Feasibility Study

Red Wing Wastewater Treatment Facility

RWING 170239

Red Wing, Minnesota | January 9, 2023

SEH

Building a Better World for All of Us®

Engineers | Architects | Planners | Scientists

Building a Better World for All of Us®

January 9, 2023

RE: Red Wing Wastewater Treatment Facility
Feasibility Study
Red Wing, Minnesota
SEH No. RWING 170239 4.00

Mr. Jerry Plein
City of Red Wing
1099 E 5th Street
Red Wing, MN 55066

Dear Mr. Plein:

This report evaluates the feasibility of constructing an activated sludge system and associated biosolids handling processes that will meet the 20-year wastewater treatment needs of the City of Red Wing with anticipated new and more stringent effluent limits that are imminent. Available area at the wastewater treatment facility (WWTF) is limited, therefore this feasibility study is an important first step in determining whether or not the City can continue to meet the wastewater treatment needs of the community at the current site. In addition to new effluent limits on the horizon, the current facilities are aging and in need of improvements to meet the needs of the City into the future.

Aging equipment and treatment processes that the current system is not capable of achieving the anticipated effluent limits are two reasons why this facility is in need of improvements in the future. Biosolids management with the new activated sludge system plays a large role in the ability to remain at the existing WWTF site.

We would like to thank you for the opportunity to work in cooperation with your city staff to provide this evaluation and recommendation for future improvements at the wastewater treatment facilities.

Sincerely,

John Friel, PE
Project Manager/Senior Prof Engineer
(MN Lic. 42130)

Bob Stark, PE
Senior Professional Engineer
(MN Lic. 19497)

x:\pt\r\rwing\170239\4-prelim-dsgn-rpts\43-prelim-dsgn\final report\red wing wwtf feasibility report_to city council - jan 9 2023.docx

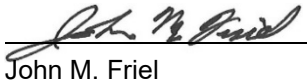
Feasibility Study

Red Wing Wastewater Treatment Facility
Red Wing, Minnesota

SEH No. RWING 170239

January 2023

I hereby certify that this report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.



John M. Friel

Date: January 9, 2023 License No.: 42130

Short Elliott Hendrickson Inc.
3535 Vadnais Center Drive
St. Paul, MN 55110-3507
651.490.2000

Executive Summary

The City of Red Wing initiated the preparation of this Feasibility Study for the wastewater treatment facility in order to address key concerns about the available area on the existing site to achieve probable effluent limits in the future. This report discusses the existing wastewater facilities, projected wastewater flows and loads, future wastewater needs and estimated costs of treatment processes to meet those needs.

Work conducted in this study determined that it is feasible to construct a new activated sludge system, designed to achieve anticipated effluent limits under projected 2040 demands, within the existing WWTF site boundaries. The facility would not look the same as it does now. A major wastewater treatment facility improvements project would be required to convert the existing fixed film process treatment technologies into a biological nutrient removal activated sludge system. With the conversion of treatment processes comes challenges with the biosolids management at the existing site.

Preliminary Engineer's Opinion of Probable Costs for Proposed System

Item	Description	Opinion of Cost
1	Civil site work, shoring, dewatering, excavation, backfill, site piping, electrical etc.	$8,680,000
2	A2O Activated Sludge Basins – 2 trains	$17,910,000
3	Pump and Blower Building (RAS, WAS, Aeration)	$9,170,000
4	Electrical Room Modifications / New Building	$6,500,000
5	Solids Thickening Building (Pre- and Post-digestion thickening)	$8,930,000
6	Solids Storage Tank (1.8MG)	$2,900,000
7	Demolition existing tanks and equipment	$1,210,000
	Subtotal	**$55,300,000**
	Contingency (30%)	$16,590,000
	Mobilization (5%)	$2,770,000
	Legal & Admin, permitting (3%)	$1,660,000
	Materials Testing (1.5%)	$830,000
	Engineering, design and construction services (16%)	$12,360,000
	Estimated Total Project Cost	**$89,510,000**
	Estimated Accuracy Range (-20%/+50%)	**$71,608,000**
		$134,265,000

Notes:

1 Limited design work completed (2%)

2 Quantities based on limited design work completed.

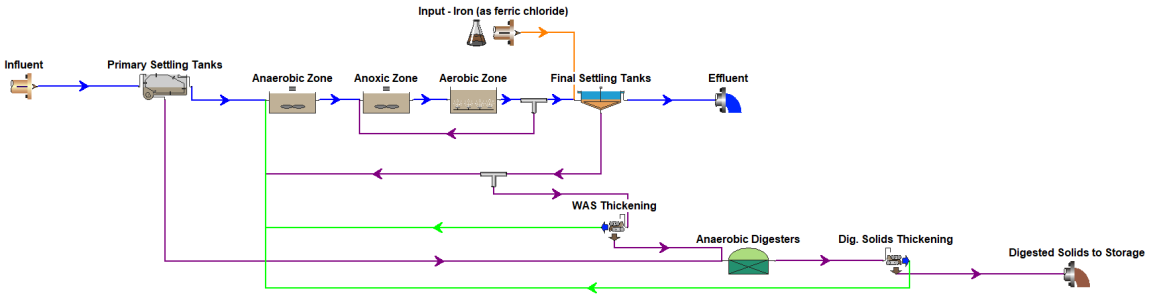
3 Unit prices based on information available at the time. All costs are 2022 capital costs.

4. Estimated accuracy range associated with an AACE class 5 cost estimate for the water and wastewater industries. The +/- value represents typical percentage variation at an 80% confidence interval of actual costs from the cost estimate after application of appropriate contingency (typically to achieve a 50% probability of project cost overrun versus underrun) for the given scope. Depending on the technical and project deliverables (and other variables) and risks associated with this estimate, the accuracy range for any particular estimate is expected to fall within the ranges identified. This does not preclude a specific actual project result from falling outside of the indicated range identified above.

Executive Summary (continued)

The proposed system to achieve anticipated NPDES permit limits is a biological nutrient removal (BNR) activated sludge system. The system would incorporate as much of the existing facilities as possible, including primary and secondary settling tanks and chlorine contact basin. The trickling filters, RBC units, intermediate clarifiers and solids drying beds would need to be demolished to make space for the new BNR system. Due to anticipated biosolids production with the new system, pre- and post-digestion solids thickening processes will need to be implemented to achieve digester solids retention time (SRT) needs. One of the 88-foot diameter trickling filters can be repurposed for liquid digested biosolids storage by adding to the tank wall height and installing new process equipment for mixing and temperature retention. Below is a process flow diagram from BioWin modeling showing the proposed system flow schematic and biosolids handling processes.

Proposed Process Flow Diagram



Proposed Site Plan

Contents

Contents (continued)

List of Tables

List of Figures

List of Appendices

Feasibility Study

Red Wing Wastewater Treatment Facility

Prepared for City of Red Wing

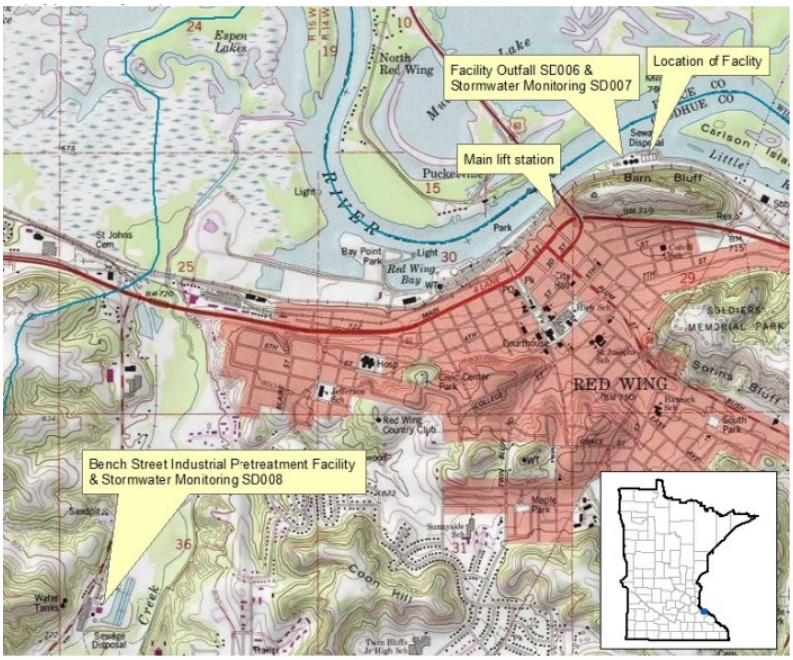
1 Introduction

This Feasibility Report has been prepared for the City of Red Wing (City) to aid the community in planning adequate wastewater treatment that meets current and future needs. The major drivers for improvements at Red Wing are to achieve future effluent limits as well as provide additional treatment capacity to continue development of the community. This plan evaluates the feasibility of constructing a biological nutrient removal (BNR) activated sludge system at the existing site to meet future effluent limits on ammonia, total nitrogen, nitrate and possibly more stringent total phosphorus concentrations.

1.1 Planning Area

Figure 1 illustrates Red Wing's municipal boundary and location of major wastewater treatment facilities (WWTF). The current location of the facility is what is referred to as the existing site in this study.

Figure 1 – Red Wing Wastewater Facilities



Source: MPCA National Pollutant Discharge Elimination System (NPDES) State Disposal System (SDS) Permit Program Fact Sheet.

The Red Wing WWTF provides sanitary sewer treatment service to the community of Red Wing. The sanitary sewer collection system directs wastewater flow to a main lift station located near Levee Park where the water goes through preliminary treatment including screening and grit removal before being pumped to the WWTF.

The 2020 estimated population for Red Wing was 16,788 based on the 2040 Community Plan.

2 Regulatory Requirements

The Minnesota Pollution Control Agency (MPCA) has responsibility for determining the best uses of the State's waters and quality of effluent necessary to meet these uses. In accordance with this responsibility, they have defined seven water use "classes" and grouped all the State's waters into one or more of these classes. Each contains a list of substances or characteristics that must be met before the water is suitable for its designated use. This list of substances and their permissible concentrations are referred to as "water quality standards". These standards have been established after appropriate public hearings, have been approved by the U.S. Environmental Protection Agency (EPA).

Treated wastewater from the City of Red Wing's Wastewater Treatment Facility (WWTF) is continually discharged into the Mississippi River, which is classified as Class 2B, 3C, 4A, 4B, 5, and 6 waters. The Mississippi River does not have a listed designation under Minnesota Rule 7050.0430. Such unlisted waters are given a 2B aquatic life and recreation classification. The definitions of these classifications follow:

- Class 2B: The quality of class 2B surface waters shall be such as to permit the propagation and maintenance of a healthy community of cool or warm water aquatic biota, and their habitats. These waters shall be suitable for aquatic recreation of all kinds, including bathing, for which the waters may be usable. This class of surface water is not protected as a source of drinking water.
- Class 3C: The quality of Class 3C waters of the state shall be such as to permit their use for industrial cooling and materials transport without a high degree of treatment being necessary to avoid severe fouling, corrosion, scaling, or their unsatisfactory conditions.
- Class 4A: The quality of Class 4A waters of the state shall be such as to permit their use for irrigation without significant damage or adverse effects upon any crops or vegetation usually grown in the waters or area, including truck garden crops.
- Class 4B: The quality of Class 4B waters of the state shall be such as to permit their use by livestock and wildlife without inhibition or injurious effects.
- Class 5: The quality of Class 5 waters of the state shall be such as to be suitable for aesthetic enjoyment of scenery, to avoid any interference with navigation or damaging effects on property.
- Class 6: The quality of Class 6 waters may be under other jurisdictions and in other areas to which the waters of the state are tributary and may include any or all of the uses listed in Minnesota Rules parts 7050.0221 to 7050.0225, plus any other possible beneficial uses.

2.1 Effluent Assumptions

The Red Wing WWTF discharges wastewater in accordance with Minnesota National Pollutant Discharge Elimination System (NPDES) / State Disposal System (SDS) permit number MN0024571. A copy of the current permit is included in Appendix A-1. This permit became effective in March 2020 and expires on February 28, 2025. The facility is currently a continuous discharge treatment system. Effluent concentration and mass limit standards set by the State for Mississippi River are summarized in Table 1.

Table 1 – Current NPDES/SDS Permit Limits

Parameter	Final Limit – Concentration	Final Limit - Mass	Limit Type	Effective Period
5-day Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	25 mg/L 40 mg/L	378 kg/day 606 kg/day	Calendar month average Max calendar week average	Jan-Dec
Total Suspended Solids (TSS)	30 mg/L 45 mg/L	454 kg/day 681 kg/day	Calendar month average Max calendar week average	Jan-Dec
pH	6 su - 9 su	N/A	Calendar month minimum Calendar month maximum	Jan-Dec
Fecal Coliform	200 MPN/100 mL	N/A	Calendar month geometric mean	Apr-Oct
Phosphorus, Total (as P)	1 mg/L	Monitor only	Calendar month average	Jan-Dec
Phosphorus, Total (as P) – Phase 2	4,421	kg/year	12-month moving total	Jan-Dec
Mercury, Total	8.9 ng/L 14.8 ng/L	N/A	Calendar month average Daily maximum	Jan, Mar, May, Jul, Sep, Nov
Nitrite Plus Nitrate, Total (as N)	Monitor only (once per month)		Calendar month average	Jan-Dec
Nitrogen, Ammonia, Total	Monitor only (once per month)		Calendar month average	Jan-Dec
Nitrogen, Kjeldahl, Total	Monitor only (once per month)		Calendar month average	Jan-Dec
Nitrogen, Total (as N)	Monitor only (once per month)		Calendar month average	Jan-Dec

2.2 Probable Future Limits

Based on the City's current flow and future projected growth in the community, the city of Red Wing will likely need to expand their current NPDES/SDS permit because of MPCA antidegradation policy. No wastewater facility with planned growth will be able to increase the effluent loadings to the receiving stream unless accepting frozen mass limits (load caps) or going through the antidegradation assessment process with MPCA. Degradation is only allowed if MPCA's antidegradation review concludes that it is necessary to accommodate important economic and social development. Refer to MPCA Antidegradation Guidance document dated December 1, 2019 for more information.

A preliminary effluent limit request was not submitted to the MPCA as a part of this feasibility study, this will have to be completed during the facility planning phase of the project.

The following table summarizes the probable future NPDES permit effluent limits based on communications from MPCA at recent MESERB meeting in 2022. At the time of writing this feasibility study, it is unclear when the ammonia, total nitrogen, nitrate and/or more stringent phosphorus limits will be required of the facility. It is assumed that the planned growth at the facility will either trigger an antidegradation assessment with MPCA or the City can choose to accept frozen mass limits. Table 2 shows probable effluent limits assuming frozen mass limits for current NPDES permit values, there is not a large difference in concentration when accepting frozen mass limits based on the planned growth stated in the 2040 Community Plan. These effluent limits become the treatment goals of the BNR activated sludge system included in the feasibility study.

Table 2 – Probable Effluent Limits

Parameter	Antidegradation Load Limits				Accepted Load Caps			
	Value	Units	Load Limit	Units	Value	Units	Conc. [1]	Units
AWW Design Flow	4.0	mgd			4.37	mgd		
$cBOD_5$	25	mg/L	378	kg/d	378	kg/d	23	mg/L
TSS	30	mg/L	454	kg/d	454	kg/d	27	mg/L
Ammonia	1	mg/L		kg/d	17	kg/d	1.0	mg/L
TN	10	mg/L		kg/d	174	kg/d	10	mg/L
TP	1	mg/L	4,421	kg/yr	4,421	kg/yr	0.73	mg/L
Fecal Coliform (Apr-Oct)	200	orgs/100ml			200	orgs/100ml		
pH	6-9 su				6-9 su			

Notes

1 Calculated equivalent day average concentration required to meet mass limit.

3 Flows and Loadings

Historical influent and effluent discharge monitoring report (DMR) data obtained from the wastewater data browser by MCPA Data Services was analyzed for the Red Wing WWTF for January 1, 2017, through December 31, 2021. This five-year review period was used to gain an understanding of the existing flows and loading conditions unless otherwise noted. The following sections summarize the existing flows and loads to the WWTF.

3.1 Flow Definitions

For the purposes of activated sludge planning level process design, the following two flow conditions listed below are the parameters to be used. The future facility planning phase of the project will require further analysis of average dry weather flow, peak hourly wet weather flow and peak instantaneous wet weather flow:

- **Annual Average Flow (AAF):** AAF is the daily average discharge of wastewater during a calendar year period, expressed as a rate of flow in million gallons per day.
- **Average wet weather (AWW) flow:** AWW or max month flow is the daily average flow for the 30 consecutive days with the highest precipitation for continuous dischargers. AWW of peak month flow is the daily average for the approximately 180 consecutive days between November 15 and May 15 and May 15 to November 15 for controlled dischargers.

3.2 Load Definitions

The MPCA refers to the Ten States Standards for design load determination. The Ten States Standards defines several load conditions that are used to design process units. The existing system design and the capacities of existing process units reference the following flow conditions:

- **Design Average Load:** The design average load is generally the average of the load to be received for a continuous 12-month period for the design year, expressed as weight per day.
- **Design Maximum Month as Day Load:** The design maximum month as day load is the largest amount of load to be received for a continuous 30-day period for the design year, expressed as weight per day.

The design load for facilities having critical seasonal high loading periods (e.g., recreational areas, campuses, industrial facilities) shall be based on the average organic load to be received during the seasonal period.

The determination for projected design loads is calculated as follows:

$$\text{Design Load} = \text{Calculated Peaking Factor} \times \left[\left(\text{Design Per Capita Load} \times \text{Domestic Service Population} \right) + \left(\text{Actual Per Capita Load} \times \text{Commercial and Light Industrial REU} \right) \right] + \text{Industrial Load}$$

where,

- Calculated peaking factor is based on the reported DMR sampling data.
- Design per capita load is based on the larger of the calculated per capita loading based on the reported DMR sampling data minus industrial contribution, MPCA design minimums, or other reference values.

- Domestic service population is the projected service population for the design year.
- Actual per capita load is based on the reported DMR sampling data minus industrial contribution.
- Commercial and light industrial residential equivalent units (REU) is based upon the anticipated non-significant industrial user (SIU) / categorical industrial user (CIU) industrial growth and non-domestic growth converted to a population equivalent.
- Industrial load is based on the anticipated growth and planned additional capacity for SIUs and CIUs.

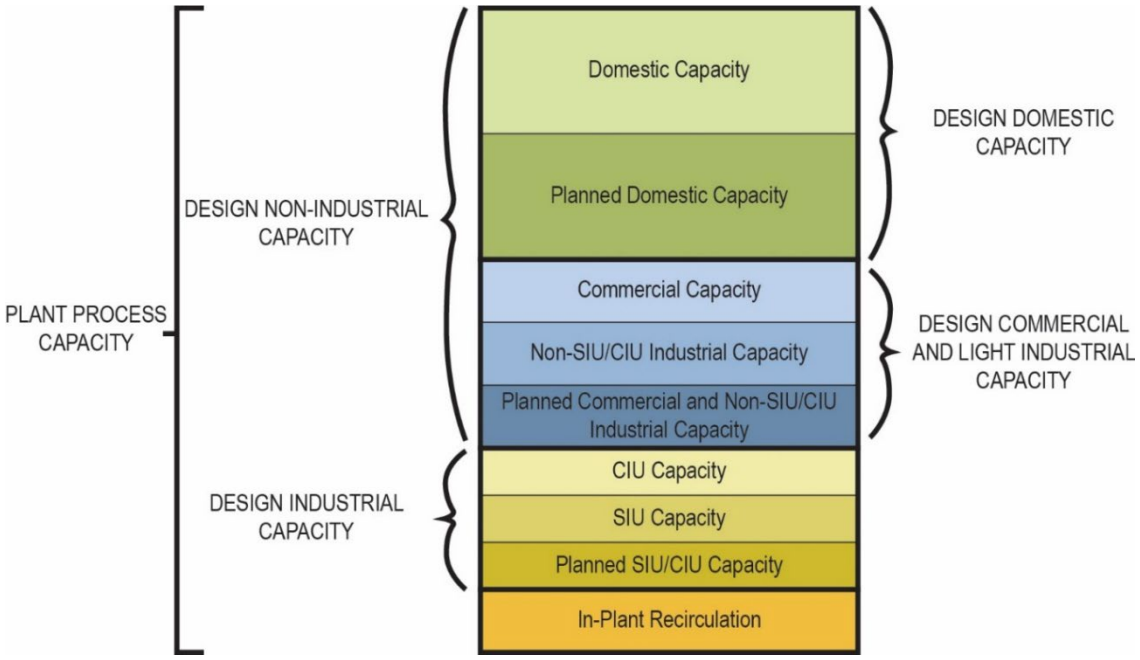
3.3 Planning Definitions

Review of the current flows and loads and the determination for future flow and load capacities can generally be divided into four planning categories. The categories can generally be described as follows:

- **Domestic Capacity:** The domestic capacity reflects the residential contribution of wastewater flows and loads for current and future capacities. The basis of current flows is associated with the Minnesota Demographic Center population projections for determination of current per capita flows and loads, and the population projection determined in this report for future flow and load capacity. At a minimum, the MPCA requires minimum flow and load per capita loadings for design of future capacities as discussed later in this report.
- **Commercial and Light Industrial Capacity:** The commercial and light industrial capacity reflects the non-domestic and non-SIU/CIU industrial contribution of wastewater flows and loads for current and future capacities. The current flows and loads are included in the per capita flow and load contribution determination. The future flow and load contribution is based on the approved comprehensive growth plan acreage identified for commercial and light industrial development. An assumed flow per acre based on land use is utilized and associated to a residential equivalent unit. The actual per capita load is then used based on the equivalent residential unit to determine a future load condition.
- **Industrial Capacity:** The industrial capacity reflects the identified significant industrial and categorical industrial users identified by the City. The basis of current flows and loads reflect the significant industrial user agreements prepared by the City, and the future flow and load conditions reflect discussions between the industrial users and the City based on projected future wastewater generation.
- **In-Plant Recirculation Capacity:** The in-plant recirculation capacity reflects the flows and loads generated by recirculation waste streams generated by wastewater treatment. The recirculation capacity may include washdown water, decant, process drains, filtrate, and other treatment side streams. These side streams may reflect existing processes and be impacted by proposed alternatives. For the facility, the side stream flows and loads are introduced after influent flow measurements and sampling. Although treatment capacity for individual units will reflect in-plant recirculation capacity, the permitted facility design capacity review does not.

Refer to Figure 2 for the components of the design capacity planning definitions.

Figure 2 – Design Capacity Planning Definitions



3.4 Current Wastewater Flows and Loads

Discharge monitoring reports (DMRs) from January 2017 through December 2021 (review period) are summarized in Table 3 and include industrial contributions.

In addition to flow data, Table 3 shows the average flow, and organic, solids, phosphorus, and total Kjeldahl nitrogen (TKN) loadings determined from the review period. Annual organics loading, analyzed as 5-day carbonaceous biochemical oxygen demand ($cBOD_5$), averaged approximately 4,025 pounds per day (ppd) over the period, with a maximum load of 20,026 ppd.

Annual solids loading, analyzed as total suspended solids (TSS), averaged approximately 3,395 ppd over the review period. The greatest maximum daily TSS load was 11,319 ppd.

Annual nutrient loading analyzed as total phosphorus (TP) and total Kjeldahl nitrogen (TKN) averaged 78 ppd and 662 ppd respectively during the review period. The maximum month loading for TP was 322 ppd. The greatest maximum daily load for TKN as nitrogen was 2,402 ppd.

Table 3 – Current Wastewater Characteristics

Characteristic	Annual Average [A]	Max Month [B]	Units
Influent Wastewater Flow	2.08	3.87	MGD
Biochemical Oxygen Demand (BOD)	4,025	20,026	lb/day
	232	621	mg/L
Total Suspended Solids (TSS)	3,395	11,319	lb/day
	196	351	mg/L
Total Kjeldahl Nitrogen (TKN)[C]	662	1,935	lb/day
	38	60.0	mg/L
Total Phosphorus (TP)	78	322	lb/day
	4.51	10.0	mg/L

Notes:

A. Corresponds to the absolute average of monthly data from Jan 2017 to December 2021.

B. Corresponds to the calendar month total flow rate in April 2019 divided by 30 days in that month, assumed to be the wettest consecutive 30 days within the review period of January 2017 through December 2021.

