
Lead	145	5.7	0.681	0.681	213.0	8.4
Nickel	888	98.7	0.998	0.997	890	99.0
Silver	11.8	N.A.	0.850	N.A.	13.9	N.A.
Zinc - Default Translator			0.978	0.986	228	226
Zinc - Site Specific Translator	223	223	0.91	0.79	245	282
Zinc - 50th Percentile Hardness	243	243	0.91	0.79	267	308

In the absence of site specific hardness data, use 162 mg/L, the statewide default hardness value.

Hardness data 25th Percentile for Hardness

5/30/2017	243
6/09/2017	256
6/21/2017	209 ▲
6/28/2017	238
7/10/2017	239
7/17/2017	236
7/26/2017	215
8/01/2017	211
8/08/2017	237
8/15/2017	225
8/21/2017	226
9/05/2017	232
9/12/2017	263
9/18/2017	250
9/25/2017	252
10/02/2017	238
10/09/2017	210
10/17/2017	160
10/24/2017	186

**City of Shelbina
Reasonable Potential Analysis
Copper**

Notes:

1. Values shown in bold, red, underlined text have been corrected for suspected unit reporting errors on discharge monitoring reports.

DATE	OUTFALL	CMAVG (µg/L)
5/30/2017	001	17.1
6/09/2017	001	20.3
6/21/2017	001	11.3
6/28/2017	001	13.4
7/10/2017	001	15.5
7/17/2017	001	16
7/26/2017	001	14.3
8/01/2017	001	17.8
8/08/2017	001	20.8
8/15/2017	001	22.9
8/21/2017	001	21.9
9/05/2017	001	18.2
9/12/2017	001	24.8
9/18/2017	001	18.9
9/25/2017	001	23.1
10/02/2017	001	20.4
10/09/2017	001	16.2
10/17/2017	001	13.8
10/24/2017	001	18.7
10/31/2017	001	17
09/30/2017	001	19
08/31/2017	001	2.1
07/31/2017	001	18
06/30/2017	001	22
05/31/2017	001	9.6
04/30/2017	001	6
03/31/2017	001	15
02/28/2017	001	15
01/31/2017	001	13
12/31/2016	001	16
11/30/2016	001	20
10/31/2016	001	24
09/30/2016	001	15
08/31/2016	001	14
07/31/2016	001	18
06/30/2016	001	22
05/31/2016	001	19
04/30/2016	001	18
03/31/2016	001	13
02/29/2016	001	30
01/31/2016	001	10
12/31/2015	001	13
11/30/2015	001	18
10/31/2015	001	2.1
09/30/2015	001	18
08/31/2015	001	20
07/31/2015	001	15
06/30/2015	001	17
05/31/2015	001	21
04/30/2015	001	14
03/31/2015	001	17
02/28/2015	001	9
01/31/2015	001	9.8
12/31/2014	001	15
11/30/2014	001	17
10/31/2014	001	18
09/30/2014	001	18
08/31/2014	001	18
07/31/2014	001	19
06/30/2014	001	13
05/31/2014	001	16
04/30/2014	001	18
03/31/2014	001	20
02/28/2014	001	11
01/31/2014	001	20
12/31/2013	001	14
11/30/2013	001	10
10/31/2013	001	21
09/30/2013	001	28
08/31/2013	001	15
07/31/2013	001	19
06/30/2013	001	14
05/31/2013	001	11
04/30/2013	001	7.6

Data continued on next page.

OUTFALL 001		Average Flow (cfs) =	0.758
Number of Samples (n)	149	Design Flow (cfs) =	1.024
Maximum (µg/L)	30.0		
Minimum (µg/L)	2.10		
Mean (µg/L)	15.8	Flow (cfs)	Dilution Factor
Standard Deviation (µg/L)	4.91	7Q10	0.0
CV	0.311	MZ	0.0
		ZID	0.0
			1.0
			1.0
$\sigma^2 = \ln(CV^2 + 1)$		Receiving Water Mass Balance	
	σ 0.304	$C = \frac{(C_u * Q_u) + (C_e * Q_e)}{(Q_u + Q_e)}$	
	$\rho_u = (1 - CL)^{1/n}$ 0.970 99% CL		
	Z ₉₉ 2.326	C _u = upstream concentration (µg/L)	MZ 0.0
	Z ₉₉ 1.881	Q _u = upstream flow (cfs)	ZID 0.0
	C ₉₉ 1.937	C _e = effluent concentration (µg/L)	34.3
	C ₉₉ 1.692	Q _e = effluent flow (cfs)	1.02
	C ₉₉ /C ₉₉ 1.145	C = downstream concentration (µg/L)	34.3
		Reasonable Potential to Exceed?	YES
Water Quality Criteria, Default Multiplier			
Chronic Criterion, CCC =			
Acute Criterion, CMC =			
Water Quality Criteria, Site-Specific Multiplier			
Chronic Criterion, CCC =			
Acute Criterion, CMC =			

