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February 21, 2018

# Wastewater Treatment Facility Plan

## City of Watertown, Minnesota

Project Number T21.115288

**Submitted by:**

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# Certification

Wastewater Treatment Facility Plan

for

Watertown Wastewater Treatment Facility  
NPDES MN0020940  
Watertown, Minnesota  
M21.107040

**DRAFT**

I hereby certify that this plan, specification or 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.

By: \_\_\_\_\_  
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License No. 54607

Date: \_\_\_\_\_

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## I. EXECUTIVE SUMMARY

The City of Watertown owns and operates a mechanical treatment facility serving its commercial and residential users. The treatment facility's last major capital project was in 1993 when a stabilization pond system was converted to an activated sludge treatment facility with effluent filtration and chlorine disinfection. Much of the equipment installed in 1993 has exceeded its design life and should be replaced.

In January of 2018, the Minnesota Pollution Control Agency (MPCA) issued an Effluent Limitations Summary for Watertown's upcoming NPDES permit renewal. The new permit will include mass and concentration discharge limits for phosphorus. These limits will require construction of a nutrient removal system at the treatment facility.

Additionally, the community is projected to grow from its current 4,500 residents to an estimated 7,200 residents by 2038. This increased population will require expansion of some treatment processes.

To address these needs, it is recommended that the facility undertake a major capital improvement project to expand and refurbish its treatment processes. A summary of recommended upgrades and their associated costs is provided in Table ES1.

<b>Table ES1 – Preliminary Opinion of Costs Wastewater Treatment Facility City of Watertown, MN</b>	
<b>Upgrade Item</b>	<b>Estimated Cost</b>
Replace existing secondary clarifier mechanisms	\$350,000
Convert existing anaerobic digester to aerated storage tank	\$450,000
Provide a dedicated sludge storage tank blower	\$250,000
Construct biosolids storage and loadout facility	\$1,000,000
RAS/WAS pumping improvements	\$550,000
Replace effluent filtration	\$2,900,000
Chemical storage and feed for phosphorus removal	\$150,000
Expanded aeration basin	\$790,000
New anaerobic and anoxic basin for nutrient removal	\$900,000
Replace aeration blowers	\$350,000
Construct additional final clarifier	\$400,000
Replace preliminary treatment	\$1,000,000
Disinfection upgrade	\$700,000
Refurbish lab and office area	\$250,000
New SCADA system	\$300,000
Modify lagoon return system	\$90,000
<b>Total</b>	<b>\$10,430,000</b>

Although the MPCA has not yet provided a schedule for complying with the proposed phosphorus limits, the City is targeting having the new facility on-line in 2022. Limited funding or other obstacles could lengthen the project timeline.

## II. INTRODUCTION

### A. Purpose

The City of Watertown owns and operates a mechanical treatment facility serving its commercial and residential users. The treatment facility's last major capital project was in 1993 when a stabilization pond system was converted to an activated sludge treatment facility with effluent filtration and chlorine disinfection. Much of the equipment installed in 1993 has exceeded its design life and should be replaced.

The facility operated under NPDES permit MN0020940, included as Appendix A. The permit has been due for renewal since September 30, 2014. MPCA issued a summary of effluent limits that will be included in a upcoming NPDES permit, included as Appendix B. The new permit will include mass and concentration discharge limits for phosphorus. These limits will require construction of a nutrient removal system at the treatment facility.

Additionally, the community is projected to grow from its current 4,500 residents to an estimated 7,200 residents by 2040. This increased population will require expansion of some treatment processes.

This Facility Plan evaluates the existing wastewater treatment facility and provides the City of Watertown with alternatives and recommendations designed to maintain the reliability of existing equipment, meet a projected increase in demand, and comply with anticipated changes in effluent requirements. The plan includes the following:

1. Evaluation of the population, flow and loading projections.
2. Evaluation of the existing facilities.
3. Determination of facility modifications required to meet future needs.
3. Evaluation and recommendation for the most cost effective plan to meet future needs.

### B. Report Organization

The wastewater treatment facility plan for the Watertown Wastewater Treatment Facility is organized and presented in the following sections.

1. Introduction
2. Design Considerations
3. Evaluation of Existing Wastewater Treatment Facilities
4. Evaluation of Wastewater Treatment Facility Improvement Alternatives
5. Cost Opinions
6. Recommendations and Implementation

### III. DESIGN CONSIDERATIONS

#### A. Planning Criteria

##### 1. Planning Period

This evaluation is based on a 20-year planning period with a 2040 design year. Residential population projection is the primary basis for the design year flow and load projections. Currently, the Watertown wastewater treatment facility (WWTF) does not serve any significant industrial users (SIU). Therefore, all projections are made based on normal domestic strength wastewater.

##### 2. Customer / User Projections

The Metropolitan City Council's population estimates for the City of Watertown are used in this report. Their estimates, as well as historic census numbers are presented in Table 3.1 The values are similar to other estimates based on a moderate annual percentage growth rate or estimates based on recent building permit trends within the City. The projection has been reviewed and approved by the Watertown City Council and treatment facility staff.

<b>Year</b>	<b>Watertown Population</b>
1990	2,539
1995	2,790
2000	3,128
2005	3,874
2010	4,205
2017	4,388
2020	4,900
2030	6,200
2040	7,200

#### B. Historical Influent Wastewater Characteristics

Historical wastewater treatment facility influent flow and pollutant loadings are reviewed in the following sections. Effluent wastewater characteristics and facility performance are discussed following development of facility design criteria.

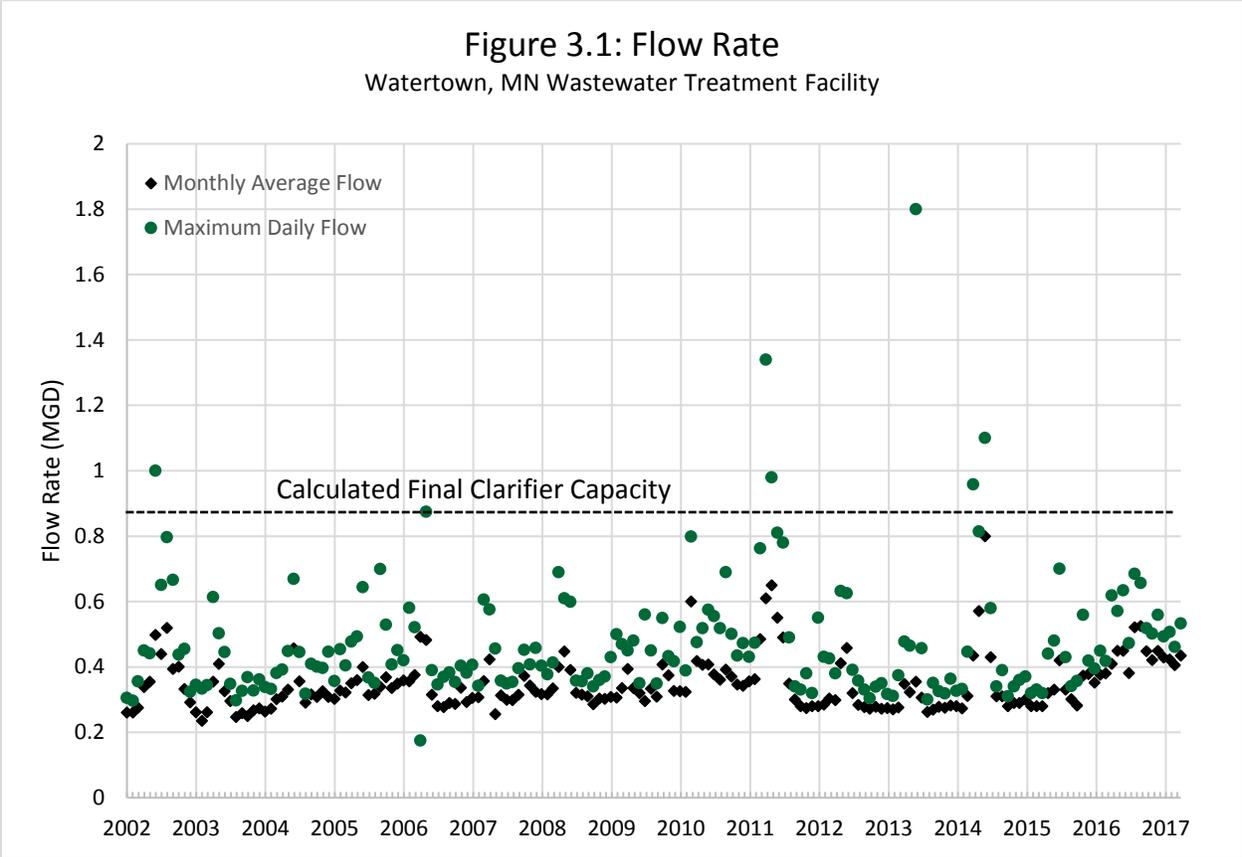
##### 1. Flow

Table 3.1 and Figure 3.1 present average influent flow rates to the Watertown Wastewater Treatment Facility from 2003 through 2017. Flow measurements include the influent flow to the mechanical treatment process plus any flow returned from the excess flow lagoon. Direct effluent flow measurement is not provided.