C. Data only recorded from March 2020 to April 2022.

Over the review period, the annual average influent flow was 2.08 MGD. When evaluated as a continuous discharge facility, the highest 30 consecutive days of flow were evaluated for a maximum month as day flow of 3.87 MGD. Based on a 2020 service population of 16,788 residents, the annual average flow corresponds to a per capita flow of 124 gallons per capita per day (gpdc).

Peak hourly wet weather (PHWW) and peak instantaneous wet weather (PIWW) flows are also important for preliminary treatment and primary and secondary settling unit process capacity determination. Flow and precipitation data is required for determining the PHWW and PIWW flows. Although the facility has an influent flow meter, it does not have a historian to save measured data. Therefore, instantaneous precipitation data is not available for Red Wing, further analysis of wet weather flows is required in the facility planning phase. For the purposes of estimating clarifier unit process treatment capacity, the peak hourly flow was determined using a peaking factor from the 10 States Standards based on the service population. A factor of 3.0 was calculated for an approximate PHWW flow value of 6.2 MGD.

Nutrient loading to the facility is based upon present calculated per capita loading compared to reference design standards. The more conservative per capita design loading was used for facility design for the community population under design conditions. The per capita loading is referenced against accepted design standards from the Recommended Standards for Wastewater Facilities (2014), often referred to as “Ten States Standards,” the Fourth Edition of the Wastewater Engineering Treatment and Reuse text by Metcalf and Eddy (2003), Water Environment Federation Manual of Practice No. 8, and the MPCA guidance for minimum design standards.

The calculated per capita $cBOD_5$ load is 0.24. According to the Ten States Standards the design of domestic waste treatment shall be based upon at least 0.17 ppcd $cBOD_5$, or 0.22 ppcd where garbage comminutors are commonly used. The calculated per capita load of 0.24 ppcd $cBOD_5$ was used for design.

The calculated per capita TSS load is 0.20. According to the Recommended Standards for Wastewater Facilities (Ten States Standards), the design of domestic waste treatment shall be based upon at least 0.20 ppcd TSS, or 0.25 ppcd where garbage disposals are commonly used. The calculated per capita load of 0.20 ppcd TSS was used for design.

The calculated per capita total phosphorus load is 0.0047. Metcalf and Eddy (2003) Wastewater Engineering suggest a typical design range for total phosphorus of 0.006-0.010 ppcd. The reference per capita load of 0.006 ppcd total phosphorus was used for design.

The calculated per capita total Kjeldahl nitrogen load is 0.039. The calculated per capita load of 0.039 was used for design.

Metcalf and Eddy (2003) Wastewater Engineering suggest a typical design range for ammonia as nitrogen of 0.011-0.026 ppcd. No influent ammonia as nitrogen was available for this analysis, however influent TKN values were available.

Ammonia as nitrogen in domestic wastewater can be expected to comprise 60% of the total Kjeldahl nitrogen. Therefore, the expected NH_3-N / TKN would be expected to be 0.60. Projected 20-year Flows and Loadings assume the ammonia loading to be 60% of the total Kjeldahl nitrogen loading.

Population projections are also important to assess the requirements of new or existing treatment processes. The flow conditions, described below, account for future population growth and industrial expansion as shown in the 2040 Community Plan. However, no new significant industrial users are included in the projections unless noted in the 2040 Community Plan.

3.4.1 Planning Period

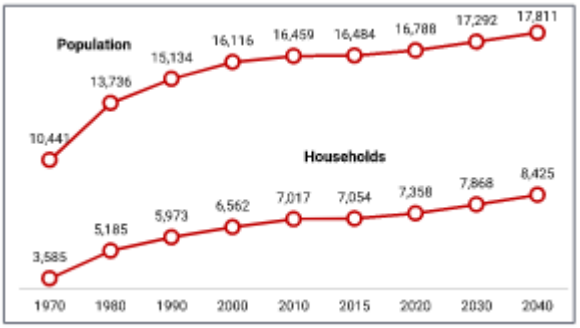
The typical planning period for collection system infrastructure is 50 to 70 years and 20 years for wastewater treatment facilities. The future capacity of the WWTF will be based upon the greater value of either:

- Projections of flow and load to the year 2040, which will be considered the design year, or
- The existing permitted capacity of the WWTF.

3.4.2 Design Population

According to the US Census, the City of Red Wing had a population of 16,788 residents with 7,358 households for 2020. The Community of Red Wing have completed a 2040 Community Plan dated February 25, 2019, and the population projections developed as part of that plan will be used as the basis of design growth during the feasibility study planning period. The Community Plan provides a population projection through 2040.

Figure 3 – Red Wing Population and Household Projection



Source: 2040 Community Plan

Based on the assumed population growth developed as part of the 2040 Community Plan, the 2040 design year service population is 17,811 residents with 8,425 households.

3.4.3 Flow and Loading Projections

The historical flow data from January 2017 through December 2021 was used to help determine the 20-year projected flows and loads. The projected average wet weather flow for 2040 is 4.37 million gallons per day (MGD). The projected flow and loading conditions for 2040 are reported in Table 4 and account for the projected 2040 population of 17,811 residents plus non-industrial and non-domestic land use which equates to 1,163 population equivalents, totaling 18,974 population equivalents. Table 5 details the non-industrial and non-domestic flows based on land use projections in the 2040 Community Plan. Further flow and loading projection analysis is recommended in the facility planning phase of the project to better develop the design basis of the treatment facilities.

The design loadings include $cBOD_5$, TSS, total phosphorus and total Kjeldahl nitrogen. These projected design loadings are determined based on the projected service population and the calculated per capita loading or reference loading presented in Table 2 and discussed in Section 3.4. Peaking factors were determined by calculating the per capita load based on current loading and service population and applying he same per capita load to the projected service population.

Table 4 – 2040 Projected Wastewater Characteristics

Characteristic	Annual Average [A]	Max Month [B]	Units
Influent Wastewater Flow	2.35	4.37	MGD
Biochemical Oxygen Demand (BOD)	4,549	22,634	lb/day
	232	621	mg/L
Total Suspended Solids (TSS)	3,837	12,793	lb/day
	196	351	mg/L
Total Kjeldahl Nitrogen (TKN)[C]	748	2,187	lb/day
	38	60	mg/L
Total Phosphorus (TP)	114	365	lb/day
	5.8	10	mg/L

Notes:

A. Corresponds to the absolute average of monthly data from Jan 2017 to April 2022.
B. Corresponds to the absolute maximum of the monthly averages from Jan 2017 to April 2022.
C. Data only recorded from March 2020 to April 2022.

The community had developed and adopted a 2040 Community Plan in 2019. As a part of that plan, zoning maps and tables were developed to indicate the areas in and around the City which are targeted for particular types of development. As part of these maps and tables, the following land use areas were identified for non-residential development:

- 0.2 acres of community commercial
- 11.1 acres of regional commercial
- 13.1 acres of mixed-use corridor
- 6.8 acres of mixed-use downtown
- 103.5 acres of business park
- 15.2 acres of industrial

The 2040 Community Plan identifies the anticipated land uses for each area. Each area is assumed to generate residential strength wastewater and contain SIU or CIU users, which would be otherwise identified as Industrial users for the purposed flow and load design capacities.

- **Community Commercial:** Land guided for commercial business areas providing small-scale retail sales of goods and services, food and beverage, entertainment, offices, and institutions. It is assumed this land use will generate 1,200 gallons of wastewater per day per acre at The City's current wastewater loading rate.
- **Regional Commercial:** Land guided for large-scale commercial business areas that provide goods and services for a regional trade area, including uses such as regional-scale malls, shopping centers of various sizes, freestanding large-format stores, freestanding smaller businesses, multi-story office buildings, automobile dealerships, and large institutions. It is assumed this land use will generate 1,200 gallons of wastewater per day per acre at The City's current wastewater loading rate.
- **Mixed-use Corridor:** Land along major corridors guided for the integration of more than one land use either vertically (e.g. multi-story buildings with residential, office, and/or hospitality uses above and commercial uses at street level) or horizontally as planned development designed to integrate complementary land uses. Land uses allowed are

commercial, office, medium/high density residential, park and institutional. It is assumed this land use will generate 1,200 gallons of wastewater per day per acre at The City's current wastewater loading rate.

- **Mixed-use Downtown:** Downtown land guided for the integration of more than one land use either vertically (e.g. multi-story buildings with residential, office, and/or hospitality uses above and commercial uses at street level) or horizontally as planned development designed to integrate complementary land uses. Land uses allowed are commercial, office, high density residential, park and institution. It is assumed this land use will generate 1,200 gallons of wastewater per day per acre at The City's current wastewater loading rate.
- **Business Park**: Land guided for integration of commercial and industrial land uses which are compatible with each other, including office, light industrial, and retail/service uses. It is assumed this land use will generate 900 gallons of wastewater per day per acre at The City's current wastewater loading rate.
- **Industrial**: Land guided primarily for manufacturing, assembly, processing, packaging, warehousing, storage, distribution, or research and development of products, in order to provide employment opportunities and increase the city's tax base. It is assumed this land use will generate 900 gallons of wastewater per day per acre at The City's current wastewater loading rate.

Additional commercial and light industrial flow can be characterized by the residential equivalent unit. This unit is a helpful tool in understanding the available capacity for non-domestic wastewater generation in terms of population equivalents. For the City, the typical wastewater generation is approximately 124 gallons per capita per day. Since the additional planned flows and loads are required to be at or below residential strength, a similar approach can be assumed for anticipated loads as a result of additional development.

Table 5 summarizes the anticipated additional flows and loads as a result of Non-Industrial and Non-Domestic users; these values are incorporated into the total design flows and loadings shown in Table 4.

Table 5 – Non-Industrial and Non-Domestic Wastewater REU Determination

Land Use Description	Commercial			Light Industrial		
	gal/d/ acre [A]	acre [B]	gal/d	gal/d/ acre [A]	acre [B]	gal/d
Community Commercial	1,200	0.2	240			
Regional Commercial	1,200	11.1	13,320			
Mixed-Use Corridor	1,200	13.1	15,720			
Mixed-Use Downtown	1,200	6.8	8,160			
Business Park				900	103.5	93,150
Industrial				900	15.2	13,680
	Total	31.2	37,440	Total	118.7	106,830
Flow Condition or Load Parameter	**Unit**		**Value**	**Unit**		**Value**
Wastewater Flow, gallons per capita day [C]	gpd		124	gpd		124
Population equivalents, persons	persons		302	persons		862
Residential equivalents	Land-Use Population Equivalents					1,163

Notes:

A. Based on assumed wastewater flow generation rates for associated land uses.
B. Acreage from areas identified in 2040 Community Plan.
C. Based on the assumed Non-Industrial Calendar Average Day Flow, which correlates to MPCA minimum values.

The additional Non-Industrial and Non-Domestic wastewater anticipated to be generated from the areas identified in the 2040 Community Plan correspond to a population equivalent of 1,163 population equivalents (residents).

3.4.4 2040 Design Conditions

The City intends to require new industries sited in the community and discharging to the sanitary sewer system to pretreat industrial wastewater to residential strength as needed. The projected flows and loads are based on a service population of 18,974 residential equivalents, which includes capacity for any addition commercial and light industrial users.

4 Existing Facilities

The City of Red Wing operates a collection system, main lift station, industrial pretreatment system and main treatment facility. The wastewater treatment facility was originally constructed in 1960, with updates that occurred in 1978, digester improvements in 1990s and additional rehab updates in the early 2000s. The current facility is designed to treat an average wet weather flow of 4 million gallons per day.

The facility is considered a Class A facility. This classification comes from Minnesota Administrative Rule 9400.0500, which defines a scoring system assigning facilities to Classes A, B, C, or D. With this classification, the facility must be operated by an operator who is certified to operate a Class A facility.

4.1 100 Year Floor Elevation

Facilities and improvements for the facility shall not be located in FEMA designated Zone A areas or lower elevations which may be impacted by overland flooding adjacent to Zone A areas.

Zone A is defined by FEMA as an area subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analysis have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.

Several state agencies govern activities in the flood plain:

- Under the Minnesota statewide floodplain management standards, local communities cannot allow development in the floodway that would cumulatively cause more than six inches increase in the height of the 199-year flood (MN DNR). Development normally allowed in the flood fringe provided that the buildings are placed on fill so that the lowest floor, including the basement, is above the 100-year flood level.
- Minnesota Building Code §6120.5800 requires public utility facilities within the floodplain to be designed to minimize increases in flood elevations and be compatible with existing local comprehensive floodplain development plans. Where failure or interruption of the public facility results in danger to the public health or safety, protection to the flood protection elevation shall be provided. The flood protection elevation is defined as an elevation one foot above the 100-year flood. The elevation of the lowest floor of a dwelling must be at or above the flood protection level. Local regulations will also require the access road elevation to within two feet of the flood protection elevation.
- MPCA design guidelines for wastewater treatment facilities require treatment plant structure and electrical and mechanical equipment to be protected from physical damage by the 100-year flood. Additionally, treatment plants should remain fully operational and accessible during the 25-year flood. These requirements apply to new construction and to existing facilities undergoing major modification.

If new facilities are constructed in the floodplain, hydraulic modeling, and coordination with the Minnesota Department of Natural Resources (MN DNR) are required to confirm that the new facilities do not result in a flood elevation change more than six inches. To avoid this, it is recommended that any new facilities be located outside the 100-year flood elevation.

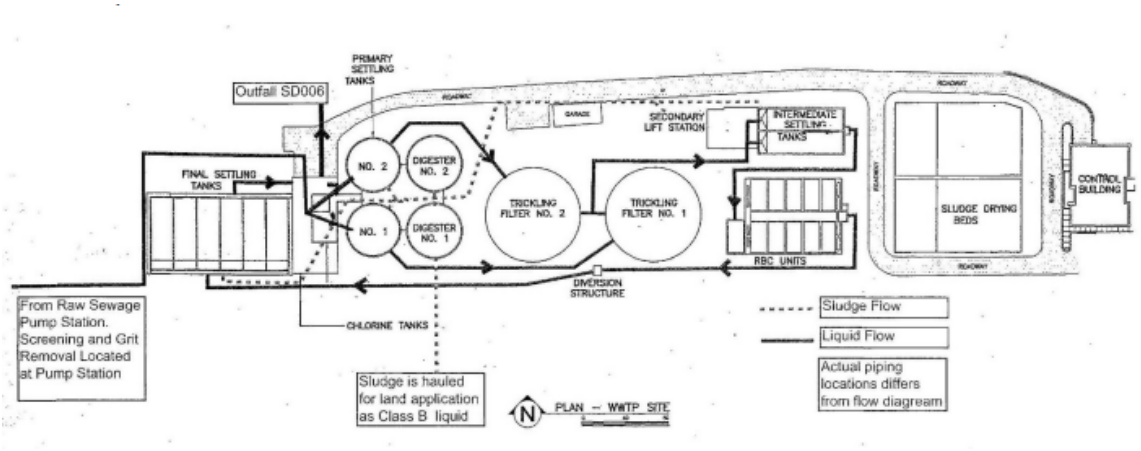
4.2 Wastewater Treatment Facilities

The City of Red Wing operates a fixed-film treatment system at the municipal wastewater treatment facility for treatment of wastewater generated within the City. The facility operates/consists of a main lift station with mechanical fine screen, two vortex grit removal systems. Screenings are compressed and grit is washed and drained prior to disposal. The main treatment facility is located on the banks of the Mississippi River and consists of two primary clarifiers, two trickling filters, ferric chloride feed system for phosphorus removal, two intermediate clarifiers, an intermediate pump station, two trains of rotating biological contactors (RBCs) consisting of 10 units total, two final clarifiers, chlorine contact tank for disinfection, dechlorination with sulfur dioxide, and post aeration. The treatment facility consists of an industrial pretreatment plant and main treatment plant.

The main treatment facility has a continuous discharge to the Mississippi River and is designed to treat an average wet weather (AWW) flow of 4.0 MGD with a five-day biochemical oxygen

demand concentration of 156 mg/L and total suspended solids concentration of 145 mg/L. There are no other outfalls or bypasses at the main treatment facility or in the collection system

Figure 4 – Red Wing Wastewater Treatment Facility



Source: MPCA National Pollutant Discharge Elimination System (NPDES) State Disposal System (SDS) Permit Program Fact Sheet.

The existing treatment units were evaluated to determine if the current system would be capable of achieving probable effluent limits including ammonia, total nitrogen, nitrate and/or more stringent total phosphorus components. The following sections describe and summarize the capacities of each existing treatment unit. Any treatment unit, whether for liquid or solids, can limit the capacity of a wastewater treatment facility. As effluent limits change, so do the design criteria for the unit processes. The wastewater treatment components were analyzed against the current flows and load and the probable discharge permit effluent limits. The capacity analysis used accepted design standards from the Recommended Standards for Wastewater Facilities (2014), often referred to as “Ten States Standards,” the Fourth Edition of the Wastewater Engineering Treatment and Reuse text by Metcalf and Eddy (2003), and Water Environment Federation Manual of Practice No. 8.

The condition of existing facilities is also identified in the following sections. Costs for proposed improvements, as well as recommendations for timing, are presented in Section 5 of this report as needed. Much of the equipment for the treatment facility is near or beyond their useful lifespan. Typically, equipment has a useful lifespan of 15 to 20 years. Thus, it is timely for the City to proactively plan for replacement and rehabilitation so that funds are available when the equipment can no longer meet its intended use. The equipment has served its intended use and the City staff has done a good job maintaining the equipment over the years. Typically, structures at WWTFs have a useful life of 50 to 75 years. Most of the structures appear to be in serviceable condition but are showing their age. All structures should be examined by a structural engineer prior to a design and construction project.

4.2.1 Liquids Treatment System

The Red Wing WWTF consists of a fixed-film treatment system designed to remove biochemical oxygen demand, total suspended solids and fecal coliform. The existing treatment system consists of two primary clarifiers, two trickling filters, ferric chloride feed system for phosphorus removal, two intermediate clarifiers, an intermediate pump station, two trains of rotating biological contactors (RBCs) consisting of 10 units, two final clarifiers, chlorine contact tank for disinfection,

dechlorination with sulfur dioxide, and post aeration. The following paragraphs describe the secondary treatment system.

4.2.1.1 Review of Secondary Treatment System

The secondary treatment system consists of two trickling filters, followed by intermediate clarification and 10 RBC units and final settling. Process calculations for trickling filters and RBC units were performed to determine whether or not these existing processes would be capable of completely nitrifying and denitrifying. These calculations showed that there is not enough media surface area in either trickling filters or RBCs for complete nitrification, and no anoxic zones present to denitrify in order to meet a probable nitrate or total nitrogen effluent limit.

4.2.1.1.1 Trickling Filters

Trickling filter is a three-phase system with fixed biofilm carriers. Wastewater enters the bioreactor through a distribution system and trickles down over the biofilm surface and air moves upward or downward in the third phase. Biofilm develops on biofilm carriers (media) and consumes BOD_5 and sometimes NH_3-N when sized appropriately. Table 6 shows industry design standards for trickling filters from *Standards of Design of Water Resource Recovery Facilities (Metcalf and Eddy, 2003; Table 9.8)* that the trickling filter process needs to comply with. The dimensions and loadings for the Red Wing WWTF trickling filter fall within the carbon oxidizing criteria.

Table 6 – Trickling Filter Design Criteria

Parameter	Treatment Level		
	Unit	BOD_5 removal	BOD_5 removal and nitrification
Hydraulic loading	gpm/ sq ft	0.25 to 1.5	0.25 to 1.5
Organic loading	lbs BOD/d. 1000 ft^3	20 to 60	5 to 15
NH3 loading	lbs NH_3/d. 1000 ft^2	N/A	0.04 to 0.2
Effluent BOD_5*	mg/L	15 - 30	15 - 30
Effluent NH_4-N*	mg/L	N/A	0.5 to 3

The trickling filters have relatively new plastic media installed with updated distribution equipment. Calculated media surface area do not provide organic loading rates to achieve BOD_5 removal and nitrification in the two existing 88 ft diameter trickling filters. Especially the ammonia loading rate is considerably higher than the range presented in Table 6 or 5.5 lbs NH_3/d. 1,000 ft^2. The organic loading rate is approximately 30 lbs BOD/d. 1000 ft^3 which is sufficient for the trickling filters original intent, however too high to achieve both BOD removal and nitrification simultaneously.

4.2.1.1.2 Rotating Biological Contactors

Rotating biological contactor process uses a cylindrical, synthetic media bundle that is mounted on a horizontal shaft. The media is partially submerged and slowly rotates to expose the biofilm to substrate in the bulk of the liquid (when submerged) and to air (when not submerged). As a secondary treatment process, RBC has been applied where average effluent water quality standards are less than 30 mg/L BOD_5 and TSS. When the RBC is used in conjunction with

effluent filtration, the process is capable of meeting more stringent effluent water quality limits of 10 mg/L BOD_5 and TSS. When sized appropriately, nitrification RBCs can produce effluent having less than 1 mg/L ammonia-nitrogen remaining in the effluent stream.

Table 7 – Rotating Biological Contactor Design Criteria

Parameter	Unit	Treatment Level		
		BOD_5 removal	BOD_5 removal and nitrification	Separate Nitrification
Hydraulic loading	Gal/d sq ft	2 to 3.9	0.7 to 2.0	1.0 to 2.5
Organic loading	lbs soluble BOD/d. 1000 ft^2	0.8 to 2.0	0.5 to 1.6	0.10 to 0.20
	lbs BOD/d. 1000 ft^2	1.6 to 4.0	1.0 to 3.2	0.20 to 0.40
NH3 loading	lbs NH_3/d. 1000 ft^2		0.15 to 0.31	
Hydraulic retention time	hrs	0.7 to 1.5	1.5 to 4	1.2 to 3
Effluent BOD_5*	mg/L	15 to 30	7 to 15	7 to 15
Effluent NH_4-N*	mg/L	--	<2	1 to 2
Note: * above effluent values are for wastewater temperature above 13°C (55°F).				

Source: *Standards of Design of Water Resource Recovery Facilities (Metcalf and Eddy, 2003; Table 9.8).*

The RBCs process equipment in Red Wing is in poor operating condition, only 6 of the 10 total units are operable which reduces the treatment capacity of this treatment process. With all 10 units operational, the hydraulic loading rate, organic loading rate and ammonia loading rates exceeded the values recommended in Table 7. The organic loading rate and ammonia loading rates are double what is recommended in Table 7 to achieve BOD removal and complete nitrification simultaneously. This includes BOD removal occurring in the primary settling tanks, trickling filters, intermediate clarifiers before reaching the RBC units. Due to the high ammonia loading rates observed to the trickling filters, it is assumed that no nitrification is occurring in the trickling filter process.

An activated sludge system will be required to achieve probable future effluent limits of effluent ammonia and/or total nitrogen or nitrates in an efficient manner.

4.2.1.2 Primary and Final Settling Tanks Review

The primary and final settling tanks appear to be sized appropriately for projected flow rates. Process equipment may need to be upgraded in order to extend the useful life of the treatment processes another 20 years, these costs are not included in the feasibility study cost estimate as it is the understanding that the final settling tank mechanisms are in the planning phase of improvements at time of writing.

The primary settling tanks in Red Wing are quite deep compared to industry standard unit processes. This increased water depth provides a buffering effect to influent peak flows and

loadings to the facility, it is recommended to keep the primary settling tanks in service and BioWin modelling shows that there is still sufficient food for biological nutrient removal to occur.

4.3 Structural Review

A structural review was conducted of the trickling filter roofs as well as RBC structures. A visual structural inspection was performed at the WWTF. Below is a list of the findings during the visual structural inspection of the trickling filter conditions in Red Wing:

- Multiple sections of exposed rebar on inside of the trickling filter cover
- A few small holes in concrete on the cover, problem has not spread substantially yet.
- Walls appear to be in fair condition
- The walls need to be sand blasted and thoroughly cleaned to extend the longevity.
- Hollow (delaminated) areas along perimeter of thickened top of wall need to be repaired prior to installation of a new cover.
- Until the wall is exposed and accessible, it is impossible to tell its condition more than a few inches into the wall and perimeter wall-cover joint.