City of Shelbina
Reasonable Potential Analysis
Copper

03/31/2013	001	7.6
02/28/2013	001	17
01/31/2013	001	17
12/31/2012	001	17
11/30/2012	001	16
10/31/2012	001	19
09/30/2012	001	21
08/31/2012	001	29
07/31/2012	001	23
06/30/2012	001	22
05/31/2012	001	<u>12</u>
04/30/2012	001	<u>16</u>
03/31/2012	001	<u>13</u>
02/29/2012	001	<u>11</u>
01/31/2012	001	<u>8.1</u>
12/31/2011	001	<u>10</u>
11/30/2011	001	<u>12</u>
10/31/2011	001	<u>21</u>
09/30/2011	001	<u>20</u>
08/31/2011	001	<u>18</u>
07/31/2011	001	<u>26</u>
06/30/2011	001	<u>24</u>
05/31/2011	001	<u>22</u>
04/30/2011	001	16
03/31/2011	001	8.5
02/28/2011	001	20
01/31/2011	001	16
12/31/2010	001	10
11/30/2010	001	10
10/31/2010	001	10
09/30/2010	001	16
08/31/2010	001	15
07/31/2010	001	14
06/30/2010	001	12
05/31/2010	001	12
04/30/2010	001	17
03/31/2010	001	10
02/28/2010	001	13
01/31/2010	001	12
12/31/2009	001	18
11/30/2009	001	15
10/31/2009	001	11
09/30/2009	001	16
08/31/2009	001	20
07/31/2009	001	20
06/30/2009	001	22
05/31/2009	001	18
04/30/2009	001	12
03/31/2009	001	10
02/28/2009	001	10
01/31/2009	001	10
12/31/2008	001	10
11/30/2008	001	10
10/31/2008	001	15
09/30/2008	001	10
08/31/2008	001	15
07/31/2008	001	14
06/30/2008	001	13
05/31/2008	001	13
04/30/2008	001	10
03/31/2008	001	10
02/29/2008	001	15
01/31/2008	001	10
12/31/2007	001	16
11/30/2007	001	18
10/31/2007	001	12
09/30/2007	001	20
08/31/2007	001	13
07/31/2007	001	22
06/30/2007	001	21
05/31/2007	001	19
04/30/2007	001	10
03/31/2007	001	11
02/28/2007	001	18
01/31/2007	001	12

Zinc

1. The following data points are suspected outliers and were excluded from the data set as they were more than 6X-10X the standard deviation from the mean: 360 µg/L (2/29/08) and 550 µg/L (7/31/08).

Data continued on next page.OUTFALL 001

Number of Samples (n)	147
Maximum (µg/L)	79.0
Minimum (µg/L)	4.20
Mean (µg/L)	25.4
Standard Deviation (µg/L)	11.1
CV	0.438

$$\sigma^2 = \ln(CV^2 + 1) = 0.175$$

σ 0.419

$$\rho_n = (1 - CL)^{1/n} = 0.969 \quad 99\% \text{ CL}$$

$Z_{99} \quad 2.326$

$Z_{pn} \quad 1.866$

C₉₉ 2.425

C_{pn} 2.000

y/C_{pn}	1.212
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$$C\rho_n = (z\sigma - 0.5\sigma^2)$$

C_{99}/C_{pn}	1.212
-----------------	-------

Water Quality Criteria, Default Multiplier

Chronic Criterion, CCC =	226.0
Acute Criterion, CMC =	228.0

Water Quality Criteria, Site-Specific Multiplier

Chronic Criterion, CCC =	282.0
Acute Criterion, CMC =	245.0

Average Flow (cfs) = 0.758

Design Flow (cfs) = 1.024

	<u>Flow (cfs)</u>	<u>Dilution Factor</u>
7Q10	0.0	—
MZ	0.0	1.0
ZID	0.0	1.0

Receiving Water Mass Balance

$$C = \frac{(C_s * Q_s) + (C_e * Q_e)}{(Q_e + Q_s)}$$

	MZ	ZID
C_u = upstream concentration ($\mu\text{g/L}$)	0.0	0.0
Q_u = upstream flow (cfs)	0.0	0.0
C_e = effluent concentration ($\mu\text{g/L}$)	95.8	95.8
Q_e = effluent flow (cfs)	1.02	1.02
C = downstream concentration ($\mu\text{g/L}$)	95.8	95.8
Reasonable Potential to Exceed?	NO	NO

City of Shelbina
Reasonable Potential Analysis
Zinc

05/31/2013	001	27
04/30/2013	001	16
03/31/2013	001	14
02/28/2013	001	48
01/31/2013	001	33
12/31/2012	001	31
11/30/2012	001	31
10/31/2012	001	26
09/30/2012	001	19
08/31/2012	001	25
07/31/2012	001	13
06/30/2012	001	30
05/31/2012	001	15
04/30/2012	001	17
03/31/2012	001	36
02/29/2012	001	39
01/31/2012	001	43
12/31/2011	001	28
11/30/2011	001	33
10/31/2011	001	39
09/30/2011	001	29
08/31/2011	001	23
07/31/2011	001	35
06/30/2011	001	31
05/31/2011	001	32
04/30/2011	001	30
03/31/2011	001	15
02/28/2011	001	37
01/31/2011	001	36
12/31/2010	001	30
11/30/2010	001	35
10/31/2010	001	27
09/30/2010	001	22
08/31/2010	001	17
07/31/2010	001	24
06/30/2010	001	16
05/31/2010	001	18
04/30/2010	001	42
03/31/2010	001	14
02/28/2010	001	29
01/31/2010	001	36
12/31/2009	001	34
11/30/2009	001	21
10/31/2009	001	10
09/30/2009	001	17
08/31/2009	001	19
07/31/2009	001	13
06/30/2009	001	21
05/31/2009	001	34
04/30/2009	001	14
03/31/2009	001	11
02/28/2009	001	46
01/31/2009	001	25
12/31/2008	001	23
11/30/2008	001	15
10/31/2008	001	18
09/30/2008	001	11
08/31/2008	001	12
07/31/2008	001	550
06/30/2008	001	28
05/31/2008	001	18
04/30/2008	001	22
03/31/2008	001	21
02/29/2008	001	360
01/31/2008	001	13
12/31/2007	001	32
11/30/2007	001	52
10/31/2007	001	27
09/30/2007	001	34
08/31/2007	001	29
07/31/2007	001	26
06/30/2007	001	25
05/31/2007	001	38
04/30/2007	001	79
03/31/2007	001	31
02/28/2007	001	14
01/31/2007	001	34