Review of the data indicates that the historical maximum month flow remains below the current permitted 30-day average wet weather (AWW) flow of 1.26 MGD, however historic peak flows have sometimes exceeded 10-States Standard's capacity recommendations for the facility's final clarifiers.

Table 3.2 – Watertown Wastewater Treatment Facility Influent Flow			
Year	Average Annual Flow (MGD)	Maximum Monthly Flow (MGD)	Peak Flow (MGD)
2003	0.286	0.409	0.614
2004	0.317	0.457	0.669
2005	0.340	0.401	0.669
2006	0.345	0.492	0.874
2007	0.338	0.423	0.606
2008	0.337	0.447	0.690
2009	0.338	0.407	0.560
2010	0.388	0.583	0.799
2011	0.416	0.649	1.340
2012	0.312	0.458	0.632
2013	0.292	0.355	1.800
2014	0.382	0.800	1.100
2015	0.32	0.420	0.70
2016	Q1	0.525	0.69
2017 (partial)	0.42	0.435	0.53

Figure 3.1: Flow Rate  
Watertown, MN Wastewater Treatment Facility



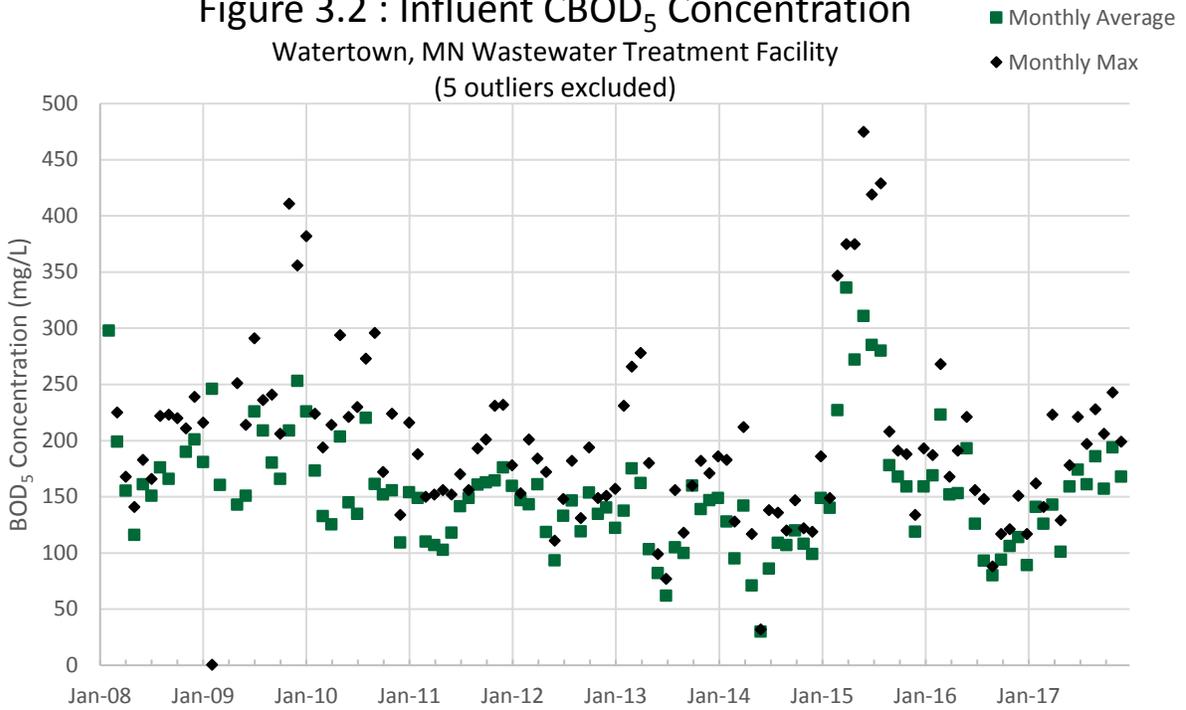
2. CBOD<sub>5</sub>, TSS and Phosphorus Load

Reported monthly average influent loads are summarized in Table 3.3. Influent load and concentrations are presented in Figures 3.2 through 3.7. Influent loads are calculated based on the average of daily influent flow measurements (MGD) and weekly CBOD<sub>5</sub>, TSS and phosphorus concentration measurements (mg/L).

<b>Table 3.3 – Historical Monthly Influent Loadings</b>									
<b>Year</b>	<b>Carbonaceous Biochemical Oxygen Demand (CBOD<sub>5</sub>)</b>			<b>Total Suspended Solids (TSS)</b>			<b>Phosphorus (P)</b>		
	<b>Average Month</b>		<b>Max Mo</b>	<b>Average Month</b>		<b>Max Mo</b>	<b>Average Month</b>		<b>Max Mo</b>
	<b>(mg/L)</b>	<b>(lb/day)</b>	<b>(lb/day)</b>	<b>(mg/L)</b>	<b>(lb/day)</b>	<b>(lb/day)</b>	<b>(mg/L)</b>	<b>(lb/day)</b>	<b>(lb/day)</b>
2003	197	458	604	167	391	694	--	--	--
2004	214	557	853	185	478	681	--	--	--
2005	202	566	706	172	481	755	--	--	--
2006	229	638	778	266	717	1,430	7.29	20.1	26.6
2007	199	553	729	436	1,220	2,706	9.13	25.9	41.9
2008	182	505	784	199	550	884	7.07	19.4	27.1
2009	224	658	2,055	599	1,851	9,176	13.07	39.0	134
2010	162	516	688	304	985	2,239	7.32	23.4	42.2
2011	140	466	580	152	537	942	5.12	17.0	22.6
2012	138	351	407	102	267	461	5.69	14.6	16.8
2013	124	301	471	96	229	350	6.24	15.2	19.8
2014	104	300	535	87	251	447	5.92	18.0	32.0
2015	216	583	998	297	828	1,807	7.0	18.8	24.9
2016	139	485	723	143	500	672	5.4	19.2	22.5
2017	222	294	519	157	444	625	4.4	12.2	16.3

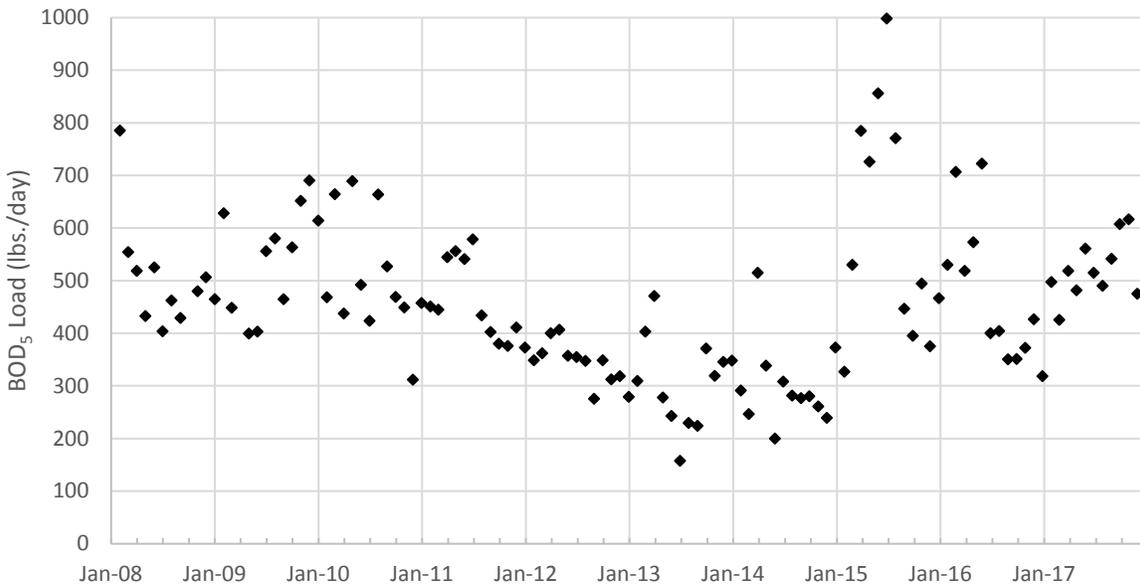
### Figure 3.2 : Influent CBOD<sub>5</sub> Concentration

Watertown, MN Wastewater Treatment Facility  
(5 outliers excluded)