4.3.1 Trickling Filters

There is exposed rebar and holes in the existing concrete covers, these will need to be either coated or demolished and replaced in order to extend the useful life of the structures.

Along the outside of the tank walls, there appear to be some areas that will need a deeper repair/patch, but they are not extensive. This would be in the locations that have holes all the way through or like those seen in figure 5.

Figure 5 – Trickling Filter Exterior

From the inside of the trickling filter concrete covers, this would be a prime candidate for a repair product to be coated on the entire underside which would extend the life of the structure significantly. A loss of cover on the wire mesh reinforcement is observed. As the reinforcing corrodes, the degradation can start to go exponentially. To repair this, shut down operation of each trickling filter at a time, install scaffolding inside the trickling filter and apply the coating product, ideally this would be done during low ground water and dry weather conditions with low influent flow.

Figure 6 depicts the existing conditions inside the tank, showing the holes and exposed reinforcement in the inner side of the concrete cover.

Figure 6 – Trickling Filter Roof Interior

As-is this structure is going to continue to degrade in the wet environment (interior) and with freeze-thaw cycles on the exterior. Structural estimates about 10 years before it starts to get beyond its useable life. The earlier the repairs are done the better to ensure longevity of the structure. After the repairs get done it would extend the service life to approximately 20 years. These repairs are still thought of as short-term fixes; full replacement (concrete) with planned maintenance will get you to 60-100 years of life. However, process tank covers are typically aluminum or fiberglass reinforced plastic (FRP. Due to the uncertainty of the future of the tanks the repair option may be more appropriate than replacement.

Figure 7 shows the existing condition of the trickling filter tank wall from the exterior. The top portion of the vertical outer wall is delaminated along the perimeter of the tank wall and requires repair.

Figure 7 – Trickling Filter Exterior

4.3.2 RBC Units

The RBC unit's media and process equipment are aging and are in need of repairs. Currently only 6 of the 10 RBC units are operable. The City does not know how much resources to pour into the RBC units given the uncertainty of when an activated sludge system will be needed to achieve anticipated effluent limits. The concrete structures are in fair condition structurally overall.

Figure 8 shows the existing condition of the RBC units from the exterior.

Figure 8 – Rotating Biological Contactor Exterior

4.4 Current Solids Stabilization

Solids generated in the biological treatment process are anaerobically digested in one primary and one secondary digester and then land applied to agricultural land as Class B biosolids. The secondary digester serves as the liquid biosolids storage volume, solids drying beds are available if additional biosolids storage is required before being land applied. Methane generated during digestion is used by a boiler to provide heat for the digestion process.

The following sections describe several components incorporated in solids stabilization at Red Wing WWTF, including anaerobic digestion and liquid biosolids land application.

4.4.1 Anaerobic Digestion: Primary and Secondary

The anaerobic digestion system is currently adequately sized for the trickling filter and RBC solids generated. However, when converting the facility to a BNR activated sludge system, a higher quantity of solids are generated and at lower solids concentration than currently observed. This amounts to a higher loading rate to the anaerobic digesters as well as not enough solids retention time to meet Class B biosolids requirements.

The primary anaerobic digestion volume is insufficient for proposed activated sludge system solids production and concentration under maximum month design conditions. The secondary digester would need to be converted to operate as a primary digester by allowing for heating of the secondary digester as well as operating at a constant water level. With the conversion of the secondary digester to an additional primary digester, biosolids storage will be required. The primary and secondary digesters have both recently been improved, therefore it is assumed for the purposes of this study that no further process improvements are required of the existing digesters, only operational changes to digester 2 (current secondary digester).

4.4.2 Biosolids Storage

The secondary digester is currently used for biosolids storage, with the added benefit of further volatile suspended solids (VSS) reduction before liquid biosolids land application in the spring and fall seasons. Drying beds are available for storage if weather is not conducive to land application and there is not enough capacity in the secondary digester; however, biosolids are typically land applied as liquid. Separate biosolids storage will be required if the secondary digester is converted to a primary digester.

5 Proposed System

The feasibility of constructing a biological nutrient removal (BNR) activated sludge system to achieve probable effluent limits under future flows and loadings at the current Red Wing WWTF was evaluated. BioWin process models were created with multiple scenarios to perform a high-level sizing of the required treatment processes to achieve BNR in Red Wing. In general it appears feasible to construct a BNR system within the existing site, although demolition of trickling filters, RBCs, intermediate clarifiers and solids drying beds will be required to make room for the proposed system.

Each aspect of these improvements, including capital cost, layout, construction sequencing and solids management implications were considered, and summarized further in the following sections. The proposed system site plan can be found in Figure 9 of this report, a larger version of this figure can be found in Figure 1 of Appendix B.

Figure 9 – Proposed System Site Plan

5.1 Primary Treatment

Primary settling tanks remain in place to provide buffer of peak flow and organic loadings to the activated sludge system. BioWin process models show sufficient BOD concentration at the activated sludge system to keep the primary settling tanks in service. If implemented and it is observed that the BOD concentration downstream of primary settling tanks is too low to provide adequate food for the biological nutrient removal biomass, the primary settling tanks could be converted to flow equalization basins.

Primary solids feed is beneficial for anaerobic digester biogas generation, and therefore it is recommended that the primary settling tanks remain in operation. No costs associated with improvements to the primary settling tanks or solids pumping system have been included in the cost estimate for this feasibility study.

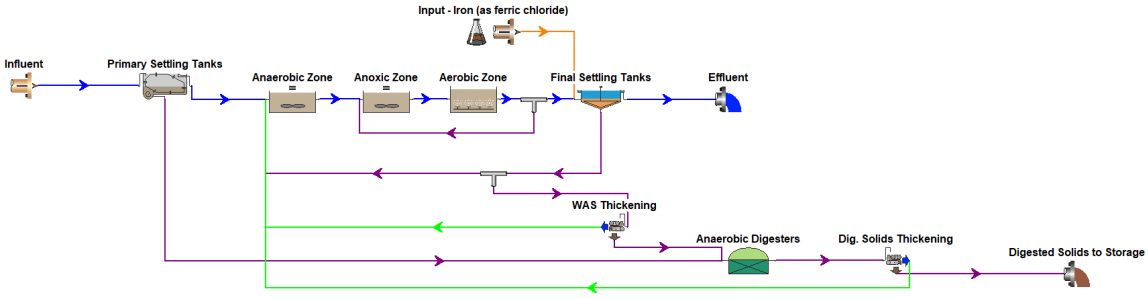
5.2 Secondary Treatment

The proposed secondary treatment for this facility includes an A2/O activated sludge system consisting of anaerobic zones for biological phosphorus removal, anoxic zones for biological nitrogen removal and aerobic (or Oxic) zones for biochemical oxygen demand and nitrification (ammonia removal). Following the proposed activated sludge system will be the existing final settling tanks and chlorination / dechlorination process currently employed. With the implementation of an activated sludge system, aeration blowers and return activated sludge (RAS) and waste activate sludge (WAS) pumping systems are required. For preliminary planning purposes, it was assumed that these systems would be installed in a single building referred to as the pump and blower building in the following sections.

5.2.1 A2/O Activated Sludge System

In the purposed system, an activated sludge system will replace the trickling filters, intermediate clarifiers, and RBC process units at the existing facility. A2/O stands for Anaerobic, Anoxic, Oxic process and consists of these processes in sequential order. RAS and influent flows are directed to the anaerobic zone which is followed by the anoxic and aerobic zones. Nitrified mixed liquor is recycled from the aerobic zone to the anoxic zone to encourage denitrification of nitrates formed in the nitrification process in the aerobic zone. Denitrification is the process where nitrates are converted to nitrogen gas and water under low oxygen conditions. Denitrification in the anoxic zone helps reduce the nitrates in the RAS returned to the anaerobic zone, improving enhanced biological phosphorus removal (EBPR) as well. Figure 10 shows the BioWin model components used for the Red Wing WWTF Feasibility Study proposed system, including biosolids management process flow diagram and sidestream flows to be treated in the liquid stream processes before being discharged.

Figure 10 – Proposed A2/O Process Flow Diagram



There are many BNR processes to consider, for planning level purposes the A2/O system was considered for Red Wing because it is designed for nitrification and moderate levels of total nitrogen removal without external carbon source addition. Alkalinity recovery and reduced oxygen requirements resulting from denitrification is another added benefit of this process, while

providing a smaller footprint than other processes such as the five-stage Bardenpho, UCT and Johannesburg processes.

Downsides of this system are:

- Anaerobic digestion return streams may require chemical coagulant for phosphorus removal and higher aeration demand for nitrification.
- The return streams also have the possibility of forming struvite or brushite when anaerobic digestion is used with EBPR.
- Process control / added operator attention

5.2.2 Final Settling Tanks

The existing final settling tanks will remain in use for the proposed system. The City of Red Wing plans to rehabilitate the final settling tank process equipment in the near future. No costs associated with improvements to the final settling tanks have been included in the cost estimate.

5.2.3 Pump and Blower Building

The proposed activated sludge system will require the addition of a pump and blower building. The pump and blower building will be located in the area where the eastern trickling filter is currently located. This building will house the blowers for activated sludge system in the main level as well as RAS and WAS pumps, piping and valves in the lower level. Solids thickening building will be located adjacent to the Pump and Blower Building for efficiencies with WAS feed to WAS thickening process equipment.

5.3 Proposed Solids Management

To be able to utilize the existing digesters, WAS thickening upstream of digestion is required to achieve target solids retention time (SRT) in the digester tanks. Both digester tanks are required to be operational as primary digesters in order to achieve this SRT in the existing tanks, therefore additional biosolids storage is required. In order to reduce the overall volume of biosolids storage required, post digestion biosolids thickening is recommended. This allows for partial demo and repurpose of the western existing trickling filter tank to be built up for liquid biosolids storage prior to land application.

5.3.1 Declassifying of Electrical Room in Digester Complex

To meet current NFPA 820 guidelines, with a major upgrade, separation of electrical components or a new electrical building would be required.

5.3.2 Thickening Building

The thickening building will be located in the area where the eastern trickling filter is currently located. This building will be adjacent to the pump and blower building housing activated sludge system ancillary systems.

WAS thickening is required pre-digestion to achieve target solids retention time under max month conditions. There are many various thickening technologies available on the market, for planning purposes it was assumed that gravity belt thickening equipment will be installed to achieve WAS thickening prior to digestion. This will consist of two (one duty and one standby) gravity belt thickeners with associated pumps, piping, valves and instrumentation to achieve a solids

concentration between 5-6% solids. Thickening the waste activated sludge increases the digestion capacity of existing anaerobic digestion tanks such that no additional tankage is required to meet minimum SRT and volatile solids loading rate values at the projected conditions.

The anaerobic digestion process breaks down volatile suspended solids and reduces the solids concentration of material once the digestion process is complete. With that, post digested solids concentration is projected to be approximately 3.5-4% solids concentration. In order to reduce the liquid biosolids storage volume required, post digested biosolids thickening is recommended. The second thickening step will thicken the digested biosolids between 5-6% solids concentration, thus reducing the volume of solids being pumped to storage.

Both Pre- and post-digestion thickening generates filtrate/centrate that is in need of further treatment. Anaerobic digestion process releases ammonia and phosphorus that was bound in the solids from biological phosphorus removal. Therefore, the post digested biosolids thickening process will bring a highly concentrated return stream of ammonia and phosphorus back to the BNR activated sludge system. To account for this increased phosphorus and ammonia loading, backup chemical phosphorus removal system should be retained from the existing facility in order to ensure the probable effluent phosphorus concentration can be achieved.

5.3.3 Struvite and Brushite Precipitation

A downside of biological nutrient removal treatment processes in conjunction with anaerobic digestion solids stabilization process is the generation of struvite and brushite.

Calcium and magnesium are present in most wastewater and can spontaneously form precipitates. From the large number of phosphate and carbonate precipitates that can be formed, the most important ones affecting soluble phosphorus levels are struvite (magnesium-ammonium-phosphate (MAP, $MgNH_4PO_4$), and brushite ($CaHPO_4$). Both calcium and magnesium are incorporated into the biomass during growth which allows for accumulation of calcium and magnesium with the solids in addition to being present in the liquid phase. The resulting struvite precipitation can occur particularly in pumps, piping, in-line instrumentation and dewatering equipment where degassing of CO_2 may occur and therefore raise the pH.

One fairly common solution to struvite precipitation is to dose ferric chloride to both the activated sludge system and anaerobic digestion tanks to reduce the phosphate load to the head of the facility. By dosing ferric chloride, struvite scaling in the solids line can also be prevented. Another option would be to dose magnesium hydroxide as done at many facilities in Europe.

5.3.4 Anaerobic vs. Aerobic Digestion

Converting the current anaerobic digestion process to aerobic digestion would be one way to prevent the precipitation of struvite and brushite when the BNR system is implemented. The aerobic process prevents the release of phosphorus and ammonia within the digesters, therefore preventing precipitation from occurring and reducing the concentration of sidestream flows returned to the BNR system.

Aerobic digestion requires higher energy costs due to the use of blowers to achieve volatile solids reduction. Aerobic digestion would no longer provide opportunity to generate, collect and use biogas as currently done with anaerobic digestion.

For planning level purposes, no costs for improvements or changes to the existing anaerobic digestion process were incorporated into the cost estimate. Further evaluation of emerging technologies and additional process alternative analysis is recommended during the facility planning phase. Ferric chloride storage and dosing is made available as a part of the improvements cost estimate for struvite mitigation as a part of this study.

5.3.5 Increased Liquid Biosolids Storage

365-days of digested biosolids storage volume would be ideal for relieving stress during land application periods. This would require roughly 4.0 MG of storage tank volume without employing post-digestion solids thickening process, and 2.4 MG with post digestion thickening. Unfortunately, there is not excess space available for this amount of storage volume at the current site. Liquid biosolids storage is proposed because dewatered biosolids storage requires a larger land area for storing material and does not allow for vertical construction like liquid storage provides. There is an opportunity to maximize use of existing infrastructure by re-purposing one of the existing 88-foot diameter trickling filter tanks for liquid biosolids storage. This would require repairs to the existing concrete walls, and to increase the overall wall height to the desired storage volume within reason for the constructability not allowing increased wall height to be too tall.

A compromise of 1.8 MG biosolids storage volume provides approximately 270 days of storage at the design average annual conditions. This incorporates the 6% solids concentration of digested solids thickening process to reduce the required storage capacity. To accomplish this, 27 ft additional wall height needs to be added to trickling filter walls, totaling 40 ft tank height at 88 ft diameter.

5.4 Total Estimated Cost

The proposed improvements to the facility including demolition of one trickling filter, 10 RBCs, 2 intermediate clarifiers and solids drying beds to construct a new activated sludge system, pump and blower building, and thickening building, and the conversion of one trickling filter into biosolids storage. The Association of the Advancement of Cost Engineering International (AACE) prepared guidelines for many classifications of cost estimates in the industry. A class 5 cost estimate is known as a rough order of magnitude estimate. It is used for the initial screening of projects for capital expenditure planning. Class 5 estimates are drawn from inadequate information which amounts to about 2% of project definition and is common practice for reports such as this feasibility study. The cost estimate includes contractor's overhead, profit and labor estimates for installation as well as sales tax where applicable. Table 8 summarizes the cost estimate for constructing the facility improvements at the WWTF in 2022 dollars. The cost range depicted at the bottom of the table aligns with the AACE class 5 cost estimate accuracy rage given the level of information known at the time the cost estimate was prepared.

Table 8 – Preliminary Engineer's Opinion of Probable Construction Costs for Proposed System

Item	Description	Opinion of Cost
1	Civil site work, shoring, dewatering, excavation, backfill, site piping, electrical etc.	$8,680,000
2	A2O Activated Sludge Basins – 2 trains	$17,910,000
3	Pump and Blower Building (RAS, WAS, Aeration)	$9,170,000
4	Electrical Room Modifications/New Building	$6,500,000
5	Solids Thickening Building (Pre- and Post-digestion thickening)	$8,930,000
6	Solids Storage Tank (1.8MG)	$2,900,000
8	Demolition existing tanks and equipment	$1,210,000
	Subtotal	**$55,300,000**
	Contingency (30%)	$16,990,000
	Mobilization (5%)	$2,770,000
	Legal & Admin, permitting (3%)	$1,660,000
	Materials Testing (1.5%)	$830,000
	Engineering, planning, design and construction services (16%)	$12,360,000
	Estimated Total Project Cost	**$89,510,000**
Estimated Accuracy Range (-20%/+50%)		**$71,608,000**
		$134,265,000

Notes:

1 Limited design work completed (2%)

2 Quantities based on design work completed.

3 Unit prices based on information available at the time. All costs are 2022 capital costs.

4. Estimated accuracy range associated with an AACE class 5 cost estimate for the water and wastewater industries. The +/- value represents typical percentage variation at an 80% confidence interval of actual costs from the cost estimate after application of appropriate contingency (typically to achieve a 50% probability of project cost overrun versus underrun) for the given scope. Depending on the technical and project deliverables (and other variables) and risks associated with this estimate, the accuracy range for any particular estimate is expected to fall within the ranges identified. This does not preclude a specific actual project result from falling outside of the indicated range identified above.

6 Additional Site Analysis

Analysis of floodplain shows the 100-year water surface elevation in the Mississippi River between 682.7 and 682.9 feet above sea level. The additional site identified by the City as a potential for future WWTF processes has a highest elevation of 680 feet above sea level, which is lower than the 100-year flood elevation. Fill would have to be brought into this site in order for it to be used for wastewater treatment facilities, considerable environmental and water resources work would be required to fill this land. The GIS map in Appendix 2 shows the additional site being completely within the floodplain and not suitable for use as wastewater treatment processes without great expense.

An additional study is recommended if the proposed expansion is not feasible, and an alternative site will be required.

7 Construction Sequencing

Figure 1 of Appendix B shows the layout of the proposed system at the existing WWTF site. The A2/O activated sludge system utilizes a large expanse on site, requiring careful sequencing of construction to ensure the facility is still operational during construction.

Wastewater must still be treated in accordance with the current NPDES permit during construction. In order to meet this requirement, the existing structures and facilities must remain in operation during the construction of the new facilities and temporary shutdowns during periods of low flows may be required for connection of the new facilities with the existing facilities.

This sequence requires demolition of one trickling filter, all 10 RBCs, both intermediate clarifiers, solids drying beds in order to construct the activated sludge system and will reduce the ability to recycle trickling filter effluent with the pumping building out of service.

7.1 Trickling Filters

The site layout given available space will require one trickling filter in service without the use of intermediate trickling filters and RBC units to meet NPDES permit limits. The single trickling filter will need to stay in service during construction while the other is demolished to make room for the pump, blower, and thickener buildings. It is essential that the one trickling filter is able to meet the effluent requirements.

Trickling filter calculations show that one trickling filter in service falls within the design recommendations of trickling filters hydraulic and organic loading rates listed in Table 6 of section 4. Since there will not be ammonia limits in play during construction, the secondary treatment process will be required to remove current parameters such as cBOD5, TSS and phosphorus with the primary settling tanks, single trickling filter, final settlings tanks and chlorination / dechlorination system. Chemical phosphorus removal will continue to be in operation throughout construction from the existing chemical building.

7.2 Need for Shoring and Dewatering

Given the site constraints, surrounding infrastructure must be appropriately protected through the use of sheeting, shoring and groundwater dewatering in order to construct the proposed system. Figure 1 of Appendix B outlines the extents of sheeting and shoring required to construct the A2O activated sludge process and associated building for blowers, RAS and WAS pumping equipment. Care should be taken by a General Contractor to install this sheeting and shoring to not damage nearby Admin and Chemical buildings. These extents also need to be thought through to generally allow enough room for the Contractor to access excavation extents in terms of side slope and other construction access characteristics needed.

MPCA and DNR are currently requiring Per- and Polyfluoroalkyl Substances (PFAS) treatment of groundwater dewatering systems in areas where PFAS is known to persist. For planning purposes, it is assumed as a part of this study that PFAS treatment using granular activated carbon (GAC) vessels will be required for treating the dewatering water prior to discharge. This is not a certain known cost at this time but is included in the class 5 cost estimate.

7.3 Construction of Pump and Blower, Solids Thickening Buildings

The Pump and Blower Building as well as the Solids Thickening Building will need to be constructed simultaneously with the activated sludge system. Therefore, as previously mentioned, one trickling filter would need to be demolished to make room for this building. It is also assumed that shoring and dewatering will be required to construct these buildings adjacent to the A2/O activated sludge system. The pre- and post-digestion solids thickening equipment needs to be operational when the activated sludge system is operational to ensure adequate solids retention time in the anaerobic digestion process and to maximize existing liquid biosolids storage until the biosolids storage tank can be converted.

7.4 Construct Biosolids Storage Tank

Once the A2/O activated sludge system has been constructed and is proven operational, meeting NPDES permit limits required, the trickling filter that has been in service during construction conversion to liquid biosolids storage tank work can begin. The trickling filter media and roof will be demolished, concrete walls repaired as necessary when being inspected following removal of the concrete cover. Once the existing walls have been repaired, the wall extension work can be completed and a new aluminum or FRP dome cover can be installed. Temporary digested solids hauling may be required to a nearby WWTF during the construction of the biosolids storage tank. The secondary anaerobic digester can also be used for liquid sludge storage during construction.

8 Financial Assistance

Until 1990, virtually every municipality constructing wastewater treatment facilities received funding through the Minnesota Pollution Control Agency and the U.S. Environmental Protection Agency construction grants program. When that program expired in 1990, cities pursued funding through other sources. These often have included the Public Facilities Authority (PFA), Farmers Home Administration (now referred to as USDA Rural Development [RUS/CF]), Department of Housing and Urban Development (HUD), and the Minnesota Department of Trade and Economic Development (DTED).

The most likely source of loan funds, based on availability, is from PFA. The PFA administers the Water Pollution Control Revolving Fund, which provides below market rate financing for upgrading and constructing wastewater treatment facilities. Interest rates are determined by a set formula based on demographic characteristics of the borrower and other established rules.

The PFA loan program was established to provide a permanent source of funding that could be used to finance municipal wastewater treatment projects in perpetuity. The program was created by the U.S. Congress in 1987, through amendments to the Clean Water Act, once it had decided to discontinue the construction grants program. Under this program, Congress mandated the Environmental Protection Agency (EPA) to establish and capitalize a Water Pollution Control Revolving Fund Program.

The capitalization grant received annually from EPA is used as a form of financial security for the sale of bonds by the Public Facilities Authority (PFA). Each year it is matched by State funds equal to 20 percent of the Federal grant. The money that PFA realizes through the sale of its bonds is used to award loans to municipalities for planning, design, and/or construction of wastewater treatment facilities. The PFA cannot sell an unlimited amount of bonds; a limit exists on PFA's bonding authority. In addition, the size of the capitalization grant, the financial capability

of eligible cities, and the size of each community's project all affect the amount of bonds that PFA can sell.

Each year, the MPCA prepares an Intended Use Plan (IUP), which lists eligible cities that have requested loan assistance for that year. To be eligible for placement on the IUP, a community must have an approved facility plan and a community's name must first appear on the PPL list, which is a list of all communities needing new or upgraded wastewater treatment facilities. For placement on the PPL, interested cities must send a completed PPL application and Priority Point Ranking forms to the MPCA. To move to the IUP from the PPL, another short, written request is required.

Cities contemplating any type of wastewater treatment improvements should get their name on the PPL as early as possible in the planning process. A community's placement on the IUP does not guarantee it will receive a loan. The PFA is responsible for reviewing each city's financial capability and determining the amounts, terms, and conditions of the loans. Although a city may be placed on the IUP at any of several times during the year, it is advisable to request placement as early as possible to have the best chance of receiving a loan and having the fund available when needed. However, a city cannot be placed on the IUP for a construction loan until it has an approved Facilities Plan.