Appendix D

Biotic Ligand Model Results

**City of Shelbyna
Biotic Ligand Model Results**

Location	Sample Date	Final Acute Value (FAV) µg/L	Criterion Maximum Concentration (CMC) µg/L	Criterion Continuous Concentration (CCC) µg/L	Copper µg/L	Acute Toxic Units unitless	Chronic Toxic Units unitless
Outfall 001	6/9/2017	63.93	31.97	19.85	19.20	0.60	0.97
	6/28/2017	76.35	38.18	23.71	11.60	0.30	0.49
	7/10/2017	55.44	27.72	17.22	14.30	0.52	0.83
	7/17/2017	34.23	17.11	10.63	14.20	0.83	1.34
	8/1/2017	62.20	31.10	19.32	15.60	0.50	0.81
	8/8/2017	52.32	26.16	16.25	19.10	0.73	1.18
	8/15/2017	44.99	22.49	13.97	20.40	0.91	1.46
	8/21/2017	65.78	32.89	20.43	19.70	0.60	0.96
	9/5/2017	75.88	37.94	23.56	15.80	0.42	0.67
	9/12/2017	53.25	26.62	16.54	23.50	0.88	1.42
	9/18/2017	69.38	34.69	21.55	18.40	0.53	0.85
	9/25/2017	48.75	24.38	15.14	20.80	0.85	1.37
	10/2/2017	48.39	24.19	15.03	18.50	0.76	1.23
	10/9/2017	23.45	11.72	7.28	14.20	1.21	1.95
	10/17/2017	47.96	23.98	14.90	12.00	0.50	0.81
	10/24/2017	59.12	29.56	18.36	17.00	0.58	0.93
		AVERAGE =	27.54	17.11			
Downstream	6/9/2017	84.45	42.23	26.23	8.22	0.19	0.31
	6/28/2017	33.47	16.73	10.39	7.48	0.45	0.72
	7/10/2017	52.20	26.10	16.21	5.93	0.23	0.37
	7/17/2017	76.62	38.31	23.80	6.04	0.16	0.25
	8/1/2017	41.57	20.79	12.91	5.80	0.28	0.45
	8/8/2017	79.58	39.79	24.71	7.66	0.19	0.31
	8/15/2017	73.17	36.59	22.72	7.93	0.22	0.35
	8/21/2017	60.82	30.41	18.89	7.21	0.24	0.38
	9/5/2017	74.69	37.35	23.20	7.33	0.20	0.32
	9/12/2017	71.76	35.88	22.29	8.27	0.23	0.37
	9/18/2017	51.20	25.60	15.90	8.67	0.34	0.55
	9/25/2017	70.31	35.16	21.84	8.41	0.24	0.39
	10/2/2017	73.46	36.73	22.81	8.31	0.23	0.36
	10/9/2017	40.79	20.39	12.67	5.99	0.29	0.47
	10/17/2017	77.53	38.76	24.08	5.64	0.15	0.23
	10/24/2017	51.74	25.87	16.07	6.29	0.24	0.39
		AVERAGE =	31.67	19.67			

Notes:

1. Criterion Maximum Concentration (CMC) = FAV/2
2. Criterion Continuous Concentration (CCC) = FAV/Acute-to-Chronic Ratio
3. Acute TU = Cu/CMC
4. Chronic TU = Cu/CCC
5. Data sets from samples collected on 5/30/17, 6/21/17, and 7/26/17 were incomplete and were not included in the BLM calculations.

Appendix E

Metals Translator Laboratory Reports

(See attached disk for appendix content)



Legend

-  Sample Point
-  Outfall
-  MUDD V1.0 Streams That May Cease Flow in Dry Periods
-  MUDD V1.0 Streams That Maintain Permanent Flow
-  MUDD V1.0 Standing Water Reaches of P Class Streams