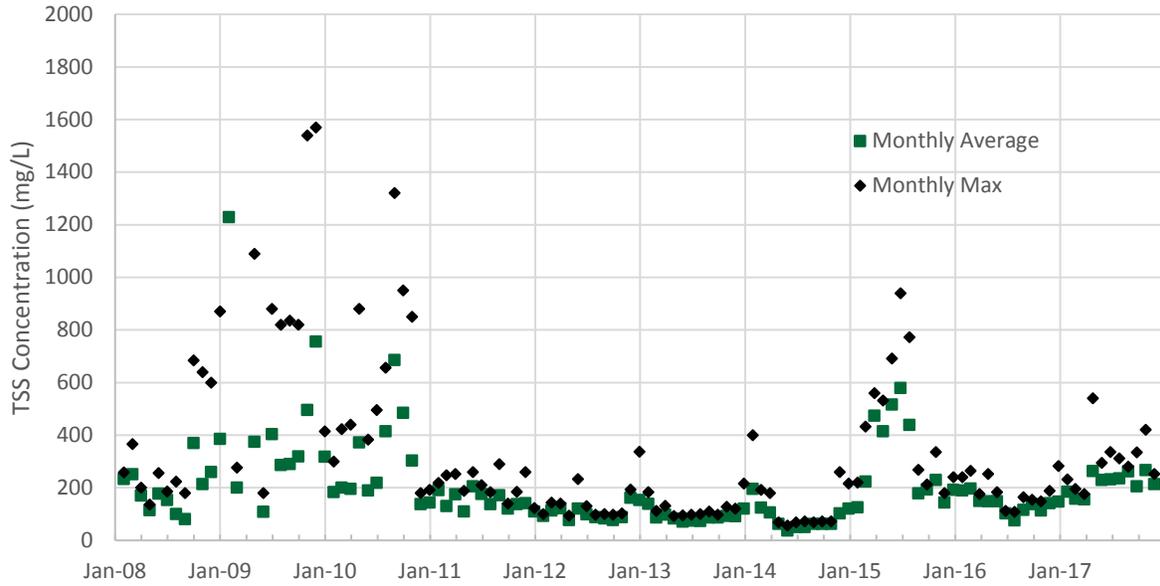
### Figure 3.3 : Influent CBOD<sub>5</sub> Load

Watertown, MN Wastewater Treatment Facility  
(2 outliers excluded)



### Figure 3.4 : Influent TSS Concentration

Watertown, MN Wastewater Treatment Facility  
(3 outliers excluded)



### Figure 3.5 : Influent TSS Load

Watertown, MN Wastewater Treatment Facility  
(2 outliers excluded)

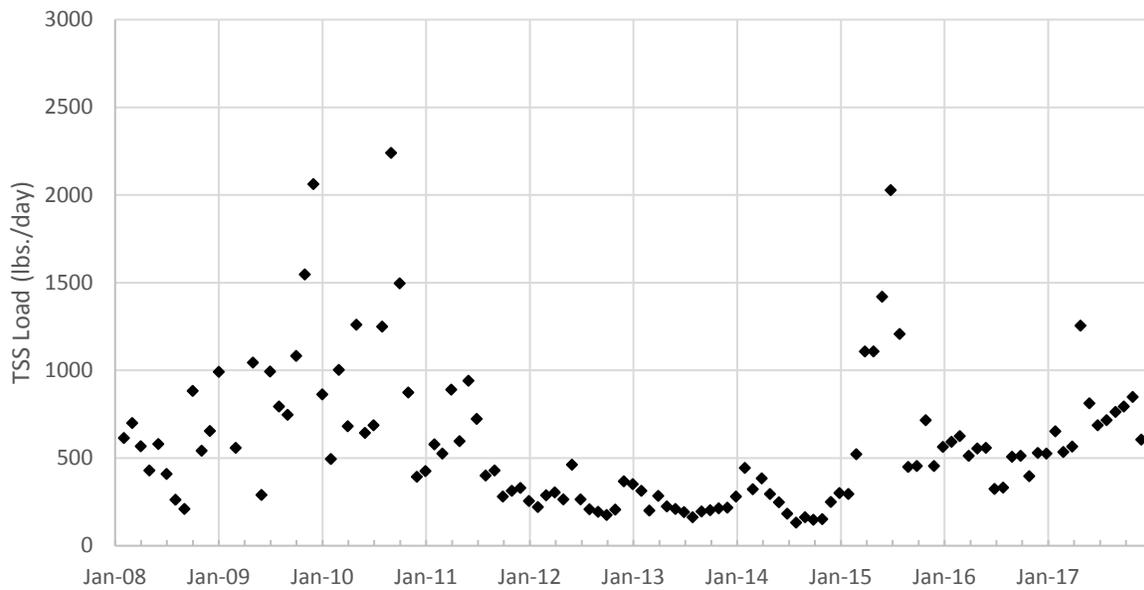


Figure 3.6 : Influent Phosphorus Concentration  
Watertown, MN Wastewater Treatment Facility

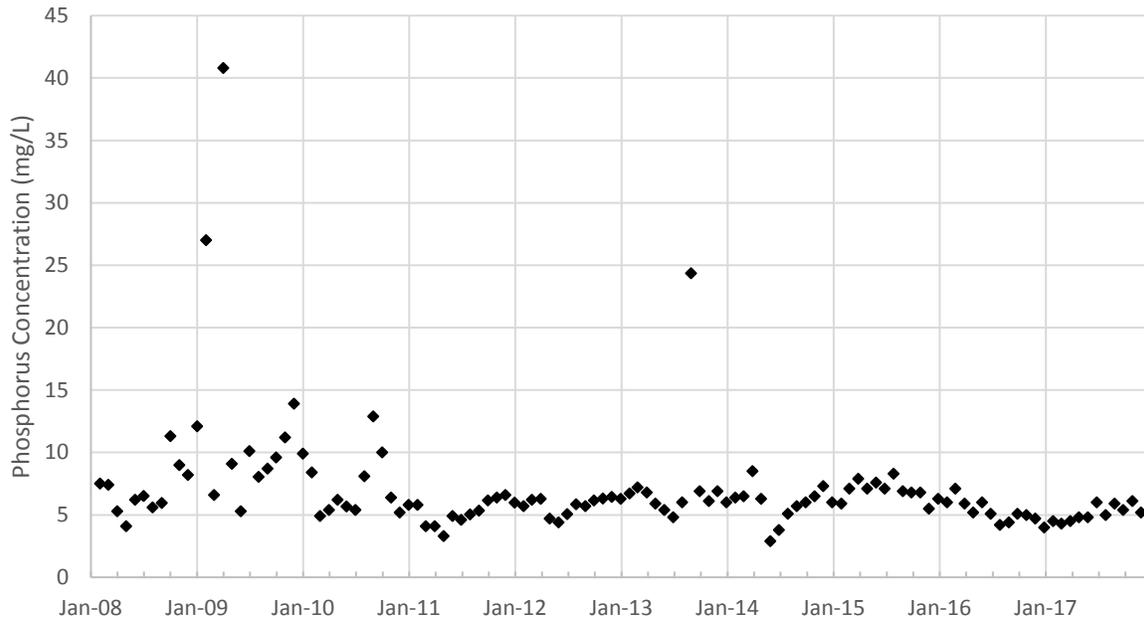
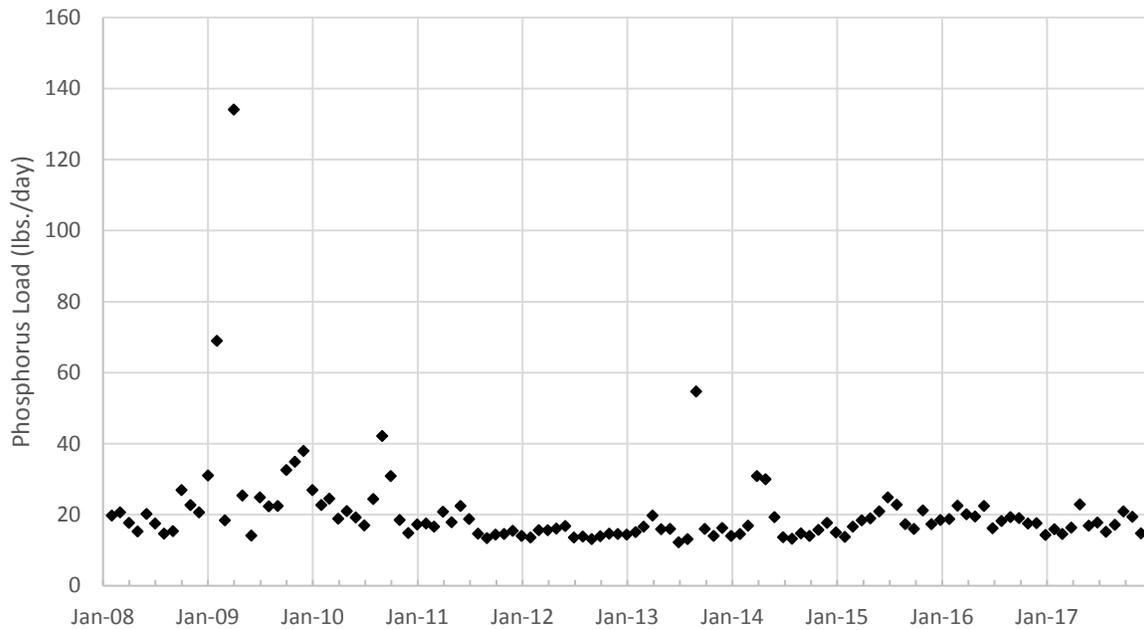


Figure 3.7 : Influent Phosphorus Load  
Watertown, MN Wastewater Treatment Facility



### 3. Nitrogen

Influent nitrogen load data is not currently available for the Watertown WWTF, however, ammonia, Kjeldahl nitrogen (TKN), and nitrate+nitrite ( $\text{NO}_3+\text{NO}_2$ ) monitoring requirements are included in the new permit. The monitoring data will be used to identify facilities that demonstrate reasonable potential to exceed water quality standards (WQS). Influent nitrogen monitoring is also useful for determining aeration requirements for nitrification and evaluation of the facility for nitrogen removal (denitrification). The current extended aeration treatment process relies on long (24 hour) detention time and sufficient oxygen to achieve complete nitrification, or conversion of influent ammonia and organic nitrogen to nitrate. It is not configured for denitrification.