Before the PFA can award a loan, the MPCA must review and approve the city's loan application and then certify the project to the PFA. An application for a construction loan must include plans and specifications, and sewer use and rate documents. A construction project must also complete the environmental review process and have a National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS) permit before loan certification can be made. Nearly all costs associated with a wastewater treatment project are eligible, including costs incurred prior to loan award.

There are two categories of costs which are not eligible; these include:

- Storm Sewers; and
- Land that is not an integral part of the treatment process or that will not be used for the ultimate disposal of residues resulting from such treatment.

All other costs associated with facilities planning, preparation of contract documents including drawings and specifications, and construction are eligible. This includes legal, administrative, equipment, and any other costs related to the project.

Two key features of the PFA loan program are the requirements to:

- Pay Federal and State mandated wage rates during construction, and
- Use a qualified full-time inspector during major construction activity.

Other funding sources for wastewater treatment improvement projects such as this one are available. Loan funding is also available through Rural Development. These loans tend to have higher interest rates compared with PFA loans, but they can be paid back over longer periods, up to forty years, to keep the payments lower. Additional funding sources for wastewater treatment improvement projects include but are not limited to:

- Clean Water State Revolving Fund (SRF)
- Point Source Implementation Grants (PSIG)
- Federal Infrastructure Bill

- Bonding Bill
- Water Infrastructure Fund (WIF)
- Green Project Reserve
- DEED Funding

9 Recommendations/Implementation Schedule

A preliminary project schedule is outlined in Table 9 that generally follows major milestones of wastewater treatment plant improvements projects receiving public funding. The tentative dates are subject to when the City receives new NPDES discharge permit limits for ammonia, total nitrogen, nitrates and/or more strict total phosphorus limits. The proposed system to meet potential future limits involves a substantial change in treatment processes at the WWTF and requires a great deal of additional planning, preliminary and final design, bidding, construction and startup implementation. This is a long process and includes collaboration with many stakeholders.

Table 9 – Preliminary Project Schedule

Action	Tentative Date[1]
Submit Facility Plan	March 1, 2025
Request placement on the Clean Water PPL (MPCA)	March1, 2025
Request placement on Intended use plan (IUP) due to PFA	June 7, 2025
Receive MPCA approval of Facility Plan	June 30, 2025
Authorize preparation of design documents	July 31, 2025
Submit Plans and specifications to MPCA	March 1, 2026
Receive MPCA approval of plans and specifications	June 30, 2026
Advertise project for bids	August 1, 2026
Receive bids and award contract	September 1, 2026
Begin construction	November 1, 2026
Improvements operational	March 1, 2029
Final Completion	May 30, 2029

Notes:

1 Tentative dates are subject to change.

2 Facility Plan submittal annual deadline early march. Facility Plan to be prepared in 2024

3 Current NPDES permit expiration is Feb 28, 2025

4 Funding and permit timelines may impact schedule

Appendix A

Regulatory Permitting – NPDES/SDS Discharge Permit

MINNESOTA POLLUTION CONTROL AGENCY

National Pollutant Discharge Elimination System/State Disposal System

MN0024571

Permittee:	City of Red Wing
Facility name:	Red Wing Wastewater Treatment Facility
Receiving water:	Mississippi River - Class 2Bg, 3C, 4A, 4B, 5, 6 water
City:	Red Wing **County:** Goodhue
Issuance date:	March 1, 2020
Expiration date:	February 28, 2025

The state of Minnesota, on behalf of its citizens through the Minnesota Pollution Control Agency (MPCA), authorizes the Permittee to operate a disposal system at the facility named above and to discharge from this facility to the receiving water named above, in accordance with the requirements of this permit.

The goal of this permit is to reduce pollutant levels in point source discharges and protect water quality in accordance with the U.S. Clean Water Act, Minnesota statutes and rules, and federal laws and regulations.

This permit is effective on the issuance date identified above. This permit expires at midnight on the expiration date identified above.

Signature: Paul Kimman

This document has been electronically signed.

Paul Kimman
Supervisor
Southeast/Southwest Regional Unit
Municipal Division

for the Minnesota Pollution Control Agency

Submit eDMRs
Submit via the MPCA e-Services at
https://rsp.pca.state.mn.us/TEMPO_RSP/Orchestrate.do?initiate=true

Submit WQ reports to:

Electronically: wq.submittals.mpca@state.mn.us
Include *Water quality submittals form:*
https://www.pca.state.mn.us/sites/default/files/wq-wwprm7-71.docx

Or, by mail:
Attention: WQ Submittals Center
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Whole Effluent Testing (WET) and Pretreatment Annual Reports must be mailed to the WQ Submittals Center

Questions on this permit?
For eDMR and other permit reporting issues, contact:
Jennifer Satnik (jennifer.satnik@state.mn.us) 651-757-2692

For specific permit requirements, please refer to:
Steven Speltz (steven.speltz@state.mn.us) 507-206-2602

Wastewater Permit Program general questions, contact:
MPCA, 651-282-6143 or 800-657-3938.

Table of Contents

Page

1. Permitted facility description

The Red Wing Red Wing Wastewater Treatment Facility (WWTP) (facility) is located at 1020 E 5th St, Red Wing, Minnesota 55066, Goodhue County.

This Class A Facility consists of:

The **sanitary sewer collection system** includes approximately 100 miles of municipally owned gravity sewer ranging from eight-inches to 30-inches, nine submersible lift stations and the associated forcemains. The collection area is essentially limited to the city limits, though there are rural areas within the city limits that utilize individual on-site systems. All sanitary sewers are separate sewers. Those sewers that were formerly combined were separated during the years 1980 to 2000.

The **industrial pretreatment plant** consists of a mechanical bar screen, manual bar screen, influent pump station, influent flow meter, chemical addition, a pH adjustment mixing tank, two flocculation mixing tanks, two primary clarifiers, two final clarifiers, effluent flow meter and effluent pumping. Wastewater is predominantly generated by the S.B. Foot Tanning Company, which is located immediately adjacent to the industrial pretreatment plant. Chemical addition includes a cationic polymer and ferric chloride to coagulate the suspended solids and caustic soda to adjust the pH. An anionic polymer is added upstream from the primary clarifiers to promote flocculation and settling. The primary objective is to reduce chromium levels in the wastewater before it is pumped to the Hay Creek Trail trunk sewer for conveyance to the main treatment facility. Settled sludge is pumped to two sludge storage tanks prior to being dewatered using a rotary press screen and is hauled to an industrial landfill for final disposal. A cationic polymer is used in the sludge dewatering process. Industrial pretreatment plant effluent is pumped to a trunk sewer leading to the main treatment facility and is treated and discharged with the flow from the main treatment facility. Basin 5, a dewatering pad, is located on the pretreatment campus, to be used for emergency dewatering of pretreatment sludge and as a receiving site for the contents from the city's sewer Vactor truck operations.

The **main lift station** is located approximately 2500 feet west of the main treatment facility and includes a mechanical fine screen and two vortex grit removal systems. Screenings are compressed and grit is washed and drained prior to disposal.

The **main treatment facility** is located on the bank of the Mississippi River and consists of two primary clarifiers, two trickling filters, ferric chloride feed system for phosphorus removal, two intermediate clarifiers, an intermediate pump station, two trains of rotating biological contactors (10 units), two final clarifiers, chlorine contact tank for disinfection, dechlorination with sulfur dioxide, and post aeration. Sludge is anaerobically digested in one primary and one secondary digester and then land applied to agricultural land as Class B biosolids. Sand drying beds are also available for storage; however, biosolids are typically land applied as a liquid. Methane generated during sludge digestion is used by a boiler to provide heat for the digestion process.

The main treatment facility has a continuous discharge (SD006) to the Mississippi River (Class 2Bg, 3C, 4A, 4B, 5, 6 water) and is designed to treat an average wet weather (AWW) flow of 4.0 million gallons per day (mgd) with a five-day biochemical oxygen demand concentration of 156 milligrams per liter (mg/L) and a total suspended solids concentration of 145 mg/L. There are no other outfalls or bypasses at the main treatment facility or in the collection system.

Changes to the facility may result in an increase in pollutant loading to surface waters or other causes of degradation to surface waters. If a change to the facility will result in a net increase in pollutant loading or other causes of degradation that exceed the maximum loading authorized through conditions specified in the existing permit, the changes to the facility are subject to antidegradation requirements found in Minn. R. 7050.0250 to 7050.0335.

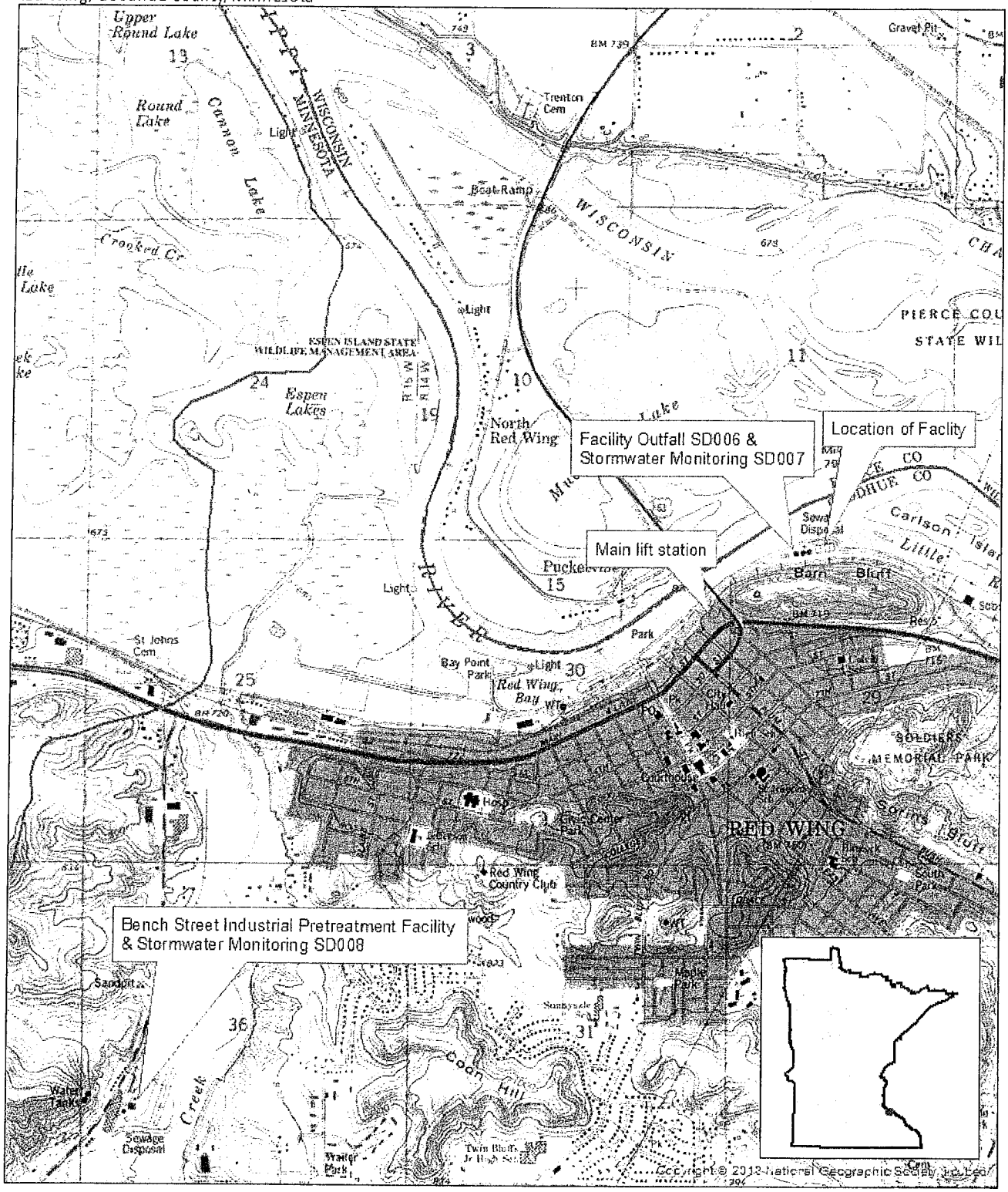
This Permit also complies with Minn. R. 7053.0275 regarding anti-backsliding.

Any point source discharger of sewage, industrial, or other wastes for which a National Pollutant Discharge Elimination System (NPDES) permit has been issued by the MPCA that contains effluent limits more stringent than those that would be established by Minn. R. 7053.0215 to 7053.0265 shall continue to meet the effluent limits established by the permit, unless the permittee establishes that less stringent effluent limits are allowable pursuant to federal law, under section 402(o) of the Clean Water Act, United States Code, title 33, section 1342.

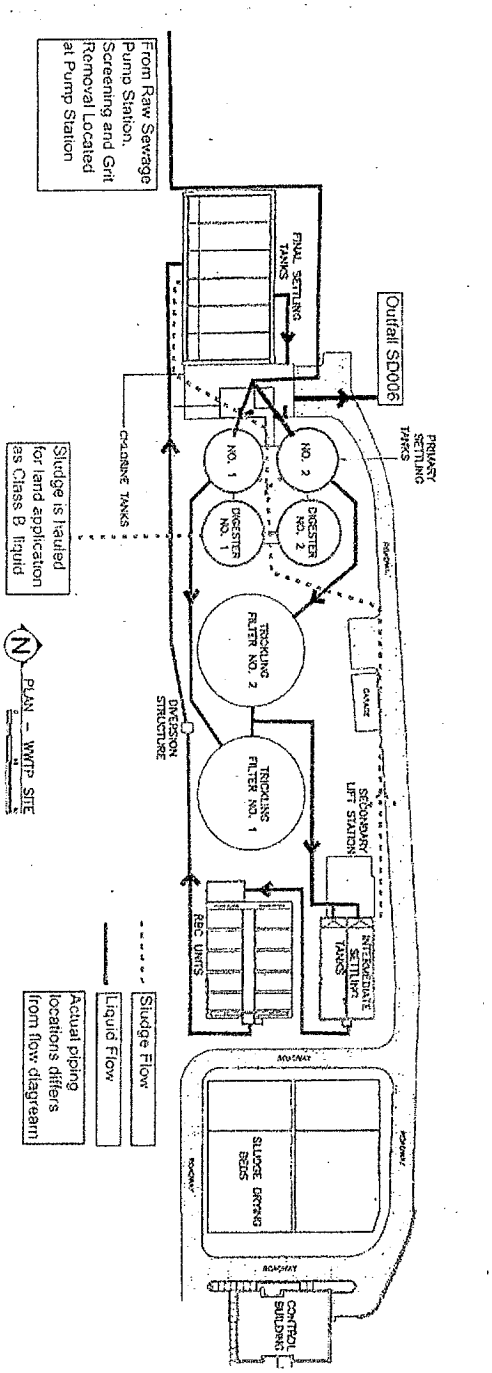
2. Location map of permitted facility

Topographic Map of Permitted Facility

MN0024571, Red Wing Wastewater Treatment Facility
T113N, R14W, Section 29
Red Wing, Goodhue County, Minnesota



3. Flow diagram



4. Summary of stations and station locations

Station	Type of station	Local name	PLS location
SD006	Effluent To Surface Water	Total Facility Discharge	T113N, R14W, S29, NW Quarter
SD007	Stormwater, Non-specific Runoff	Stormwater Discharge	T113N, R14W, S29, NW Quarter
SD008	Stormwater, Non-specific Runoff	Stormwater Discharge	T113N, R14W, S36, SW Quarter
WS001	Influent Waste	Influent Waste Stream	T113N, R14W, S29, NW Quarter

5. Permit requirements

SD006	Effluent To Surface Water	
		Surface Discharge: Class A Major Facility Effluent Requirements
	5.1.1	The Permittee shall submit a monthly DMR: Due by 21 days after the end of each calendar month following permit issuance. [Minn. R. 7001.0150, subp. 2(B)]
	5.1.2	Sampling Location. [Minn. R. 7001.0150, subp. 2(B)]
	5.1.3	Grab and composite samples for Station SD006 shall be taken at a point representative of the wastewater treatment facility discharge to the Mississippi River. [Minn. R. 7001.0150, subp. 2(B)]
	5.1.4	The Permittee shall submit monitoring results in accordance with the limits and monitoring requirements for this station. If conditions are such that no sample can be acquired, the Permittee shall report "No Flow" or "No Discharge" on Discharge Monitoring Report (DMR) and shall add a Comments attachment to the DMR detailing why the sample was not collected. [Minn. R. 7001.0150, subp. 2(B)]
		Acute Toxicity Requirements
	5.2.5	General Requirements. [Minn. R. 7001]
	5.2.6	This permit does not include an acute whole effluent toxicity limit; however the facility has a whole effluent toxicity testing monitoring requirement and is required to conduct acute toxicity tests for Surface Discharge Station SD006. Results of acute toxicity tests will be evaluated against a monitoring threshold value of 0.9999 TUa. [Minn. R. 7053]
	5.2.7	The Permittee shall submit annual acute toxicity test battery results: Due 180 calendar days after Permit Issuance Date annually and annually thereafter. [Minn. R. 7001]
	5.2.8	Species and Procedural Requirements. [Minn. R. 7001]
	5.2.9	Tests shall be conducted in accordance with procedures outlined in EPA-821-R-02-012 "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms" - Fifth Edition (Acute Manual) and any revisions to the Manual. Any test that is begun with an effluent sample that is equal to or exceeds a total ammonia concentration of 5.0 mg/l may use the carbon dioxide-controlled atmosphere technique to control pH drift. [Minn. R. 7001]
	5.2.10	Test organisms for each test battery shall include the fathead minnow (Pimephales promelas)-Method 2001.0, Ceriodaphnia dubia-Method 2002.0, and Daphnia magna-Method 2021.0 or any updates to those methods. [Minn. R. 7001]
	5.2.11	Static renewal acute serial dilution tests of the effluent shall consist of a control, 12%, 25%, 50%, 75% and 100 percent effluent. [Minn. R. 7001]
	5.2.12	All effluent samples shall be flow proportioned, 24-hour composite samples. Test solutions shall be renewed daily. Testing of the effluent shall begin within 36 hours of sample collection. Receiving water collected outside of the influence of discharge shall be used for dilution and controls. [Minn. R. 7001]
	5.2.13	Any other circumstances not addressed in the previous requirements or that require deviation from that specified in the previous requirements shall first be approved by the MPCA. [Minn. R. 7001]
	5.2.14	Quality Control and Report Submittals. [Minn. R. 7001]
	5.2.15	Any test that does not meet quality control measures or results which the Permittee believes reflect an artifact of testing shall be repeated within two (2) weeks of notification from the lab regarding the test sample results. These reports shall contain information consistent with the report preparation section of the Acute Manual. The MPCA shall make the final determination regarding test validity. [Minn. R. 7001]
	5.2.16	Positive Toxicity Result for WET. [Minn. R. 7001]
	5.2.17	Should a test exceed 0.9999 TUa for whole effluent toxicity based on results from the most sensitive test species, the Permittee shall conduct two repeat test batteries on all species. The repeat tests are to be completed within forty-five (45) days after completion of the positive test. These tests will be

		used to determine if toxicity exceeding 0.9999 TUa remains present for any test species. For both retests, if no toxicity is present above 0.9999 TUa for any test species, the Permittee shall return to the test frequency specified by the permit. If either of the repeat test batteries indicate toxicity above 0.9999 TUa for any test species, the Permittee shall submit for MPCA review and approval a plan for conducting a Toxicity Reduction Evaluation (TRE) including the Facility Performance Review within 60 days after the toxicity discovery date. Upon approval of the TRE Plan, the Permittee shall implement the plan or subsequent amendments in its entirety. Any violations of the plan are violations of this permit. In addition, the Permittee shall provide quarterly reports, starting from the date of the TRE plan submittal. The quarterly reports shall include but not be limited to a complete description of all progress made towards the identification of the source(s) of toxicity, and the Permittee's plans for the removal of the toxicity. The TRE shall be consistent with EPA guidance or subsequent procedures approved by the MPCA in attempting to identify and remove the source of the toxicity. Routinely scheduled acute toxicity test batteries required in this permit section shall be reduced to annual testing for the duration of the TRE. At the conclusion of the TRE process, the Permittee must submit a request to the MPCA to discontinue the TRE. The MPCA shall review the request and decide whether or not the TRE will be discontinued. If the MPCA discontinues a TRE, the permit may be modified to set conditions to be met by the Permittee based on the TRE results. [Minn. R. 7001]
	5.2.18	Following successful completion of the TRE, the Permittee shall conduct semi-annual testing for the next five year permit cycle. [Minn. R. 7001]
	5.2.19	WET Data and Test Acceptability Criteria (TAC) Submittal. [Minn. R. 7001]
	5.2.20	All WET test data and TAC shall be submitted to the MPCA by the dates required by this section of the permit using the Minnesota Pollution Control Agency Acute Toxicity Test Report and associated instruction forms. Data not submitted on the correct form(s), or submitted incomplete, will be returned to the permittee and deemed incomplete until adequately submitted on the designated form (identified above). These are legal forms and must be signed and dated by the Permittee. Data should be submitted to: MPCA, Attn: WQ Submittals Center, 520 Lafayette Road North, St. Paul Minnesota 55155-4194. [Minn. R. 7001, Minn. R. 7041.1400]
	5.2.21	Permit Re-opening for WET. [Minn. R. 7001]
	5.2.22	Based on the results of the testing, the permit may be modified to include additional toxicity testing and a whole effluent toxicity limit. [Minn. R. 7001]
	5.2.23	Whole Effluent Toxicity Requirement Definitions. [Minn. R. 7001]
	5.2.24	"Acute Whole Effluent Toxicity (WET) Toxicity Test" is a static renewal test conducted on an exponentially diluted series of effluent. The purpose is to calculate the proportion of effluent that causes 50 percent mortality/immobility of aquatic organisms at 48 hours for Daphnia magna and Ceriodaphnia dubia or 96 hours for fathead minnows. An LC50/EC50 (lethal/immobile concentration) less than or equal to 100 percent effluent constitutes a positive for toxicity. [State Definitions]
	5.2.25	"Acute toxic unit (TUa)" is the reciprocal of the effluent dilution that causes the acute effect by the end of the acute exposure period. For example, a TUa equals (100% effluent)/(48 LC50/EC50 for Daphnia magna and Ceriodaphnia dubia or 96 hour LC50/EC50 for fathead minnows in %). [State Definitions]
	5.2.26	"Test" refers to an individual species. [State Definitions]
	5.2.27	"Test Battery" consists of WET testing of all test species for the specified test. For acute WET testing, all test species includes fathead minnows, Daphnia magna, and Ceriodaphnia dubia. [State Definitions]
		Priority Pollutant Requirements
	5.3.28	The Permittee shall monitor the effluent three times in the life of the permit for the following specified priority pollutants. Sampling events shall occur before the second, third, and fourth year following permit issuance and shall not be less than one year apart. Monitoring shall be for the organic priority pollutants identified under the volatile, acid, base/neutral and pesticide fractions using EPA methods 624, 625 and 608 (40 CFR Part 136, October 25, 1984) as

		listed in Table II of 40 CFR Part 122, Appendix D or any updates to those methods. The following priority pollutant total metals shall also be monitored using EPA methods found in Table IB of the current version of 40 CFR Part 136: antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc. In addition, the Permittee shall monitor for Total Cyanide, Total Phenolic Compounds and Hardness (total as CaCO3) using methods approved in the most recent update of 40 CFR part 136. See the water quality standards for Class 2A/2B/2Bd waters for the required reporting limits for these analyses. Total Mercury shall be monitored by EPA method 1631E or the most recent update to this method, if not already required by the permit. [Minn. R. 7001]
	5.3.29	The Permittee shall submit the first priority pollutant monitoring report: Due 1095 calendar days before Permit Expiration Date. (By two years after permit issuance date). [Minn. R. 7001]
	5.3.30	The Permittee shall submit the second priority pollutant monitoring report: Due 730 calendar days before Permit Expiration Date. (By three years after permit issuance date). [Minn. R. 7001]
	5.3.31	The Permittee shall submit the third priority pollutant monitoring report: Due 365 calendar days before Permit Expiration Date. (By four years after permit issuance date). [Minn. R. 7001]
		Facility Specific Requirements
	5.4.32	Cyanide Monitoring. [Minn. R. 7001]
	5.4.33	A reporting limit of 5.2 ug/L (micrograms per liter) must be used using free cyanide or amenable cyanide chemistry methods. [Minn. R. 7001]
	5.4.34	Chromium Monitoring. [Minn. R. 7001]
	5.4.35	Hexavalent chromium shall be monitored using an EPA approved method found in Table IB of the current version of 40 CFR Part 136.3. The reporting limit shall be no greater than 11 ug/L. [Minn. R. 7001]
	5.4.36	All Priority Pollutant samples should be collected using a 24-hour flow proportional composite; except for the 624 volatiles and 1631E mercury samples, which must be collected using the grab method. [Minn. R. 7001]
	5.4.37	Reporting limits for Priority Pollutant analyses shall be as close as analytically possible to the Class 2B chronic water quality standards. Total cyanide shall be monitored to the free cyanide water quality standard. [Minn. R. 7001]
SD007	Stormwater, Non-specific Runoff	
		Surface Discharge: Industrial Stormwater Section T Requirements
	5.5.1	The Permittee shall submit an annual DMR: Due by 21 days after the end of each calendar year following permit issuance. [Minn. R. 7001.0150, subp. 2(B)]
	5.5.2	Sampling Location. [Minn. R. 7001.0150, subp. 2(B)]
	5.5.3	Samples for Station SD007 shall be collected at the north property boundary, representative of significant material impacts to stormwater at the treatment plant. [Minn. R. 7001.0150, subp. 2(B)]
	5.5.4	The Permittee shall submit monitoring results in accordance with the limits and monitoring requirements for this station. If conditions are such that no sample can be acquired, the Permittee shall report "No Flow" or "No Discharge" on Discharge Monitoring Report (DMR) and shall add a Comments attachment to the DMR detailing why the sample was not collected. [Minn. R. 7001.0150, subp. 2(B)]
		Facility Specific Requirements
	5.6.5	The intervention limit for $CBOD_5$ is 25 mg/L. If this limit is exceeded, the Permittee must take action as described in the stormwater section of this permit. [Minn. R. 7001]