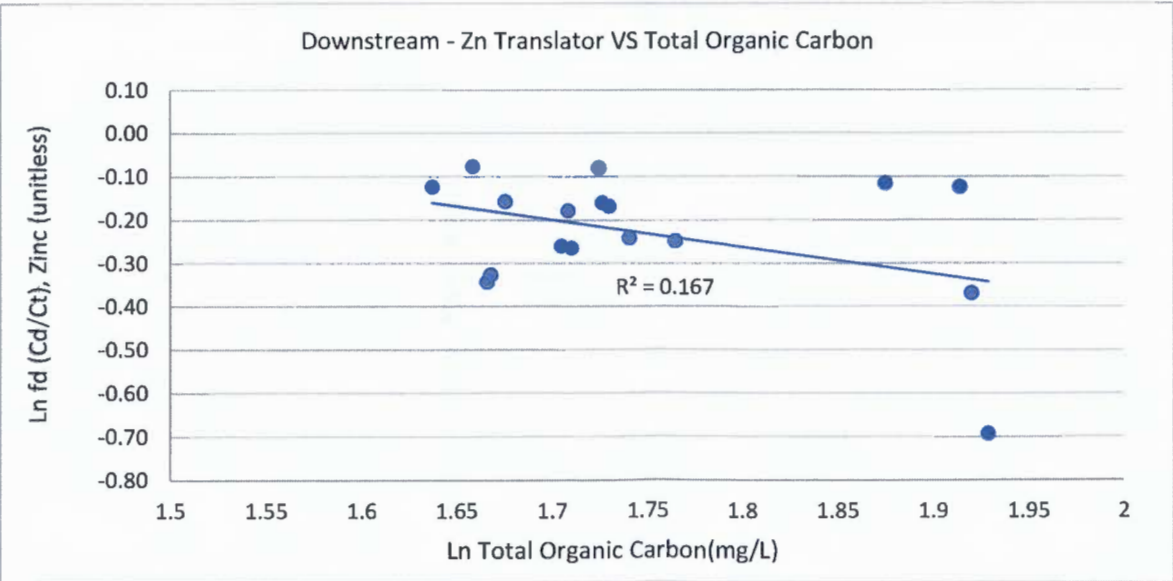
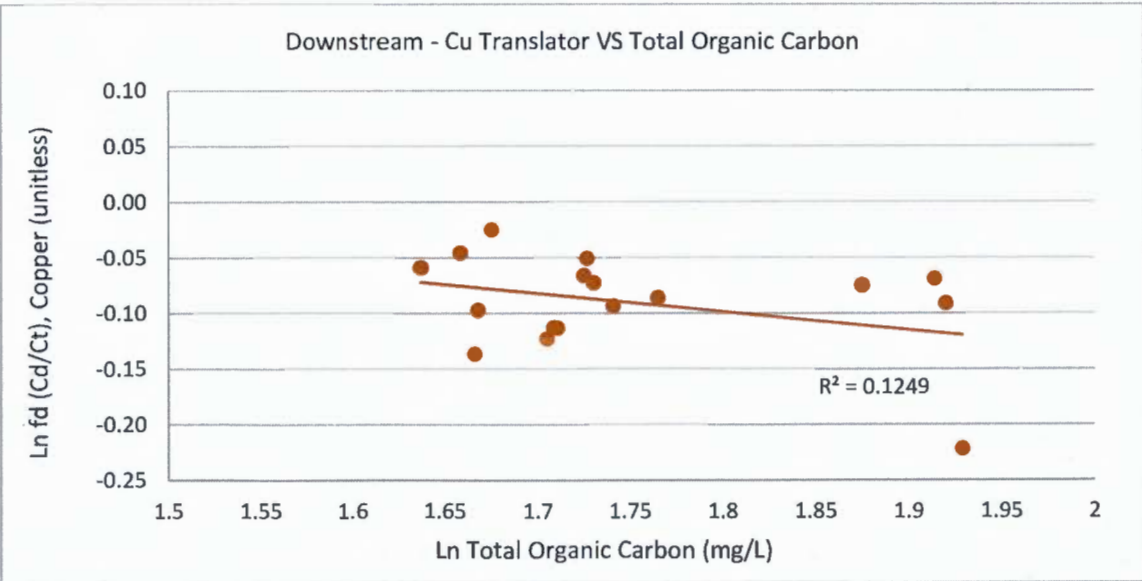
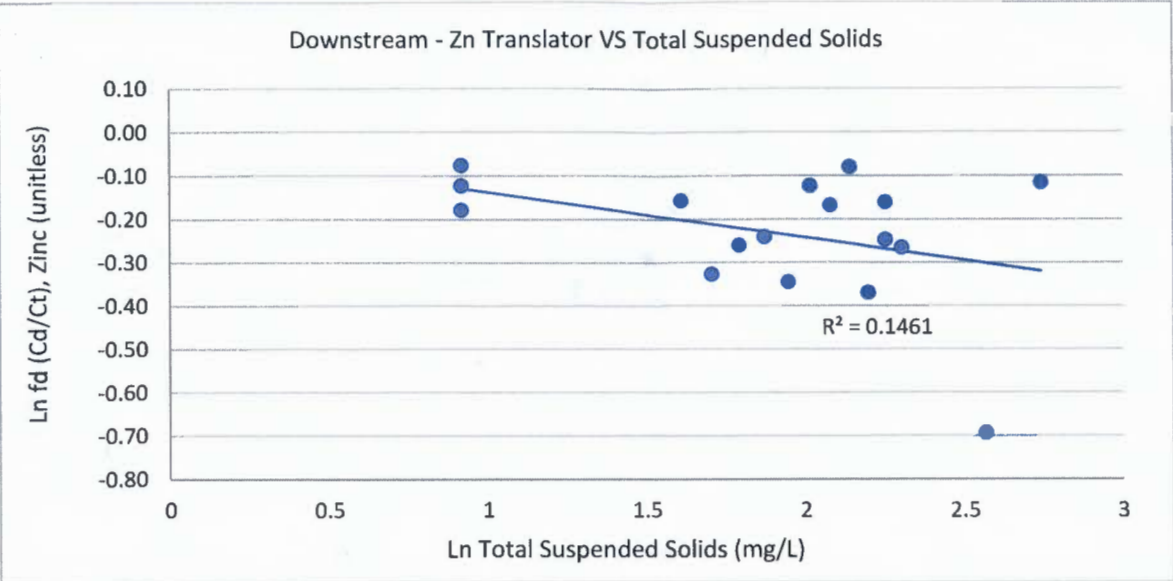
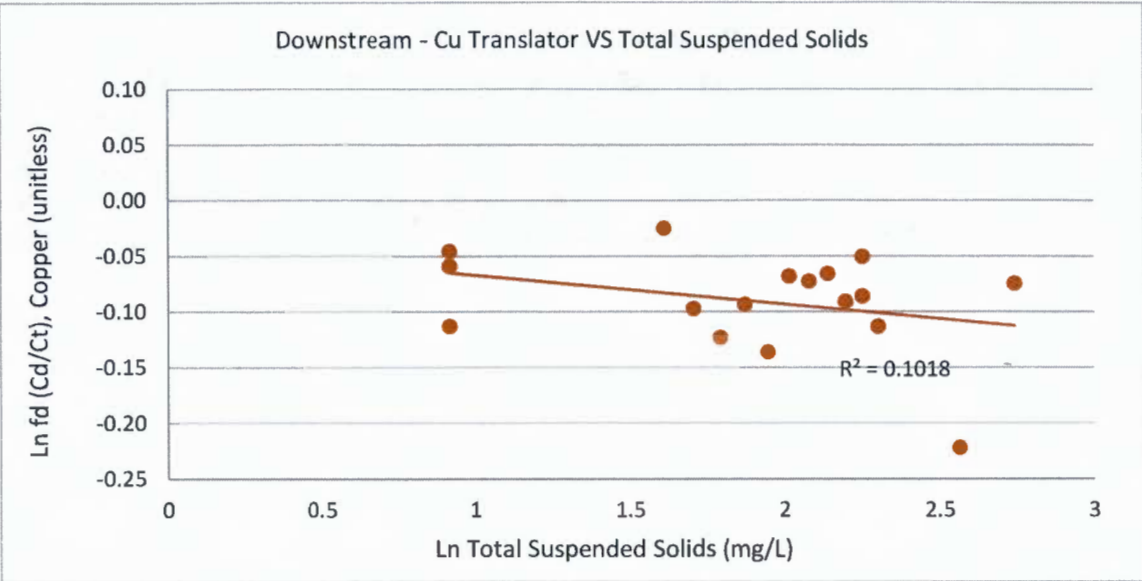