### 4. Mercury

Total mercury is the only other pollutant for which wastewater treatment facility influent data is available. Mercury is a neurotoxin that affects human health and the environment and is present in all municipal wastewater. This naturally-occurring element does not breakdown into less harmful substances, but rather accumulates in fish and animal tissues. Although the wastewater treatment processes are not designed to remove mercury, total suspended solids removal reduces the particulate, or non-dissolved, fraction of the total mercury. The current water quality standard (WQS) for total mercury is 6.9 nanograms per liter (ng/L).

In June 2013, MPCA revised the permitting strategy for mercury to require municipal major facilities which have not demonstrated reasonable potential to exceed the mercury standard to monitor effluent total and dissolved mercury concurrent with an influent and a TSS grab sample twice annually. Minor facilities are required to sample once annually. In addition, a Mercury Minimization Plan (MMP) is required once every 5-year permit cycle. The Watertown MMP was prepared and submitted in March 2014.

As indicated in Table 3.4, mercury monitoring was initiated in 2010 for the Watertown WWTF. Samples are collected in January and July of each year.

<b>Table 3.4 –Mercury Concentrations</b>	
<b>Sample Date</b>	<b>Total Mercury Influent Concentration (ng/L)</b>
January 2010	70
July 2010	172
January 2011	124
July 2011	125
January 2012	114
July 2012	< 25
January 2013	69.0
July 2013	35.8
January 2014	8.5
July 2014	31.1
January 2015	17.8
July 2015	67.3
January 2016	31
July 2016	35
January 2017	16
July 2017	2.5

## 5. Salty Discharge Parameters

The recently issued NPDES summary includes new limits on salty discharge parameters such as chlorides, hardness, bicarbonates, specific conductance, and total dissolved solids. The current wastewater treatment processes are not designed to comply with these limits. Based on our experience and published literature, compliance with such limits are most efficiently achieved through source control rather than treatment. Therefore, addressing the salty discharge limits will be outside of the scope of this report.

## 6. Per Capita Loading Rates

Table 3.5 summarizes Watertown's per capita influent loads in comparison to normal domestic strength wastewater as published in Ten States Standards and Metcalf & Eddy, Wastewater Engineering Treatment and Reuse. Watertown's per capita loading rate has generally been below the typical published values. It is therefore recommended that future designs be established based on the lower bound of the published values. That is, 0.17 lbs. CBOD<sub>5</sub>/capita/day, 0.20 lbs. TSS/capita/day, and 0.006 lbs. phosphorus/capita/day. In the absence of any nitrogen data, the middle of the published range shall be used for design purposes.

Table 3.5 – Influent Per Capita Loading Rates							
Year	Population <sup>1</sup>	Influent Load (lbs./day)			Calculated Per Capita Loading Rate (lbs./capita/day)		
		CBOD <sub>5</sub>	TSS	P	CBOD <sub>5</sub>	TSS	P
2003		458	391	--			
2004		557	478	--			
2005	3,874	566	481	--	0.146	0.124	--
2006	3,941	638	717	20.1	0.162	0.182	0.005
2007	4,008	553	1,220	25.9	0.138	0.304	0.007
2008	4,075	505	550	19.4	0.124	0.135	0.005
2009	4,143	658	1,851	39.0	0.159	0.447	0.009
2010	4,205	516	985	23.4	0.123	0.234	0.006
2011	4,263	466	537	17.0	0.109	0.126	0.004
2012	4,241	351	267	14.6	0.083	0.063	0.003
2013	4,247	301	229	15.2	0.071	0.054	0.004
2014	4,278	300	251	18.0	0.070	0.059	0.004
2015	4,345	583	828	18.8	0.134	0.191	0.004
2016	4,366	485	500	19.2	0.112	0.115	0.004
2017	4,388	294	444	12.2	0.068	0.102	0.003
<b>Normal Domestic Strength<sup>2</sup></b>					0.17-0.22	0.20-0.25	0.006-0.010

1: Population data interpolated between census points.

2: Normal domestic strength as published in Ten States Standards and Metcalf & Eddy, Treatment, Disposal and Reuse.

## C. Projected Wastewater Characteristics

### 1. Flow

Design flows were determined using the MPCA guidelines and Determination of Design Flow worksheet, included as Table 3.6.

The MPCA guidelines for determining flow projections encompass different weather conditions. The Average Dry Weather (ADW) flow is flow with no inflow due to precipitation and no infiltration due to high groundwater. The ADW flow typically occurs in winter months or during dry summers. This flow corresponds with the water pumped from drinking water wells. The Average Wet Weather (AWW) flow is an estimate of the 30-day average flow during wet weather, inclusive of infiltration and inflow. This flow condition usually occurs in the spring or early summer. The Peak Hourly Wet Weather (PHWW) flow is an estimate of the peak influent flow during a 5-year, 1-hour storm. The Peak Instantaneous Wet Weather (PIWW) flow is an estimate of the peak influent flow during a 25-year, 1-hour storm. The PHWW flow is used for unit process sizing such as pumping clarifiers, filtration and disinfection.

In completing the Determination of Design flows worksheet, wastewater flow increase due to population growth is estimated based on a per capita flow of 85 gallons per capita per day.

**Table 3.6 - Determination of Design Flows**

	(MGD)	(GPM)
<b>A. For Determination of Peak Hourly Wet Weather Design Flow</b>		
1 Present peak hourly dry weather flow	0.819	569
2 Present peak hourly flow during high groundwater period (no runoff)	0.982	682
3 Present peak hourly dry weather flow (same as line 1)	-	0.819
4 Present peak hourly infiltration	=	0.163
5 Present hourly flow during high groundwater period and runoff	1.586	1,101
6 Present hourly flow during high groundwater (no runoff) at the same	-	0.982
7 Present peak hourly inflow	=	0.604
8 Present peak hourly inflow adjusted for a 5-yr 1-hr rainfall event (1.49-	0.520	361
9 Present peak hourly infiltration (same as line 4)	0.163	113
10 Peak hourly infiltration cost effective to eliminate	-	0.000
11 Peak hourly infiltration after rehab (where cost effective)	=	0.163
12 Present peak hourly adjusted inflow (same as line 8)	0.520	361
13 Peak hourly inflow cost effective to eliminate	-	0.000
14 Peak hourly inflow after rehab (where cost effective)	=	0.520
15 Population increase: 2,722 at 85 gpcd times 2.8 peaking factor	0.648	450
16 Peak hourly flow from planned industrial increase	0.000	0
17 Estimated peak hourly flow from future unidentified industries	0.000	0
18 Peak hourly flow from other future increases	0.000	0
19 Peak hourly wet weather design flow (1+11+14+15+16+17+18)	<b>2.150</b>	<b>1,493</b>
<b>B. For Determination of Peak Instantaneous Wet Weather Design Flow</b>		
20 Peak hourly wet weather design flow (same as line 19)	2.150	1,493
21 Present peak hourly inflow adjusted for a 5-year 1-hour rainfall event	-	0.520
22 Present peak inflow adjusted for a 25-yr 1-hr rainfall event (2.08-in)	+	0.726
23 Peak instantaneous wet weather design flow	=	<b>2.199</b>
<b>C. For Determination of Average Dry Weather Design Flow (ADW)</b>		
24 Present average dry weather flow: 4,278 at 85 gpcd + comm +ind.	0.364	253
25 Population increase: 2,722 at 85 gpcd	+	0.231
26 Average flow from planned industrial increase	+	0.000
27 Estimated average flow from other future unidentified industries	+	0.000
28 Average flow from other future increases	+	0.000
29 Average dry weather design flow (24+25+26+27+28)	<b>0.595</b>	<b>413</b>
<b>D. For Determination of 30-Day Average Wet Weather Design Flow</b>		
30 Present average dry weather flow	0.364	253
31 Average infiltration after rehabilitation (where cost effective)	+	0.142
32 Average inflow after rehab (where cost effective)	+	0.525
33 Population increase: 2,722 at 85 gpcd	+	0.231
34 Average flow from planned industrial increase	+	0.000
35 Estimated average flow from other future unidentified sources	+	0.000
36 Average flow from other future increases	+	0.000
37 Average wet weather design flow (30+31+32+33+34+35+36)	=	<b>1.262</b>

2. Load

Watertown’s per capital loading rate has generally been below the typical published values. It is therefore recommended that future designs be established based on the lower bound of the published values. That is, 0.17 lbs. CBOD<sub>5</sub>/capita/day, 0.20 lbs. TSS/capita/day, and 0.006 lbs. phosphorus/capita/day.

As indicated previously, historical per capita loading rates for CBOD<sub>5</sub> and TSS were significantly lower than typical per capita loading estimates; therefore, the normal domestic loading rates were used to calculate the design pollutant loads for a design population of 7,200 residents. Design values are provided in Table 3.7.