	5.6.6	The intervention limit for TSS is 100 mg/L. If this limit is exceeded, the Permittee must take action as described in the stormwater section of this permit. [Minn. R. 7001]
SD008	Stormwater, Non-specific Runoff	
		Surface Discharge: Industrial Stormwater Section T Requirements
	5.7.1	The Permittee shall submit an annual DMR: Due by 21 days after the end of each calendar year following permit issuance. [Minn. R. 7001.0150, subp. 2(B)]
	5.7.2	Sampling Location. [Minn. R. 7001.0150, Subp. 2(B)]
	5.7.3	Samples for Station SD008 shall be collected at a stormwater inlet near the center of the pretreatment campus, representative of significant material impacts to stormwater. [Minn. R. 7001.0150, subp. 2(B)]
		Facility Specific Requirements
	5.8.4	The intervention limit for $CBOD_5$ is 25 mg/L. If this limit is exceeded, the Permittee must take action as described in the stormwater section of this permit. [Minn. R. 7001]
	5.8.5	The intervention limit for TSS is 100 mg/L. If this limit is exceeded, the Permittee must take action as described in the stormwater section of this permit. [Minn. R. 7001]
WS001	Influent Waste	
		Waste Stream: Class A Major Facility Influent Requirements
	5.9.1	The Permittee shall submit a monthly DMR: Due by 21 days after the end of each calendar month following permit issuance. [Minn. R. 7001.0150, subp. 2(B)]
	5.9.2	Sampling Location. [Minn. R. 7001.0150, subp. 2(B)]
	5.9.3	Grab and composite samples for Station WS001 shall be taken at a point representative of total influent flow to the system. [Minn. R. 7001.0150, subp. 2(B)]
	5.9.4	The Permittee shall submit monitoring results in accordance with the limits and monitoring requirements for this station. If conditions are such that no sample can be acquired, the Permittee shall report "No Flow" or "No Discharge" on Discharge Monitoring Report (DMR) and shall add a Comments attachment to the DMR detailing why the sample was not collected. [Minn. R. 7001.0150, subp. 2(B)]
MN0024571	Red Wing WWTP	
		Surface Discharge Station General Requirements
	5.10.1	Analysis Requirements. [Minn. R. 7001]
	5.10.2	When required, Dissolved Oxygen, pH, Temperature and Total Residual Chlorine analyses shall be conducted within 15 minutes of Sample collection. [Minn. R. 7053]
	5.10.3	Representative Samples. [Minn. R. 7001]
	5.10.4	Samples and measurements required by this permit shall be representative of the monitored activity. [Minn. R. 7001]
	5.10.5	Surface Discharge Prohibitions. [Minn. R. 7001]
	5.10.6	Floating solids or visible foam shall not be discharged in other than trace amounts. [Minn. R. 7001]
	5.10.7	Oil or other substances shall not be discharged in amounts that create a visible color film. [Minn. R. 7001]
	5.10.8	The Permittee shall install and maintain outlet protection measures at the discharge stations to prevent erosion. [Minn. R. 7001]
	5.10.9	Winter Sampling Conditions. [Minn. R. 7001]

	5.10.10	The Permittee shall sample flows at the designated monitoring stations including when this requires removing ice to sample the water. If the station is completely frozen throughout a designated sampling month, the Permittee shall check the "No Discharge" box on the Discharge Monitoring Report (DMR) and note the ice conditions in Comments on the DMR. [Minn. R. 7001]
	5.10.11	Chlorine Addition Requirements. [Minn. R. 7001]
	5.10.12	If chlorine is added for any purpose, the Permittee shall monitor the discharge for Total Residual Chlorine once per day during chlorine usage. The Permittee shall report the monitoring data as a comment on the next submitted Discharge Monitoring Report for the affected station. The discharge shall not exceed a 0.038 mg/L Total Residual Chlorine limit. [Minn. R. 7001]
	5.10.13	Phosphorus Limits and Monitoring Requirements. [Minn. R. 7001]
	5.10.14	Phosphorus Calculation Definitions. [Minn. R. 7001]
	5.10.15	"12-Month Moving Total" is a rolling total. To calculate, for each month multiply the total volume of effluent flow (MG) by the monthly average concentration and by a 3.785 conversion factor to get kg/month. Then add all of the monthly values (kg/mo) during the last twelve months, starting with the monthly total for the month of the current reporting period. [Minn. R. 7001]
	5.10.16	Mercury Limits and Monitoring Requirements. [Minn. R. 7001]
	5.10.17	Permittees are required to sample for TSS (grab sample) at the same time that Total/Dissolved Mercury samples are taken. Total Mercury, Dissolved Mercury, and TSS (grab sample) samples shall be collected via grab samples. All results shall be recorded on DMRs. [Minn. R. 7001]
	5.10.18	Total and Dissolved Mercury samples shall be analyzed using the most current versions of EPA Method 1631 with clean techniques method 1669. Should another mercury analytical method that has a reportable quantitation level of <0.5 ng/L that allows for low-level sample characterization be approved by the EPA and certified by an MPCA recognized accreditation body, the method may be used in place of 1631/1669. [Minn. R. 7001]
	5.10.19	Nitrogen Limits and Monitoring Requirements. [Minn. R. 7001]
	5.10.20	"Total Nitrogen" is to be reported as the summation of the Total Kjeldahl Nitrogen and Total Nitrite plus Nitrate Nitrogen values. [Minn. R. 7001]
		Waste Stream Station General Requirements
	5.11.21	Analysis Requirements. [Minn. R. 7001]
	5.11.22	When required, Dissolved Oxygen, pH, Temperature and Total Residual Chlorine analyses shall be conducted within 15 minutes of Sample collection. [Minn. R. 7053]
	5.11.23	Representative Samples. [Minn. R. 7001]
	5.11.24	Grab and composite samples shall be collected at a point representative of total influent flow to the system. [Minn. R. 7001]
	5.11.25	Mercury Limits and Monitoring Requirements. [Minn. R. 7001]
	5.11.26	Total Mercury samples shall be grab samples and shall be analyzed using EPA Method 1631 with clean techniques method 1669 and any revisions to those methods. Should another mercury analytical method that has a reportable quantitation level that allows for low-level sample characterization be approved by the EPA and certified by the Minnesota Department of Health, the Permittee is authorized to use that method. [Minn. R. 7001]
	5.11.27	Nitrogen Limits and Monitoring Requirements. [Minn. R. 7001]
	5.11.28	"Total Nitrogen" is to be reported as the summation of the Total Kjeldahl Nitrogen and Total Nitrite plus Nitrate Nitrogen values. [Minn. R. 7001]
		Mercury Minimization Plan
	5.12.29	The Permittee is required to complete and submit a Mercury Pollutant Minimization Plan (MMP) to the MPCA as detailed in this section. If the Permittee has previously submitted a MMP, it shall update its MMP and submit the updated MMP to the MPCA. The purpose of the MMP is to evaluate collection and treatment systems to determine possible sources of mercury as well as potential

		mercury reduction options. Guidelines for developing a MMP are detailed in this section. [Minn. R. 7001]
	5.12.30	The specific mercury monitoring requirements are detailed in the limits and monitoring section of this permit. Information gained through the MMP process can be used to reduce mercury concentrations. As part of its mercury control strategy, the Permittee should consider selecting activities based on the potential of those activities to reduce mercury loadings to the wastewater treatment facility. [Minn. R. 7001]
	5.12.31	The Permittee shall submit a mercury pollutant minimization plan: Due by 180 days after permit issuance. [Minn. R. 7001]
	5.12.32	At a minimum, the MMP shall include the following: a. A summary of mercury influent and effluent concentrations and biosolids monitoring data using the most recent five years of monitoring data, if available. b. Identification of existing and potential sources of mercury concentrations and/or loading to the facility. As appropriate for your facility, you should consider residential, institutional, municipal, and commercial sources (such as dental clinics, hospitals, medical clinics, nursing homes, schools, laundries, and industries with potential for mercury contributions). You should also consider other influent mercury sources, such as stormwater inputs, ground water (inflow & infiltration) inputs, lift station components, and waste streams or sewer tributaries to the wastewater treatment facility. c. An evaluation of past and present WWTF operations to determine those operating procedures that maximize mercury removal. d. A summary of any mercury reduction activities implemented during the last five years. e. A plan to implement mercury management and reduction measures during the next five years. [Minn. R. 7001]
		Mechanical System
	5.13.33	Bypass Structures. [Minn. R. 7001]
	5.13.34	All structures capable of bypassing the treatment system shall be manually controlled and kept locked at all times. [Minn. R. 7001.0030]
	5.13.35	Sanitary Sewer Extension Permit. [Minn. R. 7001]
	5.13.36	The Permittee may be required to obtain a Sanitary Sewer Extension Permit from the MPCA for any addition, extension or replacement to the sanitary sewer. If a sewer extension permit is required, construction may not begin until plans and specifications have been submitted and a written permit is granted except as allowed in Minn. Stat. 115.07, Subd. 3(b). [Minn. R. 7001.0020, D]
	5.13.37	Operator Certification. [Minn. R. 7001]
	5.13.38	The Permittee shall provide a Class A state certified operator who is in direct responsible charge of the operation, maintenance and testing functions required to ensure compliance with the terms and conditions of this permit. [Minn. R. 9400]
	5.13.39	The Permittee shall provide the appropriate number of operators with a Type IV certification to be responsible for the land application of biosolids or semisolids from commercial or industrial operations. [Minn. R. 7048]
	5.13.40	If the Permittee chooses to meet operator certification requirements through a contractual agreement, the Permittee shall provide a copy of the contract to the MPCA, WQ Submittals Center. The contract shall include the certified operator's name, certificate number, company name if appropriate, the period covered by the contract and provisions for renewal; the duties and responsibilities of the certified operator; the duties and responsibilities of the permittee; and provisions for notifying the MPCA 30 days in advance of termination if the contract is terminated prior to the expiration date. [Minn. R. 9400]
	5.13.41	The Permittee shall notify the MPCA within 30 days of a change in operator certification or contract status. [Minn. R. 9400]

		Pretreatment: Delegated Requirements
	5.14.42	Pretreatment - Definitions. [Minn. R. 7049]
	5.14.43	For the purposes of these pretreatment requirements, "Significant Industrial User" (SIU) shall mean any industrial user (IU) which: a. is subject to Categorical Pretreatment Standards, as defined in Minnesota Rules 7049.0120, subpart 5; b. discharges 25,000 gallons per day or more of process wastewater, excluding sanitary, noncontact cooling or boiler blowdown wastewater, to the POTW; c. contributes a process wastewater containing five percent or more of the flow or load of any pollutant of concern to the POTW treatment plant; or d. is designated as significant by the Permittee on the basis that the Industrial User has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement. [Minn. R. 7049]
	5.14.44	Exemption. [Minn. R. 7049]
	5.14.45	Industrial users qualifying as significant solely on the basis of criteria b. or c. above may be exempted from consideration as a SIU if the Permittee finds that they have no reasonable potential to adversely affect the POTW's operation or to violate pretreatment standards or requirements. [Minn. R. 7049]
	5.14.46	The Permittee shall notify the MPCA in writing of any Industrial User so exempted and provide justification for their exemption. [Minn. R. 7049]
	5.14.47	Pretreatment - Delegated Authority. [Minn. R. 7049]
	5.14.48	Under the authority of the General Pretreatment Regulations (40 CFR 403), the Permittee's pretreatment program was approved on July 18, 2003. The Permittee has been delegated authority to operate as the Publicly Owned Treatment Works (POTW) control authority under the General Pretreatment Regulations. The Permittee shall fully and effectively implement and operate the approved pretreatment program according to the legal authorities contained therein and the General Pretreatment Regulations. [Minn. R. 7049]
	5.14.49	In addition to the Prohibitions contained in the General Pretreatment Regulations and the approved program, the Permittee shall prohibit new discharges of non-contact cooling waters to the POTW unless there are no cost-effective alternatives. [Minn. R. 7049]
	5.14.50	Existing discharges of non-contact cooling water to the wastewater treatment facility shall be eliminated where elimination is cost effective, or where an infiltration/inflow analysis and sewer system evaluation survey indicate the need for such removal. [Minn. R. 7049]
	5.14.51	Pollutants of concern in the administration of the Permittee's pretreatment program shall be considered in the determination of the Significance of Industrial Users, monitoring of Significant Industrial Users, establishment of limitations on users, and communications with users. A pollutant of concern is a pollutant that is discharged, or may be discharged by an industrial user to the permittees treatment works and that is, or should be, of concern on the basis that it may cause interference or pass through as defined in Minnesota Rules 7049.0120, subparts 10 and 12. [Minn. R. 7049]
	5.14.52	Legal Authority. [Minn. R. 7049]
	5.14.53	The Permittee shall maintain the legal authority that allows it to fully implement its approved pretreatment program in conformance with the requirements of the General Pretreatment Regulation. [Minn. R. 7049]
	5.14.54	Industrial Users Inventory. [Minn. R. 7049]
	5.14.55	The Permittee shall update its inventory of Industrial Users at least annually and as needed to ensure that all SIUs are properly identified, characterized and categorized. The Permittee shall: a. identify Industrial Users which may be subject to the POTW pretreatment program; b. characterize the discharge of pollutants to the POTW by the Industrial User; and c. determine the applicable categories for industrial users subject to National Categorical Pretreatment Standards. [Minn. R. 7049]

	5.14.56	Within 30 days of the designation of an Industrial User as significant, the Permittee shall notify the SIU of all applicable pretreatment standards and requirements. The Permittee shall also notify all Industrial Users of all applicable pretreatment standards and requirements, and the Industrial Users' obligation to comply with applicable requirements under Subtitles C and D of the Resource Conservation and Recovery Act (RCRA). [Minn. R. 7049]
	5.14.57	Local Limits. [Minn. R. 7049]
	5.14.58	The Permittee shall develop, maintain and enforce specific local limits to implement the prohibitions listed in Minnesota Rules 7049.0140. [Minn. R. 7049]
	5.14.59	The Permittee shall evaluate the need to revise local limits to effectively implement these prohibitions at least once during the term of this permit. Prior to the expiration date of this permit, the permittee shall submit, for approval, a report on the evaluation. If the evaluation determines that a more restrictive local limit is needed, the permittee shall submit for approval a suggested schedule for amending the permittee's local limits. [Minn. R. 7049]
	5.14.60	The evaluation shall include a pollutant mass balance for all pollutants of concern. The mass balance shall attempt to balance the source of the pollutants (Industrial Users and other sources), the measured headwork's loading of the pollutants and the fates of the pollutants (discharge, biosolids and others). The mass balance shall make use of all available and appropriate monitoring data. The permittee shall, for all pollutants of concern, obtain sufficient data to allow the permittee to evaluate the need for local limits and to set local limits if they are needed. Monitoring shall be done at a sensitivity adequate to evaluate the need for local limits and set local limits if needed. [Minn. R. 7049]
	5.14.61	Permit Significant Industrial Users. [Minn. R. 7049]
	5.14.62	The Permittee shall issue and reissue permits to all existing SIUs within 180 days of expiration of the existing SIU permit for existing SIUs, or identification of a new SIU. The permit shall contain at least the following: a. a statement of duration (no longer than five (5) years); b. a statement of nontransferability without prior approval by the POTW, and provision of a copy of the existing permit to the new owner or operator; c. discharge limits based on applicable prohibited discharges in Minnesota Wastewater Pretreatment Rules (Minn. R. 7049.0140), National Categorical Pretreatment Standards, and local limits and local discharge prohibitions; d. self-monitoring, sampling, reporting, notification and record keeping requirements, including an identification of the pollutants to be monitored, sampling location, sampling frequency and sample type; and e. a statement of applicable civil and criminal penalties for violation of pretreatment standards and requirements, and any applicable compliance schedule. [Minn. R. 7049]
	5.14.63	The Permittee may not extend the compliance date beyond applicable federal deadlines in any compliance schedule. [Minn. R. 7049]
	5.14.64	Compliance Monitoring and Inspections. [Minn. R. 7049]
	5.14.65	The Permittee shall randomly sample and analyze the discharge from Industrial Users and conduct surveillance activities to identify, independent of information supplied by Industrial Users, noncompliance with pretreatment standards. The Permittee shall inspect and sample the discharge from each SIU at least once a year. [Minn. R. 7049]
	5.14.66	The Permittee shall evaluate whether each SIU needs a plan to control spill and slug discharges as provided in Minnesota Rules 7049.0830 G. Where a control plan is determined to be needed, the Permittee shall require, in the permit issued to the industrial user, that the industrial user develop and implement such a plan. [Minn. R. 7049]
	5.14.67	Industrial User Reports. [Minn. R. 7049]
	5.14.68	The Permittee shall receive and analyze self-monitoring reports and other reports and notices submitted by Industrial Users in accordance with requirements contained in permits issued by the

		Permittee and in accordance with the General Pretreatment Regulation. [Minn. R. 7049]
	5.14.69	Enforcement Actions. [Minn. R. 7049]
	5.14.70	The Permittee shall investigate instances of noncompliance with pretreatment standards and requirements as indicated by reports submitted by Industrial Users, by information collected by the Permittee or by other means. [Minn. R. 7049]
	5.14.71	The Permittee shall collect samples, analyze data and compile information in a manner to ensure accuracy and admissibility in enforcement proceedings and judicial actions. [Minn. R. 7049]
	5.14.72	In instances of noncompliance, the Permittee shall take effective enforcement action in accordance with the approved enforcement response plan. [Minn. R. 7049]
	5.14.73	Data Management and Record Keeping. [Minn. R. 7049]
	5.14.74	The Permittee shall maintain records documenting pretreatment activities. These records shall contain an inventory of industrial users, characterization of discharges, compliance status, permit status, and records of enforcement actions. [Minn. R. 7049]
	5.14.75	The Permittee shall retain all records of monitoring activities and results for at least three (3) years and shall make the records available to EPA and the MPCA upon request. [Minn. R. 7049]
	5.14.76	Public Participation. [Minn. R. 7049]
	5.14.77	The Permittee shall comply with public participation requirements of 40 CFR 25 in the enforcement of national pretreatment standards. [Minn. R. 7049]
	5.14.78	The Permittee shall, once a year, publish the names of Industrial Users that were in significant noncompliance with pretreatment requirements, as defined in Minnesota Rules 7049.0120, subpart 25, any time during the previous twelve (12) months. [Minn. R. 7049]
	5.14.79	All industrial discharge data shall be made available to the public upon request. [Minn. R. 7049]
	5.14.80	Program Resources. [Minn. R. 7049]
	5.14.81	The Permittee shall acquire sufficient resources and qualified personnel to carry out the program implementation procedures described in this permit. [Minn. R. 7049]
	5.14.82	Program Modification. [Minn. R. 7049]
	5.14.83	The Permittee shall submit to the MPCA a statement of the basis for desired program modifications and a modified program description for all substantial modifications as defined in Minnesota Rules 7049.0980. The Permittee shall await formal approval from the MPCA before implementing substantial program modifications. [Minn. R. 7049]
	5.14.84	The Permittee shall notify the MPCA of non-substantial modifications to its pretreatment program at least 45 days prior to implementing the modification. [Minn. R. 7049]
	5.14.85	Non-substantial modifications are deemed approved unless the MPCA notifies the Permittee otherwise within 45 days. [Minn. R. 7049]
	5.14.86	Multijurisdictional Agreements. [Minn. R. 7049]
	5.14.87	The Permittee shall establish agreements with any additional contract cities requiring them to develop and adopt legal authority at least as stringent as the Permittee's, and carry out the specific responsibilities listed above in implementing the pretreatment program. [Minn. R. 7049]
	5.14.88	Notification Requirements. [Minn. R. 7049]
	5.14.89	The Permittee shall notify the MPCA of planned or actual changes in the discharges from SIUs which will require changes to the user's control document and which may affect the Permittee's effluent. [Minn. R. 7049]
	5.14.90	The Permittee shall supply the MPCA with information regarding the discharge, compliance status, or enforcement actions taken for any industrial user upon request. [Minn. R. 7049]
	5.14.91	Pretreatment Annual Report. [Minn. R. 7049]
	5.14.92	The Permittee shall submit a pretreatment annual report: Due by February 28 of each year following permit issuance. [Minn. R. 7049]
	5.14.93	The Permittee shall submit the pre-treatment report annually to the following address: MPCA Attn: WQ Submittals Center