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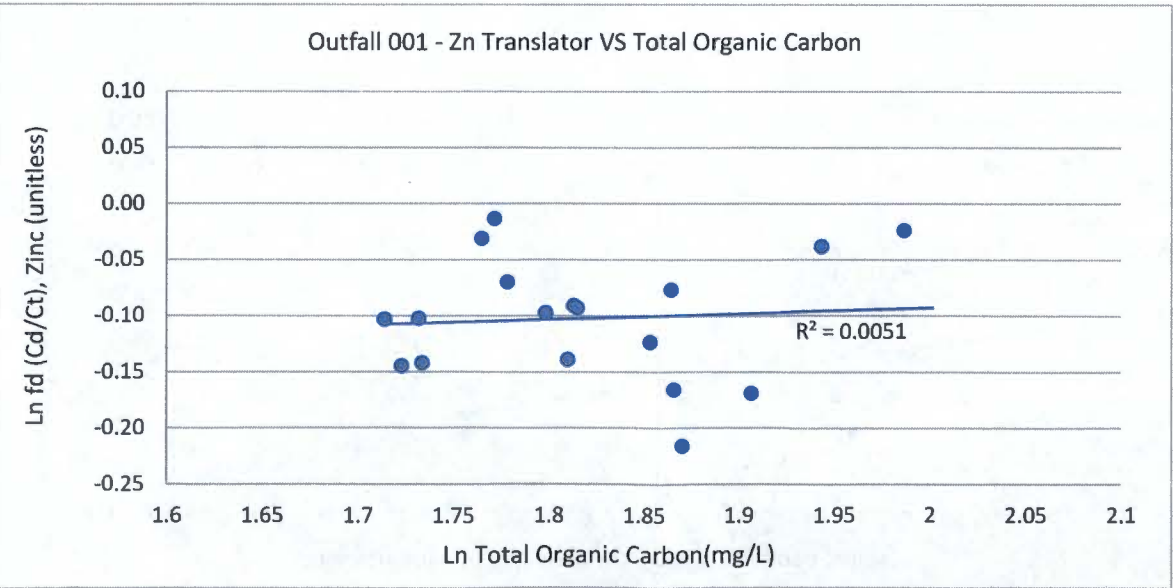
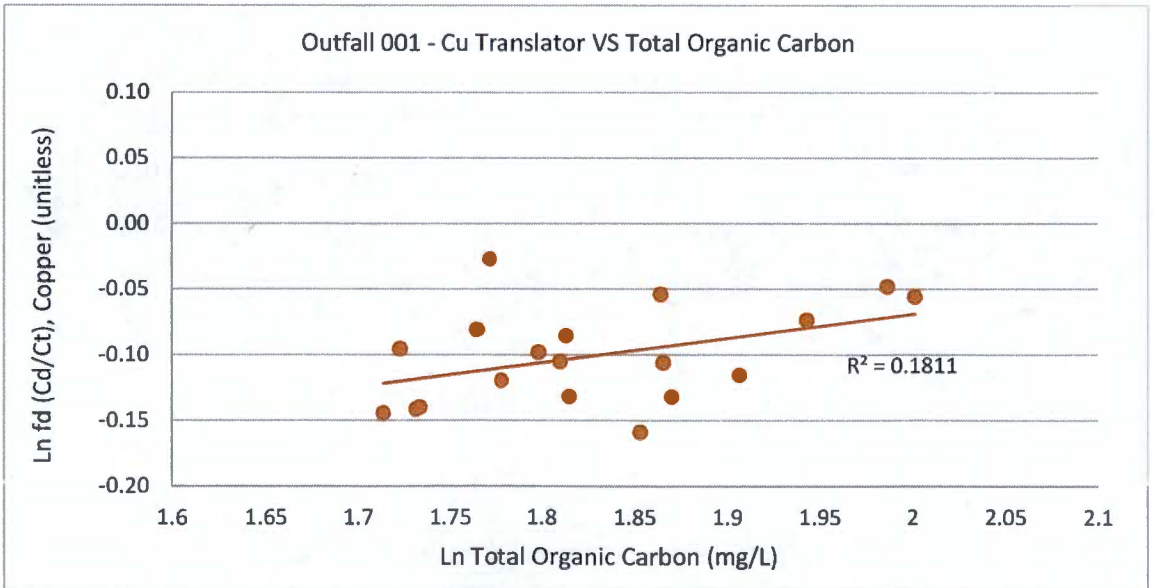