<b>Table 3.7 – Design Influent Wastewater Load</b>			
<b>Parameter</b>	<b>Normal Domestic Strength (lb/capita/day)</b>	<b>Selected Design Concentration (lb/capita/day)</b>	<b>Projected Load and Design Capacity (lb/day)</b>
<b>Design Population = 7,200</b>			
Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> )	0.17 – 0.22	0.17	1,224
Total Suspended Solids (TSS)	0.20 – 0.25	0.20	1,440
Phosphorus (P)	0.006 – 0.010	0.006	43.2
Total Kjeldahl Nitrogen	0.020-0.048	0.034	245

D. Influent Design Criteria

Table 3.8 summarizes the existing and projected influent design flow and load criteria based on the design population of 7,200 residents.

<b>Table 3.8 – Design Wastewater Influent Flow and Load</b>				
<b>Parameter</b>		<b>Existing Permitted Criteria</b>	<b>Recent (2011-2014) Discharge</b>	<b>Projected Design Criteria</b>
<b>Design Flow</b>				
Average Dry Weather Flow (ADW)	(MGD)	0.362	0.28	0.60
Design Average Flow	(MGD)	0.800	--	0.80
Average Wet Weather Flow (AWW)	(MGD)	1.262	0.80	1.26
Peak Hourly Flow (PHWW)	(MGD)	1.986	--	2.15
Peak Instantaneous Flow (PIWW)	(MGD)	2.221	--	2.20
<b>Design Load (maximum monthly average)</b>				
Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> )	(lb/day)	577	580	1,224
Total Suspended Solids (TSS)	(lb/day)	636	942	1,440
Total Phosphorus (P)	(lb/day)	--	32	43.2

E. Historical Effluent Wastewater Characteristics and Facility Performance

Historical effluent pollutant loadings are reviewed in the following sections.

1. CBOD<sub>5</sub>, TSS, Phosphorus and Ammonia Concentrations

Reported monthly average effluent concentrations for conventional pollutants including CBOD<sub>5</sub>, TSS, phosphorus and ammonia are summarized in Table 3.9. CBOD<sub>5</sub>, TSS, phosphorus and ammonia are monitored weekly.

Current effluent limits include CBOD<sub>5</sub>, TSS, and ammonia discharge limits as both concentration and an equivalent mass at the AWW flow of 1.26 MGD. Historical data indicates the facility has operated in compliance with effluent limitations and consistently produces a nitrified effluent characterized by the conversion of influent nitrogen and ammonia to nitrate. Additional treatment will be required to meet future phosphorus limits of 0.53 mg/L. Phosphorus compliance is required within the next 5-year permit cycle.

Table 3.9 – Historical Annual Average and Peak Monthly Effluent Concentrations								
Parameter:	Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> )		Total Suspended Solids (TSS)		Phosphorus (P)		Ammonia (NH <sub>4</sub> -N)	
Current Limits:	CalMoAve = 5 mg/L CalWkMax = 10 mg/L		CalMoAve = 30 mg/L CalWkMax = 45 mg/L		N/A		CalMoAve = 1.4–2.4 mg/L(seasonal)	
Year	Annual Average	Max Month	Annual Average	Max Month	Annual Average	Max Month	Annual Average	Max Month
	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
2003	2.56	4.5	5.6	8.8	--	--	--	--
2004	2.15	2.8	4.6	6.8	--	--	--	--
2005	2.31	3.3	3.7	5.0	--	--	--	--
2006	2.22	3.0	5.6	8.0	4.0	5.6	0.08	0.13
2007	2.76	5.2	5.4	7.0	4.4	5.7	0.16	0.27
2008	2.82	5.0	4.2	8.0	4.2	4.9	0.16	0.16
2009	2.70	3.8	4.4	8.8	3.9	4.5	0.16	0.19
2010	2.74	3.8	4.8	9.5	3.2	4.0	0.52	4.31
2011	2.78	5.0	4.1	5.8	2.8	4.5	0.26	0.90
2012	2.63	3.5	4.0	5.5	3.9	4.8	0.37	2.00
2013	2.47	3.4	4.0	7.4	3.4	4.1	0.18	0.25
2014	2.32	2.8	4.1	8.6	2.7	3.7	0.32	1.60
2015	2.36	3.2	4.03	6.3	3.13	3.60	0.19	0.2
2016	2.1	2.5	4.14	7.3	2.35	3.1	0.21	0.4
2017	2.28	5	2.8	3.8	2.24	3.1	0.35	1.8

2. Mercury and Other Metals

Effluent mercury monitoring was initiated in 2010 for the Watertown WWTF. Results of the effluent total and dissolved mercury monitoring are summarized in Table 3.10. The total mercury concentrations are evaluated relative to the potential to exceed the human health water quality standard of 6.9 nanograms per liter (ng/L). As indicated, the July 2014 monitoring data exceeded the associated water quality standard. Further investigation into the circumstances surrounding this monitoring event indicate that increased weather related flow may have disturbed sediment in the collection system resulting in increased mercury discharge to the wastewater treatment facility.

<b>Table 3.10 – Effluent Total and Dissolved Mercury Concentrations</b>	
<b>Sample Date</b>	<b>Total Mercury Concentration (ng/L)</b>
January 2010	0.01
July 2010	0.01
January 2011	0.01
July 2011	0.01
January 2012	0.032
July 2012	0.005
January 2013	1.19
July 2013	1.34
January 2014	0.572
July 2014	7.3 <sup>1</sup>
January 2015	1.2
July 2015	0.61
January 2016	1.8
July 2016	0.5
January 2017	2
July 2017	0.614
<sup>1</sup> : July 2014 effluent total mercury concentration influenced by an extended period of increased flow. This is believed to have disturbed sediment in the collection system. Therefore, this sample has been omitted from the reasonable potential analysis.	

Other metals of concern that may require future effluent monitoring and reasonable potential analysis include copper, cadmium, cyanide, chromium, lead, nickel, selenium, silver and zinc. Current water quality standards for a Class 2B discharge and a maximum allowable hardness of 400 mg/L are summarized below in Table 3.11. Due to the lack of dilution during low flow conditions, typical calculated monthly average effluent limits would be comparable to the chronic standards. Limits are not imposed until the facility has demonstrated reasonable potential to contribute to a water quality exceedance in the receiving stream.

<b>Table 3.11 – Minnesota Class 2B Water Quality Standards for Various Metals</b>		
<b>Parameter</b>	<b>Chronic Standard (µg/L)</b>	<b>Maximum Standard (µg/L)</b>
Copper <sup>1</sup>	23.2	65.4
Cadmium <sup>1</sup>	3.4	19
Cadmium <sup>1</sup> (draft)	0.76	6.12
Cyanide	5.2	22
Trivalent Chromium <sup>1</sup>	644	5,405
Hexavalent Chromium	11	16
Lead <sup>1</sup>	18.6	477
Nickel <sup>1</sup>	297	4,582
Selenium	5	20
Silver	0.12	0.12
Zinc <sup>1</sup>	343	379
1: Hardness dependent WQS. Value based on a hardness of 400 mg/L.		

F. Effluent Limits Determination

Effluent requirements for the treatment facility are contained in the NPDES permit MN0020940 issued by the MPCA. NPDES permits are effective for 5-years prior to reissuance. Preliminary effluent limits are summarized below in Table 3.12. Effluent limits for CBOD<sub>5</sub>, TSS and ammonia limits remain unchanged from the currently expired permit, however, future limits are proposed for anticipated for phosphorus chloride and other salty discharge parameters as a result of a reasonable potential analysis. Final discharge requirements are based on discharge to the South Fork of the Crow River (Class 2B, 3C, 4A, 4B, 5, 6 Water)

**Table 3.12 – Watertown Wastewater Treatment Facility Discharge Preliminary Effluent Limits**

Parameter	Concentration Limit		Mass Limit		Converted Mass Limit		Limit Type
Carbonaceous Biochemical Oxygen Demand (CBOD <sub>5</sub> )	5	mg/L	23.9	kg/d	11.0	lb/d	CalMoAve
	10	mg/L	47.7	kg/d	22.0	lb/d	CalWkAve
Total Suspended Solids (TSS)	30	mg/L	143	kg/d	66.1	lb/d	CalMoAve
	45	mg/L	214	kg/d	99.2	lb/d	CalWkAve
Ammonia Nitrogen (NH <sub>4</sub> -N)							
Dec-Mar	7.7	mg/L	36.7	kg/d	80.9	lb/d	CalMoAve
Apr-May	24	mg/L	114.5	kg/d	252	lb/d	CalMoAve
Jun-Sep	1.4	mg/L	6.7	kg/d	14.8	lb/d	CalMoAve
Oct-Nov	5.1	mg/L	24.3	kg/d	53.6	lb/d	CalMoAve
Phosphorus (P)	0.53	Mg/L	1,395	kg/yr	3,072	lb/yr	12 mo. moving total
Chloride (Cl)	229	mg/L		kg/d		lb/d	CalMoAve
Chloride (Cl)	273	mg/L		kg/d		lb/d	Daily Max
Total Hardness (as CaCO <sub>3</sub> )	559	mg/L		kg/d		lb/d	CalMoAve
Total Hardness (as CaCO <sub>3</sub> )	667	mg/L		kg/d		lb/d	Daily Max
Bicarbonate (HCO <sub>3</sub> )	272	mg/L		kg/d		lb/d	CalMoAve
Bicarbonate (HCO <sub>3</sub> )	312	mg/L		kg/d		lb/d	Daily Max
Total Dissolved Solids (TDS)	739	mg/L		kg/d		lb/d	CalMoAve
Total Dissolved Solids (TDS)	805	mg/L		kg/d		lb/d	Daily Max
Specific Conductance	1088	umhs/cm	--		--		CalMoAve
Specific Conductance	1244	umhs/cm	--		--		Daily Max
pH (daily min/max)	6.0 – 9.0	SU	--		--		
Dissolved Oxygen (DO)	Monitor Only	mg/L	--		--		CalMoMin
Fecal Coliform (Apr-Oct)	200	#100mL	--		--		CalMo GeoMean

**G. Historical Biosolids Characteristics**

The existing biosolids treatment process includes a 50,000 gallon anaerobic digester and a 140,000 gallon storage tank. Current practices discharge biosolids to membrane storage bags for dewatering. Although the biosolids have been stored in the membrane bags for a number of years, agricultural land application or disposal to a landfill are acceptable final disposal

alternatives. Because the facility has stored waste biosolids for several years, annual biosolids quantities and characteristics are not available.