		520 Lafayette Road North St. Paul, Minnesota 55155-4194 The report shall describe the Permittee's pretreatment activities during the previous calendar year and is due on February 28 of each year and shall contain at least the following information. [Minn. R. 7049]
	5.14.94	The Pretreatment Annual Report shall describe the pretreatment activities during the previous calendar year and shall contain the following lists: a. An updated list of the Permittee's significant industrial users including their names, addresses, any applicable federal categorical standards, and a summary total of significant industrial users and categorical industrial users. b. A separate list of deletions from and additions to previously submitted lists of SIUs, with a brief explanation for each deletion. c. A list of SIUs with expired permits. [Minn. R. 7049]
	5.14.95	The Pretreatment Annual Report shall contain the following descriptions: a. A characterization of the compliance status of each SIU during the reporting year. The compliance characterization shall at least indicate status as follows: 1. no violations noted with discharge limits, and compliance with monitoring and reporting requirements is sufficient to determine compliance with discharge limitations; 2. violations were noted with discharge limits, or violations of monitoring and reporting requirements that may have impaired the Permittee's ability to determine compliance with discharge limitations were noted, but the noncompliance does not meet the definition of significant noncompliance as referenced below; 3. significant noncompliance (as defined by 40 CFR 403.8(f)(2)(vii)); or 4. status unknown. b. A description of the standards or requirements that were violated for SIUs that are out of compliance with pretreatment standards. For an SIU in significant noncompliance, the characterization shall note the reason for the significant violations (if known) and whether the SIU is on a compliance schedule. If the SIU is on a compliance schedule, the date of final compliance shall be noted in the report. c. A description of any upsets, interference, or pass through incidents at the POTW which the Permittee knows or suspects were caused by Industrial Users of the POTW system. The description shall include the reasons why the incidents occurred, the corrective actions taken, and the Industrial Users responsible, if known. [Minn. R. 7049]
	5.14.96	The permittee shall, for all pollutants of concern, obtain sufficient data to allow the permittee to evaluate the need for local limits, and shall set local limits it they are needed. Monitoring shall be done at a sensitivity adequate to evaluate the need for local limits and set local limits if they are needed. [Minn. R. 7049]
	5.14.97	The Pretreatment Annual Report shall contain the following summaries: a. A summary of the discharge monitoring data for each SIU for the reporting year. This summary shall include all available data and shall accurately represent the discharge by the user. b. A summary of the inspection and sampling activities conducted by the POTW during the reporting year to gather information and data regarding Industrial Users. The summary shall include identification of the Industrial Users subject to surveillance by the POTW and an indication of the type (inspection or sampling) and the number of surveillance activities performed. c. A summary of the enforcement actions by the POTW during the reporting year. The summary shall include the names and addresses of the Industrial Users that were the subject of enforcement action, the enforcement action taken, and whether the Industrial User has returned to compliance. d. A summary of the Permittee's pretreatment budget for the reporting year, including the cost of personnel, equipment and services employed in the pretreatment program. e. A summary of public participation activities to involve and inform the public. This shall include a

		copy of the annual publication of significant noncompliance, if such publication was needed to comply with 40 CFR 403.8(f) (2) (vii). [Minn. R. 7049]
		Biosolids: Land Application
	5.15.98	Authorization. [Minn. R. 7041]
	5.15.99	This permit authorizes the Permittee to store and land apply domestic wastewater treatment biosolids in accordance with the provisions in this chapter and Minnesota Rules, ch. 7041. [Minn. R. 7041]
	5.15.100	Permittees who prepare bulk biosolids shall obtain approval of the sites on which bulk biosolids are applied before they are applied unless they are Exceptional Quality Biosolids. Site application procedures are set forth in Minn. R. ch. 7041.0800. [Minn. R. 7041.0800]
	5.15.101	Compliance Responsibility. [Minn. R. 7041]
	5.15.102	The Permittee is responsible for ensuring that the applicable requirements in this chapter and Minn. R. ch. 7041 are met when biosolids are prepared, distributed, or applied to the land. [Minn. R. 7041]
	5.15.103	Notification Requirements. [Minn. R. 7041]
	5.15.104	The Permittee shall provide information needed to comply with the biosolids requirements of Minn. R. ch. 7041 to others who prepare or use the biosolids. [Minn. R. 7041]
	5.15.105	Pollutant Limits. [Minn. R. 7041]
	5.15.106	Biosolids which are applied to the land shall not exceed the ceiling concentrations in Table 1 and shall not be applied so that the cumulative amounts of pollutant in Table 2 are exceeded. Table 1 Ceiling Concentrations (dry weight basis) Parameter in units mg/kg Arsenic 75 Cadmium 85 Copper 4300 Lead 840 Mercury 57 Molybdenum 75 Nickel 420 Selenium 100 Zinc 7500 Table 2 Cumulative Loading Limits Parameter in units lbs/acre Arsenic 37 Cadmium 35 Copper 1339 Lead 268 Mercury 15 Molybdenum not established* Nickel 375 Selenium 89 Zinc 2500 *The cumulative limit for molybdenum has not been established at the time of permit issuance. [Minn. R. 7041.1100]
	5.15.107	Pathogen and Vector Attraction Reduction. [Minn. R. 7041]
	5.15.108	Biosolids shall be processed, treated, or be incorporated or injected into the soil to meet one of the vector attraction reduction requirements in Minnesota Rules, pt. 7041.1400. [Minn. R. 7041.1400]
	5.15.109	Biosolids shall be processed or treated by one of the alternatives in Minnesota Rules, pt. 7041.1300 to meet the Class A or Class B standards for the reduction of pathogens. When Class B biosolids are

		applied to the land, the site restrictions in Minnesota Rules, pt. 7041.1300 shall also be met. [Minn. R. 7041.1300]
	5.15.110	The minimum duration between application and harvest, grazing or public access to areas where Class B biosolids have been applied to the land is as follows: a. 14 months for food crops whose harvested parts may touch the soil/biosolids mixture (such as melons, squash, tomatoes, etc.), when biosolids are surface applied, incorporated or injected. b. 20 months or 38 months depending on the application method for food crops whose harvested parts grow in the soil (such as potatoes, carrots, onions, etc.). The 20 month time period is required when biosolids are surface applied or surface applied and incorporated after they have been on the soil surface for at least four (4) months. The 38 month time period is required when the biosolids are injected or surface applied and incorporated within four (4) months of application. c. 30 days for feed crops, other food crops (such as field corn, sweet corn, etc.), hay or fiber crops when biosolids are surface applied, incorporated or injected. d. 30 days for grazing of animals when biosolids are surface applied, incorporated or injected. e. One year where there is a high potential for public contact with the site, (such as a reclamation site located in populated areas, a construction site located in a city, turf farms, plant nurseries, etc.) and 30 days where there is low potential for public contact (such as agricultural land, forest, a reclamation site located in an unpopulated area, etc.) when biosolids are surface applied, incorporated, or injected. [Minn. R. 7041]
	5.15.111	Management Practices. [Minn. R. 7041]
	5.15.112	The management practices for the land application of biosolids are described in detail in Minn. R. ch. 7041.1200 and shall be followed unless specified otherwise in a site approval letter or a permit issued by the MPCA. [Minn. R. 7041.1200]
	5.15.113	Overall management requirements: a. Biosolids shall not be applied to the land if it is likely to adversely affect a threatened or endangered species listed under Section 4 of the Endangered Species Act or its designated critical habitat. b. Biosolids shall not be applied to flooded, frozen or snow covered ground so that the biosolids enter wetlands or other waters of the state. c. Biosolids shall be applied at an agronomic rate unless specified otherwise by the MPCA in a permit. d. Biosolids shall not be applied within 33 feet of a wetland or waters of the state unless specified otherwise by the MPCA in a permit. [Minn. R. 7041]
	5.15.114	Monitoring Requirements. [Minn. R. 7041]
	5.15.115	Representative samples of biosolids applied to the land shall be analyzed by methods specified in Minnesota Rule pt. 7041.3200 for the following parameters: arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium, zinc, Kjeldahl nitrogen, ammonia nitrogen, total solids, volatile solids, phosphorus, potassium and pH. [Minn. R. 7041.3200]
	5.15.116	At a minimum, biosolids shall be monitored at the frequencies specified in Table 3 for the parameters listed above, and any pathogen or vector attraction reduction requirements in Minn. R. pts. 7041.1300 and 7041.1400 if used to determine compliance with those parts. Table 3 Minimum Sampling Frequencies Biosolids Applied* (metric tons/365-day period) | Biosolids Applied* (tons/365-day period) | Frequency (times/365-day period) >0 but <290 | >0 but <320 | 1 >=290 but <1,500 | >=320 but <1,650 | 4 >=1,500 but <15,000 | >=1,650 but <16,500 | 6 >=15,000 | >=16,500 | 12 * Either the amount of bulk biosolids applied to the land or the amount of biosolids received by a

		person who prepares biosolids that are sold or given away in a bag or other container for application to the land (dry weight basis). [Minn. R. 7041.1300, Minn. R. 7041.1400]
	5.15.117	Representative samples of biosolids that are transferred to storage units and are stored for more than two years shall be analyzed by methods specified in Minnesota Rule pt. 7041.3200 for each cropping year they are stored for the following parameters: arsenic, cadmium, copper, lead, molybdenum, nickel, selenium, and zinc. Mercury is specifically NOT included in the stored biosolids analysis because of the short holding time [28 days] required between sampling and analysis. [Minn. R. 7041.3200]
	5.15.118	Increased sampling frequencies are specified for the parameters listed in Table 4. Sampling at a frequency at twice the minimum frequencies in Table 3 is required if concentrations listed in Table 4 are exceeded (based on the average of all analyses made during the previous cropping year). Table 4 Increased Frequency of Sampling Parameter (mg/kg dry weight basis) Arsenic 38 Cadmium 43 Copper 2150 Lead 420 Mercury 28 Molybdenum 38 Nickel 210 Selenium 50 Zinc 3750.[Minn. R. 7041]
	5.15.119	Records. [Minn. R. 7041]
	5.15.120	The Permittee shall keep records of the information necessary to show compliance with pollutant concentrations and loadings, pathogen reduction requirements, vector attraction reduction requirements and management practices as specified in Minnesota Rules, pt. 7041.1600, as applicable to the quality of biosolids produced. [Minn. R. 7041.1600]
	5.15.121	Reporting Requirements. [Minn. R. 7041]
	5.15.122	The Permittee shall submit a biosolids annual report: Due annually, by the 31st of December on a form provided by or approved by the MPCA. The report shall include the requirements in Minnesota Rules, part 7041.1700. [Minn. R. 7041.1700]
	5.15.123	The permittee shall submit a Biosolids Annual Report by December 31 of each year for biosolids storage and/or transfer activities occurring during the cropping year previous to December 31. The report shall indicate whether or not biosolids were transferred and/or stored. If biosolids were transferred, the report shall describe how much was transferred, where it was transferred to, the name of the facility that accepted the transfer and the contact person at that facility. "Cropping year" means a year beginning on September 1 of the year prior to the growing season and ending August 31 the year the crop is harvested. For example, the 2012 cropping year began September 1, 2011, and ended August 31, 2012. [Minn. R. 7041]
	5.15.124	For biosolids that are stored for more than two years, the Biosolids Annual Report shall also include the analytical data from the representative sample of the biosolids generated during the cropping year. [Minn. R. 7041]
	5.15.125	The Permittee shall submit the Biosolids Annual Report to: MPCA Submittals Center, Minnesota Pollution Control Agency, 520 Lafayette Road North, St Paul Minnesota 55155-4194. [Minn. R. 7041]
	5.15.126	The Permittee shall notify the MPCA in writing when 90 percent or more of any of the cumulative pollutant loading rates listed for any Land Application Sites has been reached for a site. [Minn. R. 7041]
		Industrial Stormwater Sector T: Treatment Works

	5.16.127	Authorization. [Minn. R. 7001]
	5.16.128	This chapter authorizes the Permittee to discharge stormwater associated with industrial activity from domestic treatment works in accordance with the terms and conditions of this chapter. [Minn. R. 7090]
	5.16.129	This permit, unless specifically authorized by another chapter, does not authorize the discharge of sewage, wash water, scrubber water, floor drains from process areas, spills, oils, hazardous substances, or equipment/vehicle cleaning and maintenance wastewaters to ditches, wetlands, or other surface waters of the state. [Minn. R. 7090]
	5.16.130	Water Quality Standards. [Minn. R. 7001]
	5.16.131	The Permittee shall operate and maintain the facility and shall control runoff, including stormwater, from the facility to prevent the exceedance of water quality standards specified in Minn. R. chs. 7050 and 7060. [Minn. R. 7090]
	5.16.132	The Permittee shall limit and control the use of materials at the facility that may cause exceedances of ground water standards specified in Minn. R. ch. 7060. These materials include, but are not limited to, detergents and cleaning agents, solvents, chemical dust suppressants, lubricants, fuels, drilling fluids, oils, fertilizers, explosives and blasting agents. [Minn. R. 7090]
	5.16.133	Stormwater Pollution Prevention Plan. [Minn. R. 7001]
	5.16.134	The Permittee shall develop and implement a Stormwater Pollution Prevention Plan (SWPPP) to address the specific conditions at the facility. The goal of the SWPPP is to eliminate or minimize contact of stormwater with significant materials that may result in pollution of the runoff. If contact cannot be eliminated or reduced, stormwater that has contacted significant material should be treated before it is discharged from the site. Guidance for preparing the SWPPP can be found on the web at: http://www.pca.state.mn.us/r4ard68. [Minn. R. 7090]
	5.16.135	At a minimum, the SWPPP shall include: a. a description of appropriate Best Management Practices (BMPs) (including structural and non-structural) for protection of surface and groundwater quality at the facility and a schedule for implementing the practices; b. a drainage map for the entire facility; c. an inventory of exposed significant materials; d. an evaluation of the facility areas with exposure of significant materials to stormwater; e. an evaluation of all discharge conveyances from the site; a preventative maintenance program; f. a spill prevention and response procedure; and g. procedures to be followed by designated staff employed by the Permittee to implement the SWPPP. [Minn. R. 7090]
	5.16.136	In addition, the SWPPP shall include the following: a. Facility Map. Identify where any of the following may be exposed to stormwater: handling, storage or disposal areas for screenings and other solids, sludge drying beds, dried sludge piles, compost piles, septage or hauled waste receiving stations, and storage areas for process chemicals, petroleum products, solvents, fertilizers, herbicides, and pesticides. b. Potential Pollutant Sources. Describe the following additional sources that have potential pollutants associated with them: grit, screenings, and other solids handling, sludge drying beds, dried sludge piles, compost piles, septage or hauled waste receiving stations, and access roads and rail lines. [Minn. R. 7090]
	5.16.137	The SWPPP shall be developed and implemented within 180 days after permit issuance and shall be available for inspection. [Minn. R. 7090]
	5.16.138	Employee Training Program. [Minn. R. 7001]
	5.16.139	The Permittee shall develop and implement an employee training program to inform appropriate personnel of the components and goals of the SWPPP. At a minimum, training shall address:

		a. spill/leak prevention and response; b. good housekeeping; c. petroleum product management; d. process chemical management; e. fueling procedures; f. proper procedures for using fertilizer, herbicides, and pesticides; g. erosion and sedimentation controls; h. inspections; i. preventative maintenance; j. runoff management; and k. materials management practices. The SWPPP shall identify periodic dates for such training as well as personnel responsible for managing and implementing the SWPPP and those responsible for the reporting requirements of this permit. This shall include the facility contact person as indicated on the permit application. Identified personnel shall be available at reasonable times of operation. Guidance regarding employee training programs is available on the web at: http://www.pca.state.mn.us/r4ard68. [Minn. R. 7090]
	5.16.140	Inspection and Maintenance. [Minn. R. 7001]
	5.16.141	The Permittee shall develop and implement an inspection schedule that includes a minimum of one facility inspection per calendar month. A minimum of one inspection per calendar year shall be conducted during a runoff event. Inspections shall be conducted by appropriately trained personnel at the facility. The purpose of inspections is to: 1. determine whether structural and non-structural BMPs require maintenance or changes, and 2. evaluate the completeness and accuracy of the SWPPP. Inspection results and documentation shall remain on-site whenever Permittee staff are on the site and shall be available upon request. The inspection form is located on the MPCA's website at: http://www.pca.state.mn.us/r4ard68. [Minn. R. 7090]
	5.16.142	Inspections shall be documented. Documentation shall include the following information: a. inspection date and time; b. weather conditions; c. inspector name; d. findings; and e. a description of any necessary corrective actions and a schedule for corrective action completion. A copy of all inspection documentation shall be stored with the SWPPP. [Minn. R. 7090]
	5.16.143	In addition to the inspection requirements listed above, the following areas (including, but not limited to) shall be inspected: a. access roads and rail lines; b. grit, screenings and other solids handling; c. sludge drying beds; d. dried sludge piles; e. compost piles; and f. septage or hauled waste receiving stations. [Minn. R. 7090]
	5.16.144	If conditions are observed at the site that require changes in the SWPPP, such changes shall be made to the SWPPP prior to submission of the annual report for that calendar year. [Minn. R. 7090]
	5.16.145	If the findings of a site inspection indicate that BMPs are not meeting the objectives as identified

		above, corrective actions shall be initiated within thirty days and the BMP restored to full operation as soon as conditions allow. [Minn. R. 7090]
	5.16.146	Sedimentation Basin Design and Construction. [Minn. R. 7001]
	5.16.147	The Permittee is authorized to use designed infiltration devices or industrial stormwater ponds/sedimentation basins for stormwater management. Stormwater ponds/sedimentation basins shall be designed by a registered professional engineer and installed under the direct supervision of a registered professional engineer. If a new stormwater pond/sedimentation basin will be constructed, the Permittee shall follow the guidance located on the website at: http://www.pca.state.mn.us/r4ard68. [Minn. R. 7090]
	5.16.148	Benchmark Monitoring Requirements. [Minn. R. 7001]
	5.16.149	The Permittee shall comply with the benchmark monitoring procedures and sample collection methods in accordance with the Benchmark Monitoring Fact Sheet on the following website: http://www.pca.state.mn.us/r4ard68. For the purposes of this permit, Benchmark Monitoring is reflected as intervention limits in the Limits and Monitoring section of this permit. Benchmark Monitoring results shall comply with intervention limits as required. [Minn. R. 7090]
	5.16.150	The Permittee shall complete Benchmark Monitoring for the parameters and at the frequency identified in the limits and monitoring requirements specified for the Surface Discharge Stormwater, Non-Specific Runoff Station. Specified parameters shall be sampled on a calendar quarter basis beginning the first full calendar quarter following permit issuance. Each quarterly sample may be collected at any time during the calendar quarter. Quarterly sample results shall be averaged annually and the annual quarterly average shall be reported on the December electronic Discharge Monitoring Report (eDMR). [Minn. R. 7090]
	5.16.151	The Permittee shall complete Benchmark Monitoring for the parameters and at the frequency identified in the limits and monitoring requirements specified for the Surface Discharge Stormwater, Non-Specific Runoff Station. Specified parameters shall be sampled on an annual basis. Each annual sample may be collected at any time during the calendar year, and the calendar year average shall be reported on the December electronic Discharge Monitoring Report (eDMR). [Minn. R. 7090]
	5.16.152	An exceedance of a benchmark monitoring intervention limit does not constitute a violation under this permit. However, the Permittee is required to perform any necessary corrective action(s) to address stormwater control measures, including the maintenance or implementation of BMPs, when an exceedance of an applicable benchmark value occurs. Failure to respond to any benchmark intervention limit exceedance is a violation of the permit. [Minn. R. 7090]
	5.16.153	If benchmark monitoring intervention limits are exceeded, the Permittee shall modify the SWPPP, document all corrective actions, and implement necessary non-structural BMPs within 60 days after discovery and structural BMPs within 180 days after discovery of the exceedance. [Minn. R. 7090]
	5.16.154	Reporting. [Minn. R. 7001]
	5.16.155	The Permittee shall submit a stormwater annual report: Due by February 28 of each year following permit issuance. [Minn. R. 7090]
	5.16.156	A copy of the Stormwater Annual Report Form is located on the MPCA's website at: http://www.pca.state.mn.us/r4ard68. [Minn. R. 7090]
	5.16.157	The Permittee shall, upon request of the Agency, submit within a reasonable time the information and reports that are relevant to compliance with this Chapter, including the Plan, inspection reports, annual reports, original laboratory sheets from analyses conducted on the waste stream, and BMP plans and specifications. [Minn. R. 7090]
	5.16.158	Records. [Minn. R. 7001]
	5.16.159	The SWPPP shall be retained for the duration of the permit. A copy of the SWPPP shall remain on the permitted site whenever Permittee staff is on the site and be available upon request. The Permittee shall maintain the following records for the period of permit coverage: a. dates and findings of inspections;

		b. completed corrective actions; c. documentation of all changes to the SWPPP; and d. a copy of all annual reports. [Minn. R. 7090]
	5.16.160	Notification. [Minn. R. 7001]
	5.16.161	If the Permittee discharges stormwater into a regulated Municipal Separate Storm Sewer System (MS4), the Permittee shall notify the operator of the first MS4 of the existence of this permit within 30 days of its issuance. [Minn. R. 7090]
	5.16.162	No Exposure. [Minn. R. 7001]
	5.16.163	If the Permittee meets the eligibility criteria for No Exposure and is eligible for the conditional exclusion for No Exposure, as regulated by 40 CFR 122.26(b) (14) (i) through (ix) and (xi), it may submit: a. a No Exposure certification to the MPCA in accordance with Minn. R. 7090.3060; and b. a permit application for a modification of the NPDES/SDS Permit. [Minn. R. 7090]
	5.16.164	Definitions. [Minn. R. 7001]
	5.16.165	"Best Management Practices" or "BMPs" means practices to prevent or reduce the pollution of waters of the state, including schedules of activities, prohibitions of practices, other management practices, and also includes treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge, waste disposal or drainage from raw material storage. [Minn. R. 7090]
	5.16.166	"No Exposure" means all industrial materials and activities are protected by a storm resistant shelter to prevent exposure to rain, snow, snow melt, and/or runoff. Industrial activities or materials include, but are not limited to, material handling equipment or activities, industrial machinery, raw materials, intermediate products, by-products, final products, or waste products. [Minn. R. 7090]
	5.16.167	"Non-Stormwater Discharge" means any discharge not comprised entirely of stormwater discharges authorized by a NPDES permit. [Minn. R. 7090]
	5.16.168	"Runoff" means any liquid that drains over land from any part of a facility. [Minn. R. 7090]
	5.16.169	"Benchmark Monitoring Location" means the location(s) within the boundary of the facility where the Permittee will collect stormwater samples for the purpose of compliance with the benchmark monitoring requirements of this permit. The benchmark monitoring location(s) shall be in a location that: a. is below the most down-gradient BMP from the source of the industrial activity or significant materials, but prior to discharging from the Permittee's operational control; b. minimizes or eliminates sampling of stormwater from off-site sources (run-on); and c. yields a sample that best represents the contribution of pollutants the Permittee is required to monitor for in accordance with the Benchmark Monitoring Requirements section of this permit, and that receives drainage from an area of industrial activities, processes, and significant materials exposed to stormwater. [Minn. R. 7090]
		Total Residual Oxidants
	5.17.170	General Requirements. [Minn. R. 7001]
	5.17.171	"Daily Maximum" for Total Residual Chlorine (TRC) concentration limits means: A. The value of a single sample in a 24-hour period if the concentration of TRC in that sample is 0.038 mg/L or less; B. If the concentration of TRC in the first sample is greater than 0.038 mg/L reporting the average of two to twelve samples analyzed in a 24-hour period is allowed. The second sample shall be taken two hours after the first sample and subsequent samples are to be taken at one-hour intervals thereafter, not to exceed a total of twelve samples in a 24-hour period. Values below the Reporting Limit for TRC are assumed to be zero for averaging purposes only and; C. The average value of multiple daily TRC effluent sample analyses shall meet the 0.038 mg/L limit to be in compliance. [State Definitions]