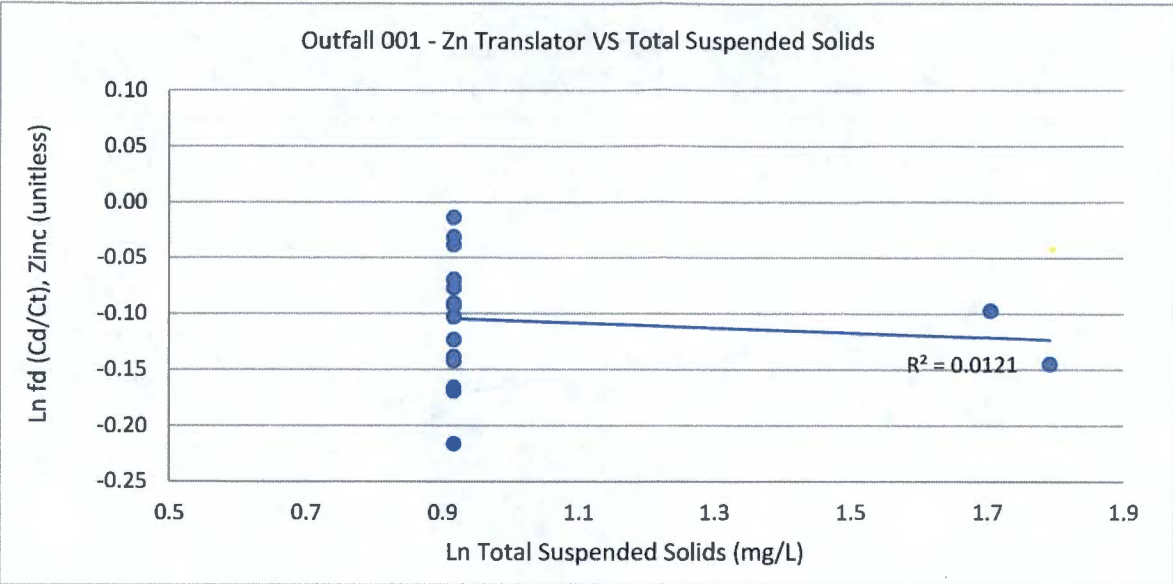
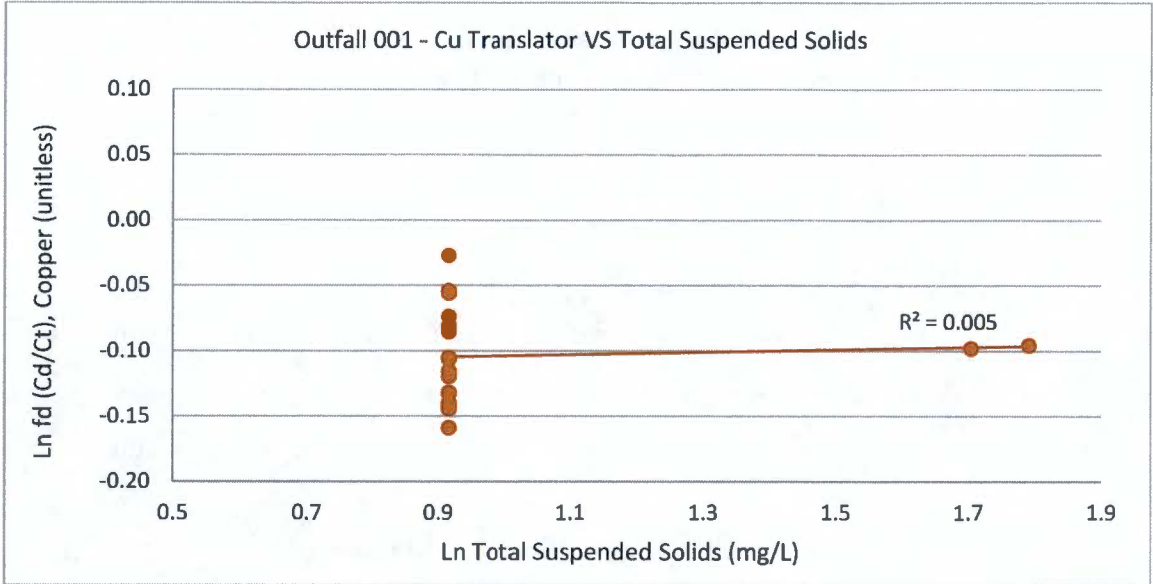
SAMPLING LOCATIONS
Metals Translator Study
Shelbina, MO