Typical solids production rates for an extended aeration activated sludge process is 0.65 lb TSS per lb of CBOD<sub>5</sub> removed. Therefore, for an average influent CBOD<sub>5</sub> load of 0.17 lb/capita/day and a current population of 4,278, the facility would theoretically produce an estimated 473 lb/day or 86 dry tons of waste biosolids annually. In the liquid form, at 2-5 percent solids concentration, this is equivalent to approximately 1,100-2,800 gallons per day (gpd) or 0.40-1.0 million gallons per year (MGY).

Although annual biosolids generation rates can not be determined from the data recorded with the current biosolids management practices, typical daily wasting rates are approximately 8,000 gpd before decanting. Approximately 3,000 to 4,000 gpd is transferred to the digester.

Biosolids characteristics of concern include nitrogen, phosphorus, salts and metal concentrations including arsenic, cadmium, copper, lead, mercury, nickel, selenium and zinc or polychlorinated biphenyls (PCBs). Land application rates are limited based on the nitrogen concentration and site soil conditions must be monitored for accumulation of phosphours and salts. Although historical biosolids data is not available for review, there is no reason to suspect levels of concern associated with metal concentrations for treatment of domestic wastewater.

H. Projected Biosolids Characteristics

Biosolids projections are based on a range of typical solids production rates for conventional to extended activated sludge of 0.65 and 0.85 lb TSS per lb of CBOD<sub>5</sub> removed, respectively. Solids generated through the chemical phosphorus removal process are estimated at 15 lb TSS per lb phosphorus removed chemically.

Biosolids production rates provided in Table 3.13 are based on the projected design criteria of 1,224 lb CBOD<sub>5</sub>/day and reduction of phosphorus from the current 4 mg/L effluent level at the average wet weather flow of 1.26 MGD.

<b>Table 3.13 – Projected Annual Biosolids</b>		
<b>Parameter</b>	<b>Influent Mass</b>	<b>Biosolids Produced</b>
CBOD <sub>5</sub> removed	1,224 lb/day	795 – 1,040 lb/day
Chemical P removal	32 lb/day	480 lb/day
Total waste solids		1,275 – 1,520 lb/day
Volume at 3.5-4.0%		3,822 – 5,207 gpd
		1.4 – 1.9 MGY

## IV. EVALUATION OF EXISTING WASTEWATER FACILITIES

### A. General

This section evaluates the existing wastewater treatment facility relative to condition and the capacity to treat the projected design flows and load. The overall wastewater treatment facility is best evaluated by analyzing the main unit processes and their respective treatment capacities. The current liquid treatment facility includes influent pumping, flow equalization, screening, extended aeration activated sludge, secondary clarifiers, filtration, chlorine disinfection. Biosolids treatment processes include anaerobic digestion and liquid biosolids storage. A process flow diagram and site layout for the existing wastewater treatment facilities is shown in Figures 4.1 through 4.3.

### B. Liquid Treatment Processes

#### 1. Influent Pumping

The influent lift station was upgraded to 1,760 gpm (2.53 MGD). This lift station includes two submersible centrifugal pumps that discharge up to 555 gpm (0.80 MGD) to the WWTF with flow in excess of 0.80 MGD routed to the flow equalization basin. One pump is designed to meet the peak demand and the second pump is provided for redundancy. The lift station is in good condition and no immediate repairs or replacement are necessary.

#### 2. Flow Equalization

The facility currently utilizes an estimated 3.5 acre (4.5 MG) flow equalization basin to reduce the peak flow to the WWTF. The clay lined equalization basin appears to be in sound condition, however, either desktop or a statistical water balance evaluation may be required to confirm the basins are in compliance with the maximum allowable seepage rate of 500 gallons per acre per day.

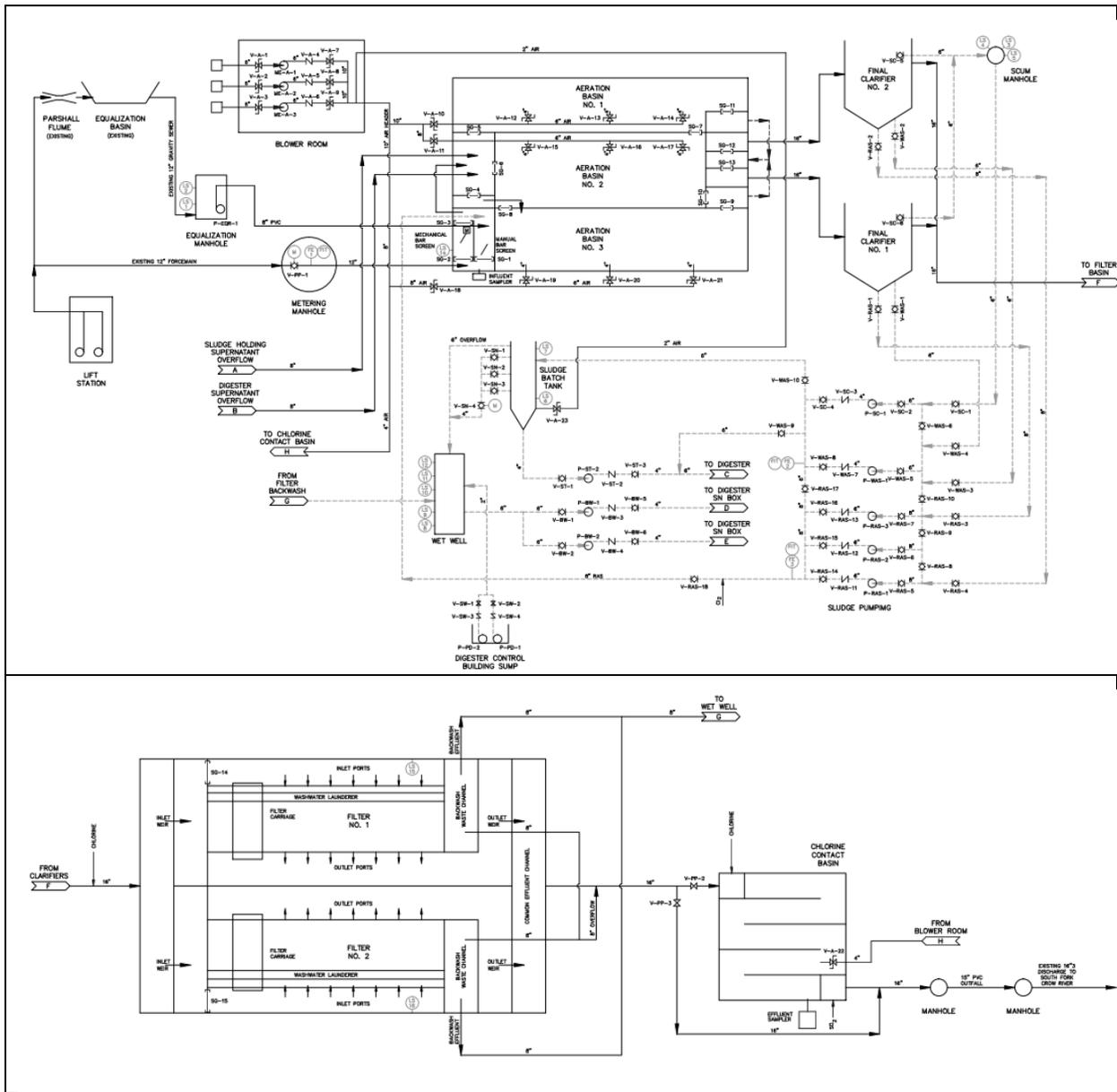
#### 3. Preliminary Treatment Facilities

Existing preliminary treatment processes at the Watertown WWTF include screening prior to the activated sludge process. Under high flow conditions, wastewater is discharged to the flow equalization lagoon prior to preliminary treatment, therefore, grit and larger material may be discharged to the equalization lagoon. Solids discharged to the lagoon will most likely settle out. Significant accumulation of solids may result in odor concerns.

Preliminary treatment consists of a mechanical bar screen located at the influent of the aeration basins. The mechanically cleaned barscreen is used to remove large objects that may damage downstream pumps and process equipment. Grit removal is not provided.