	5.17.172	Total Residual Chlorine shall be analyzed immediately. This means within 15 minutes or less of sample collection. [Minn. R. 7001]
	5.17.173	A Reporting Limit shall be established for this parameter. This must be based on the analysis of a standard at or below the Reporting Limit. A Reporting Limit of 0.1 mg/L is considered in compliance with the 0.038 mg/L limit. [Minn. R. 7001]
	5.17.174	Monitoring results below the Reporting Limit should be reported as "< " the Reporting Limit. For example, if the Reporting Limit is 0.01 mg/L based on the analysis of a standard at or below the level, and a parameter is not detected at a value of 0.01 mg/L or greater, the concentration shall be reported as "< 0.01 mg/L." The symbol "< " means "less than". [Minn. R. 7001]
	5.17.175	The Reporting Limit must be verified against a known standard at least monthly during monitoring periods. For successful verification, the standard needs to be recovered at +40% of the actual value. [Minn. R. 7001]
		Total Facility Requirements (NPDES/SDS)
	5.18.176	Definitions. Refer to the 'Permit User's Manual' found on the MPCA website (www.pca.state.mn.us) for standard definitions. [Minn. R. 7001.]
	5.18.177	Incorporation by Reference. The following applicable federal and state laws are incorporated by reference in this permit, are applicable to the Permittee, and are enforceable parts of this permit: 40 CFR pts. 122.41, 122.42, 136, 403 and 503; Minn. R. pts. 7001, 7041, 7045, 7050, 7052, 7053, 7060, and 7080; and Minn. Stat. ch. 115 and 116. [Minn. R. 7001]
	5.18.178	Permittee Responsibility. The Permittee shall perform the actions or conduct the activity authorized by the permit in compliance with the conditions of the permit and, if required, in accordance with the plans and specifications approved by the Agency. [Minn. R. 7001.0150, subp. 3(E)]
	5.18.179	Toxic Discharges Prohibited. Whether or not this permit includes effluent limitations for toxic pollutants, the Permittee shall not discharge a toxic pollutant except according to Code of Federal Regulations, Title 40, sections 400 to 460 and Minnesota Rules 7050, 7052, 7053 and any other applicable MPCA rules. [Minn. R. 7001.1090, subp. 1(A)]
	5.18.180	Nuisance Conditions Prohibited. The Permittee's discharge shall not cause any nuisance conditions including, but not limited to: floating solids, scum and visible oil film, acutely toxic conditions to aquatic life, or other adverse impact on the receiving water. [Minn. R. 7050.0210, subp. 2]
	5.18.181	Property Rights. This permit does not convey a property right or an exclusive privilege. [Minn. R. 7001.0150, subp. 3(C)]
	5.18.182	Liability Exemption. In issuing this permit, the state and the MPCA assume no responsibility for damage to persons, property, or the environment caused by the activities of the Permittee in the conduct of its actions, including those activities authorized, directed, or undertaken under this permit. To the extent the state and the MPCA may be liable for the activities of its employees, that liability is explicitly limited to that provided in the Tort Claims Act. [Minn. R. 7001.0150, subp. 3(O)]
	5.18.183	The MPCA's issuance of this permit does not obligate the MPCA to enforce local laws, rules, or plans beyond what is authorized by Minnesota Statutes. [Minn. R. 7001.0150, subp. 3(D)]
	5.18.184	Liabilities. The MPCA's issuance of this permit does not release the Permittee from any liability, penalty or duty imposed by Minnesota or federal statutes or rules or local ordinances, except the obligation to obtain the permit. [Minn. R. 7001.0150, subp. 3(A)]
	5.18.185	The issuance of this permit does not prevent the future adoption by the MPCA of pollution control rules, standards, or orders more stringent than those now in existence and does not prevent the enforcement of these rules, standards, or orders against the Permittee. [Minn. R. 7001.0150, subp. 3(B)]
	5.18.186	Severability. The provisions of this permit are severable and, if any provisions of this permit or the application of any provision of this permit to any circumstance are held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby. [Minn. R. 7001]
	5.18.187	Compliance with Other Rules and Statutes. The Permittee shall comply with all applicable air quality, solid waste, and hazardous waste statutes and rules in the operation and maintenance of the facility. [Minn. R. 7001]

	5.18.188	Inspection and Entry. When authorized by Minn. Stat. ch. 115.04; 115B.17, subd. 4; and 116.091, and upon presentation of proper credentials, the agency, or an authorized employee or agent of the agency, shall be allowed by the Permittee to enter at reasonable times upon the property of the Permittee to examine and copy books, papers, records, or memoranda pertaining to the construction, modification, or operation of the facility covered by the permit or pertaining to the activity covered by the permit; and to conduct surveys and investigations, including sampling or monitoring, pertaining to the construction, modification, or operation of the facility covered by the permit or pertaining to the activity covered by the permit. [Minn. R. 7001.0150, subp. 3(I)]
	5.18.189	Control Users. The Permittee shall regulate the users of its wastewater treatment facility so as to prevent the introduction of pollutants or materials that may result in the inhibition or disruption of the conveyance system, treatment facility or processes, or disposal system that would contribute to the violation of the conditions of this permit or any federal, state or local law or regulation. [Minn. R. 7001.0150, subp. 3(F)]
	5.18.190	Sampling. [Minn. R. 7001]
	5.18.191	Representative Sampling. Samples and measurements required by this permit shall be conducted as specified in this permit and shall be representative of the discharge or monitored activity. [40 CFR 122.41(j)(1)]
	5.18.192	Additional Sampling. If the Permittee monitors more frequently than required, the results and the frequency of monitoring shall be reported on the Discharge Monitoring Report (DMR) or another MPCA-approved form for that reporting period. [Minn. R. 7001.1090, subp. 1(E)]
	5.18.193	Certified Laboratory. A laboratory certified by the Minnesota Department of Health and/or registered by the MPCA shall conduct analyses required by this permit. Analyses of dissolved oxygen, pH, temperature, specific conductance, and total residual oxidants (chlorine, bromine) do not need to be completed by a certified laboratory but shall comply with manufacturers specifications for equipment calibration and use. [Minn. R. 4740.2010, Minn. R. 4740.2050 through 2120]
	5.18.194	Sample Preservation and Procedure. Sample preservation and test procedures for the analysis of pollutants shall conform to 40 CFR Part 136 and Minn. R. 7041.3200. [40 CFR 136, Minn. R. 7041.3200]
	5.18.195	Equipment Calibration: Flow meters, pumps, flumes, lift stations or other flow monitoring equipment used for purposes of determining compliance with permit shall be checked and/or calibrated for accuracy at least twice annually. [Minn. R. 7001.0150, 2(B and C)]
	5.18.196	Maintain Records. The Permittee shall keep the records required by this permit for at least three years, including any calculations, original recordings from automatic monitoring instruments, and laboratory sheets. The Permittee shall extend these record retention periods upon request of the MPCA. The Permittee shall maintain records for each sample and measurement. The records shall include the following information: a. the exact place, date, and time of the sample or measurement; b. the date of analysis; c. the name of the person who performed the sample collection, measurement, analysis, or calculation; d. the analytical techniques, procedures and methods used; and e. the results of the analysis. [Minn. R. 7001.0150, 2(C)]
	5.18.197	Completing Reports. The Permittee shall submit the results of the required sampling and monitoring activities on the forms provided, specified, or approved by the MPCA. The information shall be recorded in the specified areas on those forms and in the units specified. Required forms may include DMR Supplemental/Sample Value Form Individual values for each sample and measurement shall be recorded on the DMR Supplemental/Sample Value Form which, if required, will be provided by the MPCA. DMR Supplemental/Sample Value Forms shall be submitted with the appropriate DMRs. You may design and use your own supplemental form; however it shall be approved by the MPCA. Note: Required summary information shall also be recorded on the DMR. Summary information that is submitted ONLY on the DMR Supplemental/Sample Value Form does not comply with the reporting requirements. [Minn. R. 7001.1090, 1(D), Minn. R. 7001.150, 2(B)]

	5.18.198	Submitting Reports. DMRs, DMR supplemental forms and related attachments must be electronically submitted via MPCA e-Services after authorization is approved. DMRs and DMR Supplemental Forms shall be electronically submitted by the 21st day of the month following the sampling period or otherwise as specified in this permit. Electronic DMR submittal shall be complete on or before 11:59 PM of the 21st day of the month following the sampling period or as otherwise specified in this permit. A DMR shall be submitted for each required station even if no discharge occurred during the reporting period. Other reports required by this permit shall be postmarked by the date specified in the permit to: MPCA, Attn: WQ Submittals Center, 520 Lafayette Road North, St Paul Minnesota 55155-4194. [Minn. R. 7001.0150, 2(B), Minn. R. 7001.0150, 3(H)]
	5.18.199	Incomplete or Incorrect Reports. The Permittee shall immediately submit an electronically amended report or DMR to the MPCA upon discovery by the Permittee or notification by the MPCA that it has submitted an incomplete or incorrect report or DMR. The amended report or DMR shall contain the missing or corrected data along with a cover letter explaining the circumstances of the incomplete or incorrect report. If it is impossible to electronically amend the report or DMR, the Permittee shall immediately notify the MPCA and the MPCA will provide direction for the amendment submittals. [Minn. R. 7001.0150, 3(G)]
	5.18.200	Required Signatures. All DMRs, forms, reports, and other documents submitted to the MPCA shall be signed by the Permittee or the duly authorized representative of the Permittee. Minn. R. 7001.0150, subp. 2, item D. The person or persons that sign the DMRs, forms, reports or other documents shall certify that he or she understands and complies with the certification requirements of Minn. R. 7001.0070 and 7001.0540, including the penalties for submitting false information. Technical documents, such as design drawings and specifications and engineering studies required to be submitted as part of a permit application or by permit conditions, shall be certified by a registered professional engineer. [Minn. R. 7001.0540]
	5.18.201	Detection Level. The Permittee shall report monitoring results below the reporting limit (RL) of a particular instrument as "<" the value of the RL. For example, if an instrument has a RL of 0.1 mg/L and a parameter is not detected at a value of 0.1 mg/L or greater, the concentration shall be reported as "<0.1 mg/L." "Non-detected," "undetected," "below detection limit," and "zero" are unacceptable reporting results, and are permit reporting violations. Where sample values are less than the level of detection and the permit requires reporting of an average, the Permittee shall calculate the average as follows: a. If one or more values are greater than the level of detection, substitute zero for all nondetectable values to use in the average calculation. b. If all values are below the level of detection, report the averages as "<" the corresponding level of detection. c. Where one or more sample values are less than the level of detection, and the permit requires reporting of a mass, usually expressed as kg/day, the Permittee shall substitute zero for all nondetectable values. [Minn. R. 7001.0150, 2(B)]
	5.18.202	Records. The Permittee shall, when requested by the Agency, submit within a reasonable time the information and reports that are relevant to the control of pollution regarding the construction, modification, or operation of the facility covered by the permit or regarding the conduct of the activity covered by the permit. [Minn. R. 7001.0150, 3(H)]
	5.18.203	Confidential Information. Except for data determined to be confidential according to Minn. Stat. ch. 116.075, subd. 2, all reports required by this permit shall be available for public inspection. Effluent data shall not be considered confidential. To request the Agency maintain data as confidential, the Permittee shall follow Minn. R. 7000.1300. [Minn. R. 7000.1300]
	5.18.204	Noncompliance and Enforcement. [Minn. R. 7001]
	5.18.205	Subject to Enforcement Action and Penalties. Noncompliance with a term or condition of this permit

		subjects the Permittee to penalties provided by federal and state law set forth in section 309 of the Clean Water Act; United States Code, title 33, section 1319, as amended; and in Minn. Stat. ch. 115.071 and 116.072, including monetary penalties, imprisonment, or both. [Minn. R. 7001.1090, 1(B)]
	5.18.206	Criminal Activity. The Permittee may not knowingly make a false statement, representation, or certification in a record or other document submitted to the Agency. A person who falsifies a report or document submitted to the Agency, or tampers with, or knowingly renders inaccurate a monitoring device or method required to be maintained under this permit is subject to criminal and civil penalties provided by federal and state law. [Minn. R. 7001.0150, 3(G), Minn. R. 7001.1090, 1(G and H), Minn. Stat. ch. 609.671, 1]
	5.18.207	Noncompliance Defense. It shall not be a defense for the 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. [40 CFR 122.41(c)]
	5.18.208	Effluent Violations. If sampling by the Permittee indicates a violation of any discharge limitation specified in this permit, the Permittee shall immediately make every effort to verify the violation by collecting additional samples, if appropriate, investigate the cause of the violation, and take action to prevent future violations. If the permittee discovers that noncompliance with a condition of the permit has occurred which could endanger human health, public drinking water supplies, or the environment, the Permittee shall within 24 hours of the discovery of the noncompliance, orally notify the commissioner and submit a written description of the noncompliance within 5 days of the discovery. The written description shall include items a. through e., as listed below. If the Permittee discovers other non-compliance that does not explicitly endanger human health, public drinking water supplies, or the environment, the non-compliance shall be reported during the next reporting period to the MPCA with its Discharge Monitoring Report (DMR). If no DMR is required within 30 days, the Permittee shall submit a written report within 30 days of the discovery of the noncompliance. This description shall include the following information: a. a description of the event including volume, duration, monitoring results and receiving waters; b. the cause of the event; c. the steps taken to reduce, eliminate and prevent reoccurrence of the event; d. the exact dates and times of the event; and e. steps taken to reduce any adverse impact resulting from the event. [Minn. R. 7001.150, 3(K)]
	5.18.209	Upset Defense. In the event of temporary noncompliance by the Permittee with an applicable effluent limitation resulting from an upset at the Permittee's facility due to factors beyond the control of the Permittee, the Permittee has an affirmative defense to an enforcement action brought by the Agency as a result of the noncompliance if the Permittee demonstrates by a preponderance of competent evidence: a. the specific cause of the upset; b. that the upset was unintentional; c. that the upset resulted from factors beyond the reasonable control of the Permittee and did not result from operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventative maintenance, or increases in production which are beyond the design capability of the treatment facilities; d. that at the time of the upset the facility was being properly operated; e. that the Permittee properly notified the Commissioner of the upset in accordance with Minn. R. 7001.1090, subp. 1, item I; and f. that the Permittee implemented the remedial measures required by Minn. R. 7001.0150, subp. 3, item J. [Minn. R. 7001.1090]
	5.18.210	Release. [Minn. R. 7001]
	5.18.211	Unauthorized Releases of Wastewater Prohibited. Except for discharges from outfalls specifically authorized by this permit, overflows, discharges, spills, or other releases of wastewater or materials to the environment, whether intentional or not, are prohibited. However, the MPCA will consider the

		Permittee's compliance with permit requirements, frequency of release, quantity, type, location, and other relevant factors when determining appropriate action. [40 CFR 122.41, Minn. Stat. ch. 115.061]
	5.18.212	Discovery of a release. Upon discovery of a release, the Permittee shall: a. Take all reasonable steps to immediately end the release. b. Notify the Minnesota Department of Public Safety Duty Officer at 800-422-0798 or 651-649-5451 (metro area) immediately upon discovery of the release. You may contact the MPCA during business hours at 800-657-3864 or 651-296-6300 (metro area). c. Recover as rapidly and as thoroughly as possible all substances and materials released or immediately take other action as may be reasonably possible to minimize or abate pollution to waters of the state or potential impacts to human health caused thereby. If the released materials or substances cannot be immediately or completely recovered, the Permittee shall contact the MPCA. If directed by the MPCA, the Permittee shall consult with other local, state or federal agencies (such as the Minnesota Department of Natural Resources and/or the Wetland Conservation Act authority) for implementation of additional clean-up or remediation activities in wetland or other sensitive areas. [Minn. R. 7001.1090]
	5.18.213	Sampling of a release. Upon discovery of a release, the Permittee shall: a. Collect representative samples of the release. The Permittee shall sample the release for parameters of concern immediately following discovery of the release. The Permittee may contact the MPCA during business hours to discuss the sampling parameters and protocol. In addition, Fecal Coliform Bacteria samples shall be collected where it is determined by the Permittee that the release contains or may contain sewage. If the release cannot be immediately stopped, the Permittee shall consult with MPCA regarding additional sampling requirements. Samples shall be collected at least, but not limited to, two times per week for as long as the release continues. b. Submit the sampling results on the Release Sampling Form (http://www.pca.state.mn.us/index.php/view-document.html?gid=18867). The Release Sampling Form shall be submitted to the MPCA with the next DMR or within 30 days whichever is sooner. [Minn. R. 7001.1090]
	5.18.214	Bypass. [Minn. R. 7001]
	5.18.215	Anticipated bypass. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if the bypass is for essential maintenance to assure efficient operation of the facility. The permittee shall submit prior notice, if possible at least ten days before the date of the bypass to the MPCA. The notice of the need for an anticipated bypass shall include the following information: a. the proposed date and estimated duration of the bypass; b. the alternatives to bypassing; and c. a proposal for effluent sampling during the bypass. Any bypass wastewater shall enter waters of the state from outfalls specifically authorized by this permit. Therefore, samples shall be collected at the frequency and location identified in this permit or two times per week for as long as the bypass continues, whichever is more frequent. [40 CFR 122.41(m)(2 and 3), Minn. R. 7001.1090, 1(J)]
	5.18.216	All other bypasses are prohibited. The MPCA may take enforcement action against the Permittee for a bypass, unless the specific conditions described in Minn. R. Ch. 7001.1090 subp. 1, K and 122.41(m)(4) (i) are met. In the event of an unanticipated bypass, the permittee shall: a. Take all reasonable steps to immediately end the bypass. b. Notify the Minnesota Department of Public Safety Duty Officer at 800-422-0798 or 651-649-5451 (metro area) immediately upon commencement of the bypass. You may contact the MPCA during business hours at 800-657-3864 or 651-296-6300 (metro area).

		c. Immediately take action as may be reasonably possible to minimize or abate pollution to waters of the state or potential impacts to human health caused thereby. If directed by the MPCA, the Permittee shall consult with other local, state or federal agencies for implementation of abatement, clean-up, or remediation activities. d. Only allow bypass wastewater as specified in this section to enter waters of the state from outfalls specifically authorized by this permit. Samples shall be collected at the frequency and location identified in this permit or two times per week for as long as the bypass continues, whichever is more frequent. The permittee shall also follow the reporting requirements for effluent violations as specified in this permit. [40 CFR 122.41(m) (4) (i), Minn. R. 7001.1090, 1(K), Minn. Stat. ch. 115.061]
	5.18.217	Operation and Maintenance. [Minn. R. 7001]
	5.18.218	The Permittee shall at all times properly operate and maintain the facilities and systems of treatment and control, and the appurtenances related to them which are installed or used by the Permittee to achieve compliance with the conditions of the permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. The Permittee shall install and maintain appropriate backup or auxiliary facilities if they are necessary to achieve compliance with the conditions of the permit and, for all permits other than hazardous waste facility permits, if these backup or auxiliary facilities are technically and economically feasible Minn. R. 7001.0150. subp. 3, item F. [Minn. R. 7001.0150, 3(F)]
	5.18.219	In the event of a reduction or loss of effective treatment of wastewater at the facility, the Permittee shall control production or curtail its discharges to the extent necessary to maintain compliance with the terms and conditions of this permit. The Permittee shall continue this control or curtailment until the wastewater treatment facility has been restored or until an alternative method of treatment is provided. [Minn. R. 7001.1090, 1(C)]
	5.18.220	Solids Management. The Permittee shall properly store, transport, and dispose of biosolids, septage, sediments, residual solids, filter backwash, screenings, oil, grease, and other substances so that pollutants do not enter surface waters or ground waters of the state. Solids should be disposed of in accordance with local, state and federal requirements. [40 CFR 503, Minn. R. 7041]
	5.18.221	Scheduled Maintenance. The Permittee shall schedule maintenance of the treatment works during non-critical water quality periods to prevent degradation of water quality, except where emergency maintenance is required to prevent a condition that would be detrimental to water quality or human health. [Minn. R. 7001.0150, 3(F), Minn. R. 7001.150, 2(B)]
	5.18.222	Control Tests. In-plant control tests shall be conducted at a frequency adequate to ensure compliance with the conditions of this permit. [Minn. R. 7001.0150, 3(F), Minn. R. 7001.150, 2(B)]
	5.18.223	Changes to the Facility or Permit. [Minn. R. 7001]
	5.18.224	Permit Modifications. Except as provided under Minnesota Statutes, section 115.07, subdivisions 1 and 3, no person required by statute or rule to obtain a permit may construct, install, modify, or operate the facility to be permitted, nor shall a person commence an activity for which a permit is required by statute or rule until the agency has issued a written permit for the facility or activity. Permittees that propose to make a change to the facility or discharge that requires a permit modification shall follow Minn. R. 7001.0190. If the Permittee cannot determine whether a permit modification is needed, the Permittee shall contact the MPCA prior to any action. It is recommended that the application for permit modification be submitted to the MPCA at least 180 days prior to the planned change. [Minn. R. 7001.0030]
	5.18.225	Plans, specifications and MPCA approval are not necessary when maintenance dictates the need for installation of new equipment, provided the equipment is the same design size and has the same design intent. For instance, a broken pipe, lift station pump, aerator, or blower can be replaced with the same design-sized equipment without MPCA approval. If the proposed construction is not expressly authorized by this permit, it may require a permit modification. If the construction project requires an Environmental Assessment Worksheet under Minn. R. 4410, no construction shall begin until a negative declaration is issued and all approvals are

		received or implemented. [Minn. R. 7001.0030]
	5.18.226	Report Changes. The Permittee shall give advance notice as soon as possible to the MPCA of any substantial changes in operational procedures, activities that may alter the nature or frequency of the discharge, and/or material factors that may affect compliance with the conditions of this permit. [Minn. R. 7001.0150, 3(M)]
	5.18.227	Chemical Additives. The Permittee shall receive prior written approval from the MPCA before increasing the use of a chemical additive authorized by this permit, or using a chemical additive not authorized by this permit, in quantities or concentrations that have the potential to change the characteristics, nature and/or quality of the discharge. The Permittee shall request approval for an increased or new use of a chemical additive at least 60 days, or as soon as possible, before the proposed increased or new use. This written request shall include at least the following information for the proposed additive: a. The process for which the additive will be used; b. Safety Data Sheet (SDS) which shall include aquatic toxicity, human health, and environmental fate information for the proposed additive. The aquatic toxicity information shall include at minimum the results of: a) a 48-hour LC50 or EC50 acute study for a North American freshwater planktonic crustacean (either Ceriodaphnia or Daphnia sp.) and b) a 96-hour LC50 acute study for rainbow trout, bluegill or fathead minnow or another North American freshwater aquatic species other than a planktonic crustacean; c. a complete product use and instruction label; d. the commercial and chemical names and Chemical Abstract Survey (CAS) number for all ingredients in the additive (If the MSDS does not include information on chemical composition, including percentages for each ingredient totaling to 100%, the Permittee shall contact the supplier to have this information provided); and e. The proposed method of application, application frequency, concentration, and daily average and maximum rates of use. Upon review of the information submitted regarding the proposed chemical additive, the MPCA may require additional information be submitted for consideration. This permit may be modified to restrict the use or discharge of a chemical additive and include additional influent and effluent monitoring requirements. Approval for the use of an additive shall not justify the exceedance of any effluent limitation nor shall it be used as a defense against pollutant levels in the discharge causing or contributing to the violation of a water quality standard. [Minn. R. 7001.0170]
	5.18.228	MPCA Initiated Permit Modification, Suspension, or Revocation. The MPCA may modify or revoke and reissue this permit pursuant to Minn. R. 7001.0170. The MPCA may revoke without reissuance this permit pursuant to Minn. R. 7001.0180. [Minn. R. 7001.0170, Minn. R. 7001.0180]
	5.18.229	TMDL Impacts. Facilities that discharge to an impaired surface water, watershed or drainage basin may be required to comply with additional permits or permit requirements, including additional restriction or relaxation of limits and monitoring as authorized by the CWA 303(d) (4) (A) and 40 CFR 122.44.l.2.i., necessary to ensure consistency with the assumptions and requirements of any applicable US EPA approved waste load allocations resulting from Total Maximum Daily Load (TMDL) studies. [40 CFR 122.44(l) (2) (i)]
	5.18.230	Permit Transfer. The permit is not transferable to any person without the express written approval of the Agency after compliance with the requirements of Minn. R. 7001.0190. A person to whom the permit has been transferred shall comply with the conditions of the permit. [Minn. R. 7001.0150, 3(N)]
	5.18.231	Facility Closure. The Permittee is responsible for closure and post-closure care of the facility. The Permittee shall notify the MPCA of a significant reduction or cessation of the activities described in this permit at least 180 days before the reduction or cessation. The MPCA may require the Permittee to provide to the MPCA a facility Closure Plan for approval. Facility closure that could result in a potential long-term water quality concern, such as the ongoing