FIGURE 1

City of Shelbina
Correlation Coefficient Charts



City of Shelbina
Correlation Coefficient Charts



City of Shelbina
Metals Translator Sampling Results

Location	Date	Alkalinity, Total as CaCO3 (mg/L)	Dissolved Organic Carbon (mg/L)	Total Organic Carbon (mg/L)	Chloride (mg/L)	Hardness, as CaCO3 (mg/L)	Total Suspended Solids (mg/L)	Sulfate, as SO4 (mg/L)	Calcium, Total (µg/L)	Copper, Total (µg/L)	Copper, Dissolved (µg/L)	f _d (Cd/Ct), Copper (unitless)	Magnesium, Total (µg/L)	Potassium, Total (µg/L)	Sodium Total (µg/L)	Zinc, Total (µg/L)	Zinc, Dissolved (µg/L)	f _d (Cd/Ct), Zinc (unitless)	pH, Field (SU)	DO, Field (mg/L)	Spec Cond., Field (µS/cm)	Temp, Field (°C)	Flow (MGD)
Downstream	5/30/2017	205		5.85	45	243		39.4	76,100	5.48	5.65		12,900	6,020	38,400	5.8	6.7		7.27	6.35	671	17.5	0.269
Downstream	6/09/2017	168	6.52	6.52	70.1	256	15.5	42.3	76,600	8.86	8.22	0.93	15,600	9,790	54,500	11.9	10.6	0.89	7.66	6.80	810	18.3	0.266
Downstream	6/21/2017	182	7.04	6.88	26.9	209	13	33.8	65,500	5.47	4.38	0.80	11,000	5,970	27,700	5	2.5	0.5	7.55	5.82	526		0.467
Downstream	6/28/2017	179	5.97	5.79	56.1	238	5.0	40	72,300	6.29	7.48		14,000	7,790	46,300				7.02	6.80	701	19.1	0.403
Downstream	7/10/2017	179	5.21	5.25	54.8	239	<u>2.5</u>	46.6	72,600	6.21	5.93	0.95	13,900	7,730	47,100	8.1	7.5	0.93	7.42	9.04	664	25.0	0.681
Downstream	7/17/2017	164	5.23	5.3	64	236	5.5	45.5	70,900	6.66	6.04	0.91	14,200	8,570	49,200	6.8	4.9	0.72	7.69	8.06	768	27.0	0.465
Downstream	7/26/2017		6.27	6.78	66.9	215	7.5	42.7	65,200	7.54	7.04	0.93	12,600	11,200	52,700	6	5.3	0.88	7.06	5.58	722	24.0	0.534
Downstream	8/01/2017	166	5.55	5.7	51	211	6.5	43.2	65,000	6.37	5.8	0.91	11,900	7,320	40,000	4.2	3.3	0.79	7.25	8.45	655	23.0	0.293
Downstream	8/08/2017	154	5.18	5.62	63.5	237	9.5	42.2	71,600	8.06	7.66	0.95	14,100	9,750	49,700	5.4	4.6	0.85	7.80	8.50	723	21.0	0.149
Downstream	8/15/2017	150	5.38	5.64	60.5	225	8.0	42.9	70,500	8.53	7.93	0.93	12,000	8,960	42,100	5.8	4.9	0.84	7.70	6.70	674	23.0	0.222
Downstream	8/21/2017	164	5.51	5.5	54.3	226	6.0	39.2	69,600	8.16	7.21	0.88	12,700	8,140	40,900	4.8	3.7	0.77	7.54	6.11	683	22.0	0.199
Downstream	9/05/2017	167	5.54	5.52	57.2	232	<u>2.5</u>	39.4	71,900	8.21	7.33	0.89	12,800	8,490	45,500	5.5	4.6	0.84	7.70	8.60	706	21.0	0.248
Downstream	9/12/2017	158	4.95	5.34	85.3	263	5.0	43.9	82,200	8.48	8.27	0.98	14,100	10,100	58,700	5.5	4.7	0.85	7.75	9.52	809	18.0	0.247
Downstream	9/18/2017	170	5.21	5.14	73.1	250	<u>2.5</u>	39.2	75,400	9.2	8.67	0.94	15,000	11,300	59,500	6.9	6.1	0.88	7.41	6.97	780	19.0	0.227
Downstream	9/25/2017	158	5.6	5.84	70.3	252	9.5	36.2	75,700	9.17	8.41	0.92	15,200	11,700	54,200	8.2	6.4	0.78	7.60	7.10	766	22.0	0.200
Downstream	10/02/2017	155	5.42	5.61	63.3	238	8.5	32.5	72,700	8.88	8.31	0.94	13,800	11,100	49,200	7.8	7.2	0.92	7.70	7.20	694	20.0	0.254
Downstream	10/09/2017	156	4.96	5.53	44.6	210	10	34.0	63,800	6.71	5.99	0.89	12,300	9,000	38,100	7.3	5.6	0.77	7.34	6.59	591	18.7	0.287
Downstream	10/17/2017	137	6.68	6.82	31.7	160	9.0	28.2	51,400	6.18	5.64	0.91	7,590	6,910	24,000	5.5	3.8	0.69	7.69	8.80	365	20.0	0.198
Downstream	10/24/2017	153	4.96	5.29	41.4	186	7.0	28.9	57,500	7.21	6.29	0.87	10,400	6,940	31,500	5.5	3.9	0.71	7.60	8.99	512	13.0	0.226