The existing mechanical screen is constructed with ¼-in bars and ¾-in clear space between bars. It is sized for a normal flow range of 0.4 to 0.8 MGD with a peak capacity of 1.9 MGD.

The treatment capacity of this process is controlled by peak influent flow rates. Preliminary treatment capacity is based on hydraulic loading and is independent of the pollutant, or organic loading rates.



**Figure 4.1 – Watertown Wastewater Treatment Facility Liquid Process Flow Diagram**

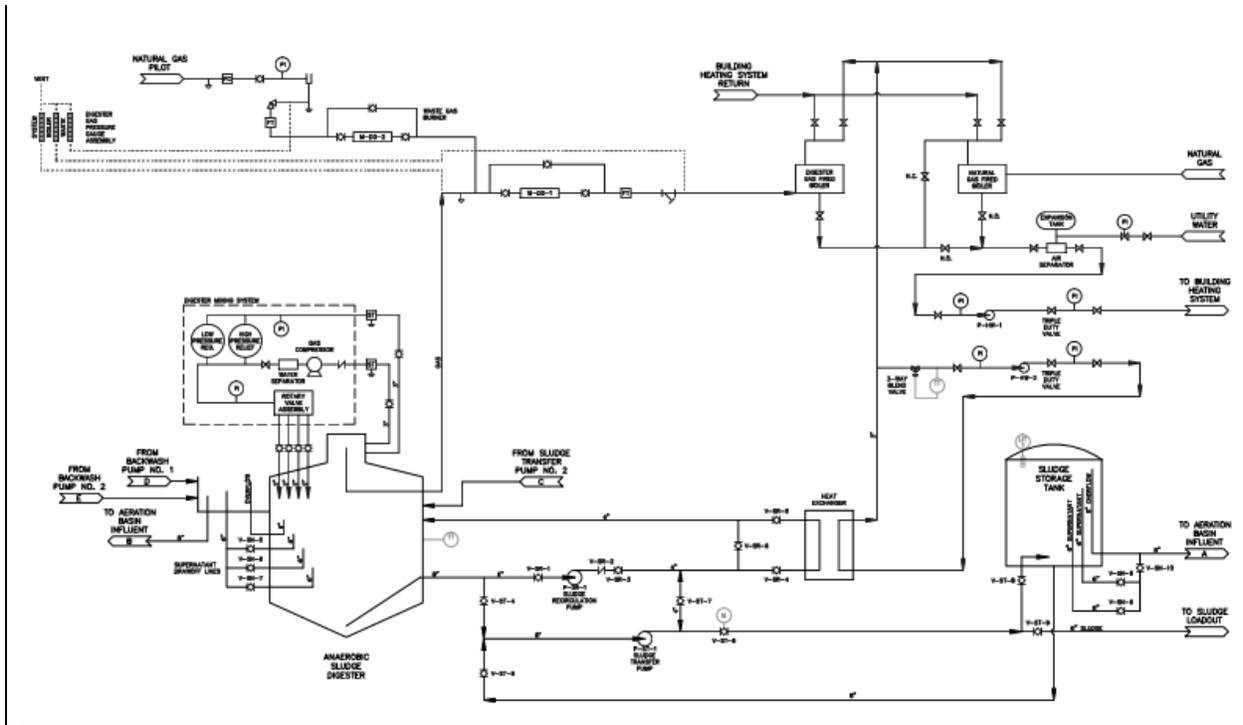


Figure 4.2 – Watertown Wastewater Treatment Facility Process Flow Diagram

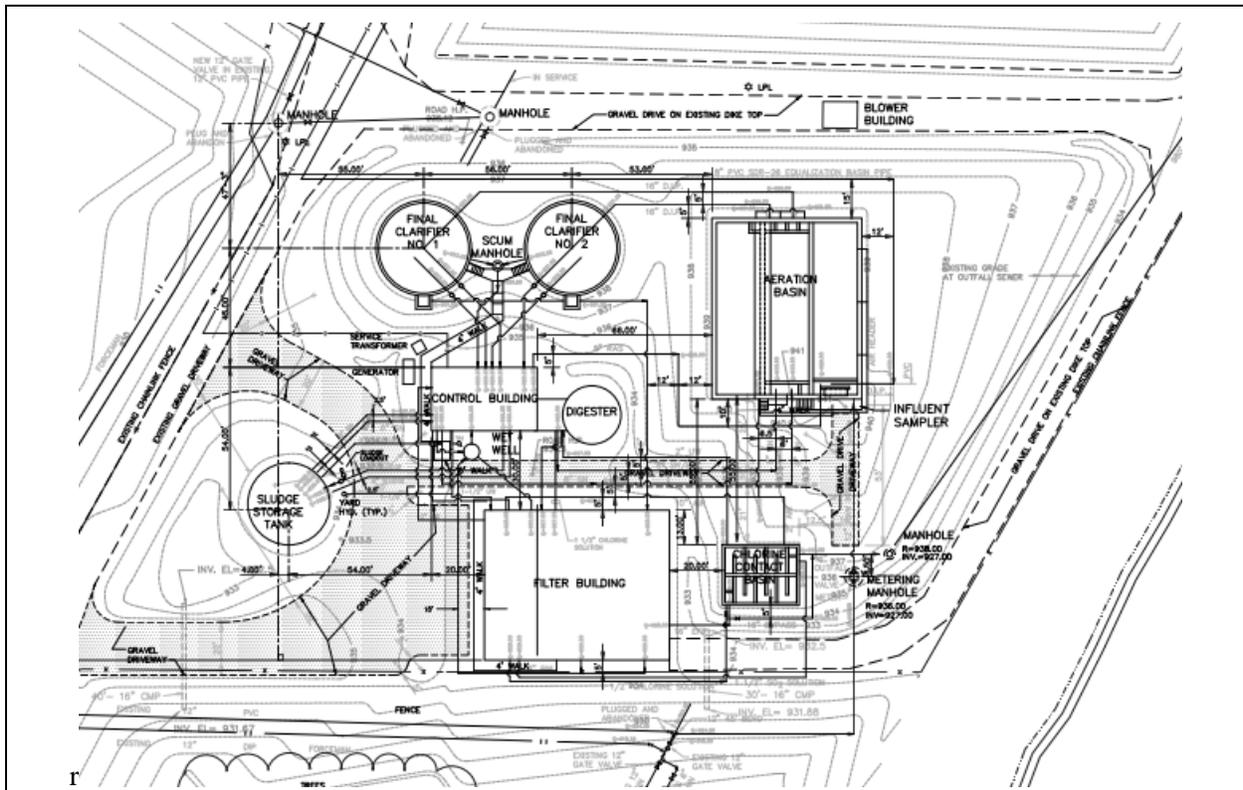


Figure 4.3 – Watertown Wastewater Treatment Facility



**Figure 4.4 – Mechanical Bar Screen Enclosure**



**Figure 4.5 – Mechanical Chain and Rake Climbing Screen**

The existing preliminary treatment consists of a mechanically cleaned bar screen shown in Figures 4.4 and 4.5. The screen and housing have exceeded their useful design life and should be replaced.

The existing preliminary treatment facilities do not include grit removal or primary clarification. Grit removal reduces sand and grit accumulation in process basins and the associated risk of damage to process equipment. Primary clarification is a unit process used at some facilities to capture influent particulate matter and convey this material directly to digestion rather than the activated sludge process. Primary clarifiers are not present at the Watertown facility and are not recommended based on the current domestic strength facility loading and the recommended solids handling methods. Installation of a grit removal process is recommended to protect downstream processes.

#### 4. Activated Sludge Process

The Watertown WWTF currently operates an extended aeration activated sludge process where the waste is biologically treated by a biomass, or “activated sludge”, in the aeration basins. The biomass is captured in the secondary clarifiers, and a portion of this returned to the aeration basin as return activated sludge (RAS) and a portion is waste activated sludge (WAS). Oxygen is supplied through an aeration system including blowers and fine pore membrane diffusers. The air used to supply the oxygen also provides mixing within the aeration basin to prevent solids from settling. The current activated sludge treatment system is designed for CBOD<sub>5</sub> removal and nitrification, or conversion of influent organic nitrogen and ammonia to nitrate. The facility is not currently design for biological phosphorus or nitrogen removal

Aeration basin treatment capacity is determined by both organic and hydraulic loadings rates. According to the Great Lakes-Upper Mississippi River Board of State Public Health and Environmental Managers Recommended Standards for Wastewater Facilities (Ten States Standards), the maximum recommended organic loading for extended aeration systems is 15 lbs of CBOD<sub>5</sub>/day/1,000 cubic feet of aeration basin volume.

The hydraulic loading of the aeration basin is approximately 8 hours at the design average wet weather flow of 1.26 MGD, 16 hours at the design average dry weather flow of 0.60 MGD and 12 hours at the design average annual flow of 0.80 MGD. Note that continued use of the existing excess flow lagoons may limit peak flows send to the aeration basin. For extended aeration facilities that remove ammonia, such as Watertown, the minimum hydraulic residence time (HRT) is recommended to be between 18 and 36 hours (Metcalf & Eddy).

The recommended minimum aeration capacity for extended aeration treatment is 2,050 standard cubic feet (SCF) / lb CBOD<sub>5</sub>.