		discharge of wastewater to surface or ground water, may require a permit modification or reissuance. The MPCA may require the Permittee to establish and maintain financial assurance to ensure performance of certain obligations under this permit, including closure, post-closure care and remedial action at the facility. If financial assurance is required, the amount and type of financial assurance, and proposed modifications to previously MPCA-approved financial assurance, shall be approved by the MPCA. [Minn. Stat. ch. 116.07, 4]
	5.18.232	Permit Reissuance. If the Permittee desires to continue permit coverage beyond the date of permit expiration, the Permittee shall submit an application for permit reissuance: Due by 180 days prior to permit expiration. If the Permittee does not intend to continue the activities authorized by this permit after the expiration date of this permit, the Permittee shall notify the MPCA in writing at least 180 days before permit expiration. If the Permittee has submitted a timely application for permit reissuance, the Permittee may continue to conduct the activities authorized by this permit, in compliance with the requirements of this permit, until the MPCA takes final action on the application, unless the MPCA determines any of the following (Minn. R. 7001.0040 and 7001.0160): a. The Permittee is not in substantial compliance with the requirements of this permit, or with a stipulation agreement or compliance schedule designed to bring the Permittee into compliance with this permit; b. The MPCA, as a result of an action or failure to act by the Permittee, has been unable to take final action on the application on or before the expiration date of the permit; c. The Permittee has submitted an application with major deficiencies or has failed to properly supplement the application in a timely manner after being informed of deficiencies. [Minn. R. 7001.0160]
		Facility Specific Requirements
	5.19.233	Pretreatment - Removal Credits. [Minn. R. 7049]
	5.19.234	The Permittee may grant a removal credit of 88% for chromium to industries using the Bench Street Facility. These removal credits are applicable to chromium limits in national categorical pretreatment standards and shall be used to adjust the limits for industries using the Bench Street Facility. [Minn. R. 7049]
	5.19.235	Where it is necessary to apply the Combined Wastestream Formula (CWF) in conjunction with removal credits, categorical standard based limits should first be adjusted to reflect the removal credits, and then permit limits should be calculated by substituting the revised limits for the categorical standards in the CWF. [Minn. R. 7049]
	5.19.236	If removal of chromium consistent with the removal credit allowed is not achieved, or if chromium causes interference or pass through, the removal credits are subject to withdrawal or modification in accordance with Minnesota Rules 7049.0470. [Minn. R. 7049]
	5.19.237	Chromium A. This Permit recognizes a 88% removal credit for chromium, approved by MPCA on June 17, 2013, and granted exclusively to the Bench Street pretreatment facility and is subject to the following conditions being met and continuing to be met: 1. The Permittee shall demonstrate and continue to achieve consistent removal of the chromium pursuant to Minnesota Rules 7049.0400 and 7049.0410; 2. The Permittee shall maintain and enforce the approved pretreatment program; 3. The Permittee shall ensure that the sludge disposal method meets all regulatory requirements; and, 4. The Permittee shall ensure that limitations and conditions of this permit associated with the removal credit approval are not violated. B. Within six (6) months of the effective date of this Permit, the Permittee shall re-evaluate, and

		adopt, if necessary, local limits for the Bench Street pretreatment facility for chromium. C. The Permittee shall monitor chromium in the primary influent and effluent of the Bench Street pretreatment facility at least one time per month. The Permittee shall submit annual reports of the primary removal percentages calculated for each such sample and the overall removal percentage for the year for chromium calculated pursuant to Minnesota Rule 7049.0410. This report shall be submitted annually in conjunction with the MPCA Pretreatment Report following the issuance of the initial industrial discharge permit limits implementing removal credits for chromium. [Minn. R. 7049]
	5.19.238	Should the actual removal percentage for chromium drop below 88% for any given month or such discharge limit revisions pursuant to the removal credits are causing a violation of any conditions or limits contained in this NPDES permit, the Permittee shall implement corrective action to bring the removal percentage up to 88% or a level that will not cause NPDES permit violations. The Permittee shall take appropriate corrective action and notify the MPCA immediately that a removal percentage has dropped below an authorized level or such discharge limit revisions pursuant to the removal credits are causing a violation of any conditions or limits contained in this NPDES permit. The Permittee will have sixty (60) days to complete corrective action. This sixty (60) day time period may be extended by MPCA if the Permittee or the effected IU(s) demonstrate(s) that a longer time period is necessary to undertake the appropriate corrective action. Any extension of this sixty (60) day time period must be approved by MPCA in writing. If the corrective action fails to bring the removal percentage up to 88% or eliminate the permit violations within the agreed upon time period, this permit may be reopened and modified pursuant to the following permit provisions. [Minn. R. 7049]
	5.19.239	Upon commencement of corrective action pursuant to the requirement above, the sampling frequency for the specific parameter shall be four times per month and the reporting frequency shall be quarterly. If the actual removal percentage for an individual parameter meets or exceeds the level for which the removal credit is granted for 6 consecutive months following corrective action, the Permittee may decrease sampling frequency for the specific parameter to monthly and the reporting frequency can be decreased to annually and submitted along with the annual pretreatment report. [Minn. R. 7049]
	5.19.240	Should the Permittee change operations at the treatment plant in a manner reasonably expected to lower the removal of chromium below 88%, the Permittee shall notify MPCA in writing within fourteen (14) days of making such operational change(s). The sampling frequency for the affected parameter(s) shall be four times per month for the first six months after the implementation of the operational change. Removal percentages for the affected parameter(s) shall be reported quarterly to MPCA during this six month time period. [Minn. R. 7049]
	5.19.241	Should corrective action fail to bring the removal percentages up to an acceptable level, this Permit may be reopened and modified to include a withdrawal or modification of the removal credit pursuant to Minn. R. 7049.0470 and the provisions above. Such action would not be done without Public Notice of the Removal Credit Modification or Withdrawal. [Minn. R. 7049]
	5.19.242	These removal credits shall be re-calculated pursuant to Minnesota Rules 7049.0410 and these re-calculations submitted with the application for NPDES permit renewal. [Minn. R. 7049]
	5.19.243	Re-Authorization Submittal Removal credits will remain in effect for the term of the POTW's NPDES permit, provided the POTW maintains compliance with the conditions specified in Minnesota Rules 7049.0470. Request for re-authorization for continuation of the removal credits shall be submitted with the permit application to the MPCA at the time of permit reissuance. [Minn. R. 7049]
	5.19.244	Drying Pad Annual Inspection. [Minn. R. 7001]
	5.19.245	The Permittee shall conduct an inspection of the drying pad annually and submit an inspection report to the MPCA by December 31st. The report shall include the following: a. Photograph(s) of the drying pad, to display pad condition. b. Visual observations of the pad condition. c. A description of the maintenance activity that has occurred in the previous year. d. A description of maintenance planned in the following year.

		The Permittee shall submit the inspection report to the following address: MPCA Attn: WQ Submittals Center 520 Lafayette Road North St. Paul, Minnesota 55155-4194. Submit a report: Due annually, by the 31st of December. [Minn. R. 7001]

6. Submittal action summary

SD006	**Effluent To Surface Water**	
		Surface Discharge: Class A Major Facility Effluent Requirements
	6.1.1	The Permittee shall submit a monthly DMR: Due by 21 days after the end of each calendar month following permit issuance. [Minn. R. 7001.0150, subp. 2(B)]
		Acute Toxicity Requirements
	6.2.2	The Permittee shall submit annual acute toxicity test battery results: Due 180 calendar days after Permit Issuance Date annually and annually thereafter. [Minn. R. 7001]
		Priority Pollutant Requirements
	6.3.3	The Permittee shall submit the first priority pollutant monitoring report: Due 1095 calendar days before Permit Expiration Date. (By two years after permit issuance date). [Minn. R. 7001]
	6.3.4	The Permittee shall submit the second priority pollutant monitoring report: Due 730 calendar days before Permit Expiration Date. (By three years after permit issuance date). [Minn. R. 7001]
	6.3.5	The Permittee shall submit the third priority pollutant monitoring report: Due 365 calendar days before Permit Expiration Date. (By four years after permit issuance date). [Minn. R. 7001]
SD007	**Stormwater, Non-specific Runoff**	
		Surface Discharge: Industrial Stormwater Section T Requirements
	6.4.1	The Permittee shall submit an annual DMR: Due by 21 days after the end of each calendar year following permit issuance. [Minn. R. 7001.0150, subp. 2(B)]
SD008	**Stormwater, Non-specific Runoff**	
		Surface Discharge: Industrial Stormwater Section T Requirements
	6.5.1	The Permittee shall submit an annual DMR: Due by 21 days after the end of each calendar year following permit issuance. [Minn. R. 7001.0150, subp. 2(B)]
WS001	**Influent Waste**	
		Waste Stream: Class A Major Facility Influent Requirements
	6.6.1	The Permittee shall submit a monthly DMR: Due by 21 days after the end of each calendar month following permit issuance. [Minn. R. 7001.0150, subp. 2(B)]
MN0024571	**Red Wing WWTP**	
		Mercury Minimization Plan
	6.7.1	The Permittee shall submit a mercury pollutant minimization plan: Due by 180 days after permit issuance. [Minn. R. 7001]
		Pretreatment: Delegated Requirements

	6.8.2	The Permittee shall submit a pretreatment annual report: Due by February 28 of each year following permit issuance. [Minn. R. 7049]
		Biosolids: Land Application
	6.9.3	The Permittee shall submit a biosolids annual report: Due annually, by the 31st of December on a form provided by or approved by the MPCA. The report shall include the requirements in Minnesota Rules, part 7041.1700. [Minn. R. 7041.1700]
		Industrial Stormwater Sector T: Treatment Works
	6.10.4	The Permittee shall submit a stormwater annual report: Due by February 28 of each year following permit issuance. [Minn. R. 7090]
		Total Facility Requirements (NPDES/SDS)
	6.11.5	Permit Reissuance. If the Permittee desires to continue permit coverage beyond the date of permit expiration, the Permittee shall submit an application for permit reissuance: Due by 180 days prior to permit expiration. If the Permittee does not intend to continue the activities authorized by this permit after the expiration date of this permit, the Permittee shall notify the MPCA in writing at least 180 days before permit expiration. If the Permittee has submitted a timely application for permit reissuance, the Permittee may continue to conduct the activities authorized by this permit, in compliance with the requirements of this permit, until the MPCA takes final action on the application, unless the MPCA determines any of the following (Minn. R. 7001.0040 and 7001.0160): a. The Permittee is not in substantial compliance with the requirements of this permit, or with a stipulation agreement or compliance schedule designed to bring the Permittee into compliance with this permit; b. The MPCA, as a result of an action or failure to act by the Permittee, has been unable to take final action on the application on or before the expiration date of the permit; c. The Permittee has submitted an application with major deficiencies or has failed to properly supplement the application in a timely manner after being informed of deficiencies. [Minn. R. 7001.0160]
		Facility Specific Requirements
	6.12.6	The Permittee shall conduct an inspection of the drying pad annually and submit an inspection report to the MPCA by December 31st. The report shall include the following: a. Photograph(s) of the drying pad, to display pad condition. b. Visual observations of the pad condition. c. A description of the maintenance activity that has occurred in the previous year. d. A description of maintenance planned in the following year. The Permittee shall submit the inspection report to the following address: MPCA Attn: WQ Submittals Center 520 Lafayette Road North St. Paul, Minnesota 55155-4194. Submit a report: Due annually, by the 31st of December. [Minn. R. 7001]

7. Limits and monitoring

		Discharge limitations							Monitoring requirements			
Subject item	**Parameter**	**Quantity /Loading avg.**	**Quantity /Loading max.**	**Quantity /Loading units**	**Quality /Conc. min.**	**Quality /Conc. avg.**	**Quality /Conc. max.**	**Quality/ Conc. units**	**Frequency**	**Sample type**	**Effective period**	**Notes**
SD006 Total Facility Discharge	BOD, Carbonaceous 05 Day (20 Deg C)	378 calendar month average	606 maximum calendar week average	kilograms per day		25 calendar month average	40 maximum calendar week average	milligrams per liter	3 times per week	24-Hour Flow Composite	Jan-Dec	
SD006 Total Facility Discharge	BOD, Carbonaceous 05 Day (20 Deg C) Percent Removal				85 minimum calendar month average			percent	once per month	Calculation	Jan-Dec	
SD006 Total Facility Discharge	Chlorine, Total Residual						0.038 daily maximum	milligrams per liter	once per day	Grab	Jan-Dec	
SD006 Total Facility Discharge	Chromium, Hexavalent (as Cr)						Monitor only. calendar month maximum	micrograms per liter	once per month	Grab	Jan, July	
SD006 Total Facility Discharge	Cyanide, Free (as CN)					Monitor only. calendar month average		micrograms per liter	once per month	24-Hour Flow Composite	Apr, Sep	
SD006 Total Facility Discharge	Fecal Coliform, MPN or Membrane Filter 44.5C					200 calendar month geometric mean		organisms per 100 milliliter	3 times per week	Grab	Apr-Oct	
SD006 Total Facility Discharge	Flow		Monitor only. calendar month total	million gallons		Monitor only. calendar month average	Monitor only. calendar month maximum	million gallons per day	once per day	Measurement, Continuous	Jan-Dec	

		Discharge limitations							Monitoring requirements			
Subject item	Parameter	Quantity /Loading avg.	Quantity /Loading max.	Quantity /Loading units	Quality /Conc. min.	Quality /Conc. avg.	Quality /Conc. max.	Quality/ Conc. units	Frequency	Sample type	Effective period	Notes
SD006 Total Facility Discharge	Mercury, Dissolved (as Hg)					Monitor only. calendar month average	Monitor only. daily maximum	nanograms per liter	twice per month	Grab	Jan, Mar, May, Jul, Sep, Nov	
SD006 Total Facility Discharge	Mercury, Total (as Hg)					8.9 calendar month average	14.8 daily maximum	nanograms per liter	twice per month	Grab	Jan, Mar, May, Jul, Sep, Nov	
SD006 Total Facility Discharge	Nitrite Plus Nitrate, Total (as N)					Monitor only. calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Jan-Dec	
SD006 Total Facility Discharge	Nitrogen, Ammonia, Total (as N)					Monitor only. calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Jan-Dec	
SD006 Total Facility Discharge	Nitrogen, Kjeldahl, Total					Monitor only. calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Jan-Dec	
SD006 Total Facility Discharge	Nitrogen, Total (as N)					Monitor only. calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Jan-Dec	
SD006 Total Facility Discharge	Oxygen, Dissolved				Monitor only. calendar month minimum			milligrams per liter	once per day	Grab	Jan-Dec	
SD006 Total Facility Discharge	pH				6.0 calendar month minimum		9.0 calendar month maximum	standard units	once per day	Grab	Jan-Dec	
SD006 Total Facility Discharge	Phosphorus, Total (as P)	Monitor only. calendar month average		kilograms per day		1.0 calendar month average		milligrams per liter	3 times per week	24-Hour Flow Composite	Jan-Dec	

		Discharge limitations							Monitoring requirements			
Subject item	**Parameter**	**Quantity /Loading avg.**	**Quantity /Loading max.**	**Quantity /Loading units**	**Quality /Conc. min.**	**Quality /Conc. avg.**	**Quality /Conc. max.**	**Quality/ Conc. units**	**Frequency**	**Sample type**	**Effective period**	**Notes**
SD006 Total Facility Discharge	Phosphorus, Total (as P)		4421 12-month moving total	kilograms per year					once per month	Calculation	Jan-Dec	
SD006 Total Facility Discharge	Solids, Total Dissolved (TDS)					Monitor only. calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Mar, Sep	
SD006 Total Facility Discharge	Solids, Total Suspended (TSS)	454 calendar month average	681 maximum calendar week average	kilograms per day		30 calendar month average	45 maximum calendar week average	milligrams per liter	3 times per week	24-Hour Flow Composite	Jan-Dec	
SD006 Total Facility Discharge	Solids, Total Suspended (TSS) Percent Removal				85 minimum calendar month average			percent	once per month	Calculation	Jan-Dec	
SD006 Total Facility Discharge	Solids, Total Suspended (TSS), grab (Mercury)					Monitor only. calendar month average	Monitor only. daily maximum	milligrams per liter	twice per month	Grab	Jan, Mar, May, Jul, Sep, Nov	
SD007 Stormwater Discharge	BOD, Carbonaceous 05 Day (20 Deg C)					Monitor only. calendar year average intervention		milligrams per liter	once per year	Grab	Jan-Dec	The intervention limit is 25 mg/L. If this limit is exceeded, the Permittee must take action as described in the stormwater section of this permit.
SD007 Stormwater Discharge	Solids, Total Suspended (TSS)					Monitor only. calendar year average intervention		milligrams per liter	once per year	Grab	Jan-Dec	The intervention limit is 100 mg/L. If this limit is exceeded, the Permittee must take action as described in the stormwater section of this permit.

		Discharge limitations							Monitoring requirements			
Subject item	**Parameter**	**Quantity /Loading avg.**	**Quantity /Loading max.**	**Quantity /Loading units**	**Quality /Conc. min.**	**Quality /Conc. avg.**	**Quality /Conc. max.**	**Quality/ Conc. units**	**Frequency**	**Sample type**	**Effective period**	**Notes**
SD008 Stormwater Discharge	BOD, Carbonaceous 05 Day (20 Deg C)					Monitor only. calendar year average intervention		milligrams per liter	once per year	Grab	Jan-Dec	The intervention limit is 25 mg/L. If this limit is exceeded, the Permittee must take action as described in the stormwater section of this permit.
SD008 Stormwater Discharge	Solids, Total Suspended (TSS)					Monitor only. calendar year average intervention		milligrams per liter	once per year	Grab	Jan-Dec	The intervention limit is 100 mg/L. If this limit is exceeded, the Permittee must take action as described in the stormwater section of this permit.
WS001 Influent Waste Stream	BOD, Carbonaceous 05 Day (20 Deg C)					Monitor only. calendar month average	Monitor only. calendar month maximum	milligrams per liter	3 times per week	24-Hour Flow Composite	Jan-Dec	
WS001 Influent Waste Stream	Flow		Monitor only. calendar month total	million gallons		Monitor only. calendar month average	Monitor only. calendar month maximum	million gallons per day	once per day	Measurement, Continuous	Jan-Dec	
WS001 Influent Waste Stream	Mercury, Total (as Hg)					Monitor only. calendar month average		nanograms per liter	twice per month	Grab	Jan, Mar, May, Jul, Sep, Nov	
WS001 Influent Waste Stream	Nitrite Plus Nitrate, Total (as N)					Monitor only. calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Jan-Dec	
WS001 Influent Waste Stream	Nitrogen, Kjeldahl, Total					Monitor only. calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Jan-Dec	

Subject item	Parameter	Discharge limitations							Monitoring requirements			Notes
		Quantity /Loading avg.	Quantity /Loading max.	Quantity /Loading units	Quality /Conc. min.	Quality /Conc. avg.	Quality /Conc. max.	Quality/ Conc. units	Frequency	Sample type	Effective period	
WS001 Influent Waste Stream	Nitrogen, Total (as N)					Monitor only. calendar month average		milligrams per liter	once per month	24-Hour Flow Composite	Jan-Dec	
WS001 Influent Waste Stream	pH				Monitor only. calendar month minimum		Monitor only. calendar month maximum	standard units	once per day	Grab	Jan-Dec	
WS001 Influent Waste Stream	Phosphorus, Total (as P)					Monitor only. calendar month average		milligrams per liter	once per week	24-Hour Flow Composite	Jan-Dec	
WS001 Influent Waste Stream	Precipitation		Monitor only. calendar month total	inches					once per day	Measurement	Jan-Dec	
WS001 Influent Waste Stream	Solids, Total Suspended (TSS)					Monitor only. calendar month average	Monitor only. calendar month maximum	milligrams per liter	3 times per week	24-Hour Flow Composite	Jan-Dec	

Appendix B

Figures

B-1 – Figure 1 – Proposed System Layout
B-2 – Figure 2 – Additional Site Floodplain Analysis

B-1 – Proposed System Layout

2/1/2022 9:04:54 AM

SEH

NOT FOR CONSTRUCTION

Project Owner
City of Red Wing

RED WING, MINNESOTA
WASTEWATER TREATMENT FACILITY FEASIBILITY STUDY
PROPOSED SYSTEM LAYOUT

SEH Project	RWING 165735
Checked By	JMF
Drawn By	BCW
Project Status	**Issue Date**
DRAFT	9/20/22

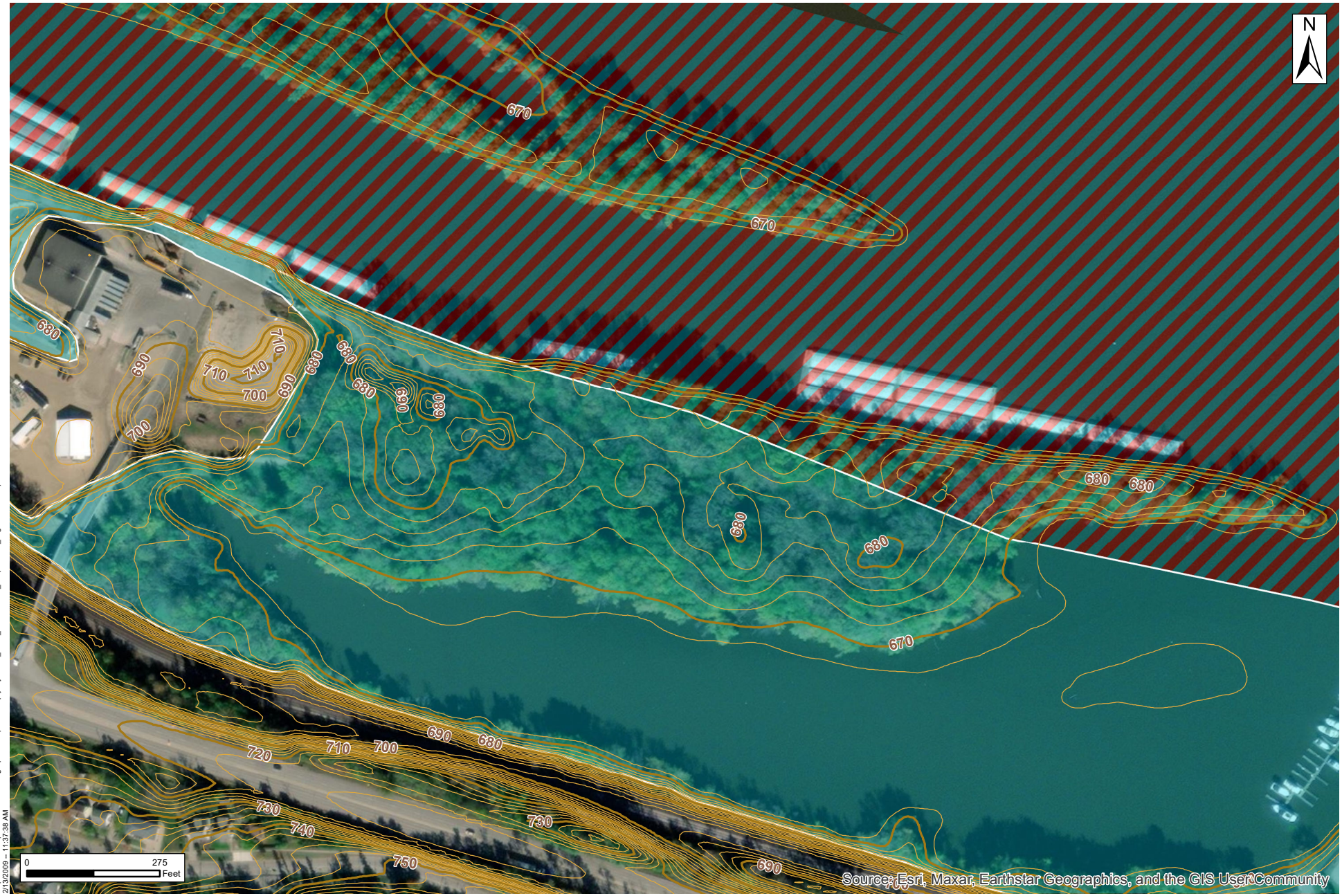
REVISION SCHEDULE

REV. #	DESCRIPTION	DATE

SITE LAYOUT

FIGURE
1

B-2 – Additional Site Floodplain Analysis



Map Document: (L:\Resources\Cartographic\Templates\EmptyLayouts\A_ANSI_8x11L\8x11L_Simple2Line_LegendBox.mxd)
2/13/2009 -- 11:37:38 AM

Project Number: RWING 165735
Print Date: 9/19/2022

Map by: LO
Projection: Goodhue County
Source: Esri, FEMA, MnTOPO

Red Wing WWTF Feasibility Study
Red Wing, MN

Contour Type	Zone Type
Index	100-Year Flood
Intermediate	Regulatory Floodway

Figure 2

Building a Better World for All of Us®

Sustainable buildings, sound infrastructure, safe transportation systems, clean water, renewable energy and a balanced environment. Building a Better World for All of Us communicates a company-wide commitment to act in the best interests of our clients and the world around us.

We're confident in our ability to balance these requirements.

Join Our Social Communities