Outfall 001	5/30/2017	131		7.29	61.8	223		43.4	71,600	17.1	16.3	0.95	10,800	10,200	44,600	21.5	21	0.98	7.52	8.11	622	20.8	-
Outfall 001	6/09/2017	97	7.23	7.4	81.9	225	<u>2.5</u>	37.8	70,000	20.3	19.2	0.95	12,200	13,500	55,800	22.4	23.5		7.35	7.06	810	20.3	-
Outfall 001	6/21/2017	139	7.13	6.98	37.9	197	<u>2.5</u>	41.6	63,500	11.3	10.5	0.93	9,400	9,190	32,600	13.3	12.8	0.96	7.50	6.70	603		-
Outfall 001	6/28/2017	132	7.05	5.55	73	224	<u>2.5</u>	40.9	68,900	13.4	11.6	0.87	12,500	11,100	48,000	18.4	16.6	0.90	7.53	7.44	733	20.0	-
Outfall 001	7/10/2017	107	5.94	5.84	72.3	209	<u>2.5</u>	43.9	65,500	15.5	14.3	0.92	11,000	11,400	52,100	19.7	19.1	0.97	7.38	6.53	750	25.0	-
Outfall 001	7/17/2017	78	5.9	5.92	82.8	196	<u>2.5</u>	42	61,500	16	14.2	0.89	10,300	12,700	53,700	13.4	12.5	0.93	7.05	6.34	782	24.2	-
Outfall 001	7/26/2017		5.84	6.38	73.5	228	<u>2.5</u>		69,000	14.3	12.2	0.85	13,500	13,000	55,000	13.8	12.2	0.88	7.33	6.23		24.0	-
Outfall 001	8/01/2017	95	6.06	6.49	68	190	<u>2.5</u>	39.5	60,700	17.8	15.6	0.88	9,270	11,600	44,700	13.9	11.2	0.81	7.50	7.32	689	22.0	-
Outfall 001	8/08/2017	81	5.64	6.13	73.4	201	<u>2.5</u>	38.9	63,200	20.8	19.1	0.92	10,500	13,800	51,100	12.7	11.6	0.91	7.40	6.80	716	22.0	-
Outfall 001	8/15/2017	73	6.44	6.73	74.8	202	<u>2.5</u>	39.8	65,000	22.9	20.4	0.89	9,560	13,100	47,600	13.5	11.4	0.84	7.20	6.30	744	22.0	-
Outfall 001	8/21/2017	92	6.31	6.46	65	200	<u>2.5</u>	37.8	63,100	21.9	19.7	0.90	10,300	12,000	44,000	13.1	11.1	0.85	7.50	6.37	681	23.0	-
Outfall 001	9/05/2017	131	5.61	5.65	74.2	210	<u>2.5</u>	38.8	64,700	18.2	15.8	0.87	11,800	10,800	52,400	14.4	13	0.90	7.70	7.40	764	21.0	-
Outfall 001	9/12/2017	89	5.89	6.45	94.9	226	<u>2.5</u>	34.6	73,100	24.8	23.5	0.95	10,500	16,500	62,400	17.6	16.3	0.93	7.31	7.70	804	28.0	-
Outfall 001	9/18/2017	98	5.69	5.88	80.4	215	<u>2.5</u>	34.0	67,000	18.9	18.4	0.97	11,600	14,300	59,200	15	14.8	0.99	7.61	6.76	768	20.0	-
Outfall 001	9/25/2017	77	5.81	6.11	86.6	207	<u>2.5</u>	28.2	64,600	23.1	20.8	0.90	11,100	15,200	59,600	17	14.8	0.87	7.30	6.50	744	22.0	-
Outfall 001	10/02/2017	88	5.74	6.04	74.5	199	5.5	27.4	63,200	20.4	18.5	0.91	10,100	14,200	50,700	20.5	18.6	0.91	7.34	7.20	696	19.0	-
Outfall 001	10/09/2017	100	5.20	6.14	60.9	194	<u>2.5</u>	32.8	61,400	16.2	14.2	0.88	10,000	12,100	44,300	19.2	17.5	0.91	6.90	7.71	730	20.5	-
Outfall 001	10/17/2017	127	5.16	5.66	42.7	181	<u>2.5</u>	35.4	58,600	13.8	12.0	0.87	8,470	9,020	31,100	15.1	13.1	0.87	7.49	7.79	516	17.0	-
Outfall 001	10/24/2017	123	5.30	5.60	63.9	197	6.0	35.2	62,100	18.7	17.0	0.91	10,300	10,900	45,000	17.8	15.4	0.87	7.60	7.90	647	16.0	-

Note -

1. Cells shown with gray fill indicate data that did not meet quality control standards and was removed from the dataset. Field data shown in gray indicates a data point was mistakenly not recorded in field notes.

2. Cells filled with red indicate that the total metal concentration was less than the dissolved metal concentration. These values were excluded from the calculation of the average translator and are attributed to normal analytical variability.

3. Values shown in bold, red, underlined font indicate a non-detect, which has been set equal to one half the reporting limit.