Table 4.1 summarizes the aeration system capacity based on the existing 0.39 MG aeration basins and three 750 SCFM centrifugal blowers. The aeration basins and blowers must be expanded to meet the future CBOD<sub>5</sub> load of 1,224 lbs./day and AWW flow of 1.26. Also, the existing blowers have exceeded their useful design life and are recommended for replacement.

<b>Table 4.1 – Activated Sludge Capacity Evaluation</b>	
<b>Design Criteria</b>	<b>Extended Aeration Available Capacity</b>
Organic Loading: 15 lbs. CBOD <sub>5</sub> /1000 ft <sup>3</sup>	780 lb CBOD <sub>5</sub> /day
Hydraulic Loading: 6-18 hour HRT	0.52 MGD
Aeration Capacity: 2,050 SCF/lbs. CBOD <sub>5</sub>	1,054 lb CBOD <sub>5</sub> /day



**Figure 4.6 – Aeration Basins**



**Figure 4.7 – Aeration Blowers**

5. Secondary Clarification and Return Activated Sludge

Secondary clarifiers allow the biomass and other remaining suspended solids to settle. The activated sludge is removed from the bottom of the clarifier and either returned to the aeration basin (return activated sludge - RAS) or wasted to the digester (waste activated sludge - WAS). The clear liquid, or clarifier effluent, is discharged to the next unit process.

Secondary clarifier capacity is determined by three factors; 1) surface overflow rate, 2) weir loading rate and 3) solids loading rate. All factors are primarily related to hydraulic loading, however, the solids loading rate is influenced by the maximum mixed liquor solids concentration in the aeration basin and the maximum return activated sludge (RAS) rate.

The clarifier design surface overflow rate is limited to 900 gpd/sf at peak flow for activated sludge with chemical phosphorus removal. Only influent flow, not including RAS flow, is used in this evaluation. As indicated below, the available capacity is 0.82 MGD. This is less than the design AWW flow of 1.26 MGD and lacks redundancy. The 4.5 MG excess flow basin provides up to 10 days storage for while one clarifier is out-of-service during wet weather conditions, however, an additional clarifier is still recommended.

The solids loading is based on the daily flow, mixed liquor suspended solids (MLSS) concentration and RAS flow rate. This evaluation is based on a 150 percent RAS rate and a MLSS concentration of 3,500 mg/L. It is important to note that the MLSS concentration will increase with implementation of chemical phosphorus removal

Table 4.2 summarizes the existing secondary clarifier capacity based on two 34-ft diameter clarifiers with 28-ft 8-in diameter peripheral 90° v-notch weirs. This results in a combined surface area of 1,800 sf and a weir length of 180 ft.

Table 4.2 - Clarifier Capacity Evaluation	
Design Criteria	Available Capacity
Surface Overflow: 900 gpd/ft <sup>2</sup>	0.82 MGD
Weir Loading: 20,000 gpd/ft	1.80 MGD
Solids Loading: 35 lb/day/ft <sup>2</sup>	64,000 lb/day (0.86 MGD at 3,500 mg/L & 150% RAS)

The clarifiers are structurally sound, however, replacement of the drive and scraper mechanism are recommended. In addition to addressing the age and condition of the mechanical parts, a flocculation chamber can be added to provide ideal mixing conditions for chemical addition. This will reduce the amount of alum or ferric chloride needed to precipitate the soluble phosphorus. Construction of a third final clarifier is recommended to accommodate flows through the plant in excess of 0.82-0.86 MGD and/or MLSS concentrations in excess of 3,500 mg/L.

The existing return activated sludge pumps (RAS) are designed to provide 440 gpm from each clarifier which is adequate to provide up to 150% recycle flow for an influent flowrate of 0.80 MGD, however, the current vertical centrifugal pumps have been in continuous operation for 20-years and frequently experience clogging due to effectiveness of the influent screening and lack of grit removal. Replacement and modification of the RAS/WAS pumping system is recommended to address pumping reliability and provide service to a future final clarifier.



**Figure 4.8 – Secondary Clarifiers**



**Figure 4.9 – RAS and WAS Pumping**

6. Filtration

Effluent sand filters are provided to remove suspended solids from the wastewater that were not removed by the secondary clarifiers. This results in reduced TSS levels as well as a reduction in CBOD<sub>5</sub> and other pollutants. The existing filters are sized based on a design loading rate of 2 gpm/ft<sup>2</sup> to meet the existing CBOD<sub>5</sub> limit of 5 mg/L.

Table 4.3 summarizes the existing filtration capacity based on two 219 ft<sup>2</sup> traveling bridge sand filters.

Table 4.3 – Traveling Bridge Media Filter Capacity	
Design Criteria	Available Capacity
Hydraulic Loading: 2 gpm/ft <sup>2</sup>	1.26 MGD

Traveling bridge media filters provide a shallow (11-in) depth of granular media. Although this technology has proven effective at reducing effluent total suspended solids (TSS) to a level that meets the effluent CBOD<sub>5</sub> requirement of 5 mg/L and effluent mercury (6.9 ng/L). It is expected to be sufficient for meeting the phosphorus limit of 0.53 mg/L.

Although the WWTF does not provide additional treatment for mercury, typical data indicates that improved effluent TSS removal will reduce the non-dissolved fraction of the total effluent mercury. Low level phosphorus limits are achieved through biological phosphorus removal and the precipitation of metal salts and soluble phosphorus. The existing filters have exceeded their useful design life and should be replaced.



**Figure 4.10 – Traveling Bridge Filter Room**



**Figure 4.11 – Traveling Bridge Filter – Surface of Media**

7. Disinfection

Prior to final discharge, the treated wastewater must be disinfected to kill any remaining pathogens. Disinfection occurs with chlorine in the chlorine contact basin. Residual chlorine is subsequently removed with sulfur dioxide to eliminate chlorine which is toxic to aquatic life. Photos of the existing chlorination and dechlorination facilities are provided as Figures 4.12 through 4.15.

The chlorine contact basin is controlled strictly by hydraulic loading. A minimum detention time of 15 minutes is required at the peak flow rate, or the maximum pumping rate to the WWTF.

Table 4.4 summarizes the existing disinfection capacity based on one, 24,000-gallon chlorine contact basin. Although the minimum contact time is 15 minutes, the contact time is reduced from 43 minutes at the current design average flow of 0.80 MGD to 17 minutes at the design peak hourly flow of 2.0 MGD. Although the disinfection basins are in reasonable condition and have sufficient capacity, it is recommended that the chemical storage area and chemical equipment be replaced in order to ensure reliable operation and safety.

<b>Table 4.4 - Disinfection Capacity Evaluation</b>	
<b>Design Criteria</b>	<b>Available Capacity</b>
Chlorine Contact Time: 15 min.	2.29 MGD
Dechlorination Contact Time: 30 sec.	2.76 MGD

8. Post Aeration

Post-aeration is provided to increase the dissolved oxygen concentration in the effluent waste stream. Fine bubble diffusers are used, similar to the aeration system, in a small detention channel/tank. No changes to the post aeration system are recommended.



**Figure 4.12 – Chlorine Contact Basin**



**Figure 4.13 – Chlorine Feed System**



**Figure 4.14 – Sulfur Dioxide Feed System**



**Figure 4.15 – Sulfur Dioxide Feed Point and Final Effluent**

9. Biosolids Treatment and Storage

Solids wasted from the secondary clarifiers are transferred to the anaerobic digester. Digestion processes, both anaerobic and aerobic, reduce both the total sludge volume to be disposed of, and the amount of pathogens and vectors found in the biosolids, resulting in biosolids of less quantity and better quality. After digestion, the biosolids are transferred to an unheated storage tank where it is thickened to further reduce the volume and stored until it can be disposed of.

The anaerobic digester capacities are determined by volatile solids loadings and minimum detention time and temperature requirements. For complete mix digesters, a loading rate of 80 lb volatile suspended solids (VSS)/1000 ft<sup>3</sup> is allowed; however, to meet the Class “B” requirements, a minimum detention time of 15 days is also required. Moderately mixed digesters are limited to 40 lb VSS/1000 ft<sup>3</sup>. The biosolids are then typically land applied to agricultural fields and injected or disked into the soils to reduce potential vector attraction. Due to Minnesota’s climate, biosolids may be applied to agricultural fields during limited time periods. Base on field availability, a minimum 180 days of storage is required for spring and fall land application. Rather than land apply the waste biosolids, the Watertown WWTF has been accumulating dewatered biosolids on-site in geomembrane bags.

Table 4.5 summarizes the existing biosolids treatment and storage capacity based on one 50,000-gallon anaerobic digester and one 140,000-gallon storage tank. The estimated solids concentration entering the digester is 3.0 percent and the solids concentration in storage is 6.0 percent. The design volatile solids concentration is 50 percent of the total solids concentration.

Table 4.5 - Biosolids Capacity Evaluation			
Design Criteria	Available Capacity		
	Biosolids Production		Treatment
Digestion: 80 lb VSS/1000 ft <sup>3</sup> /day	1069 lb /day	4,275 gpd	970 lb CBOD <sub>5</sub> /day
Time/Temperature: 15 days at 35-55°C <sup>1</sup>	834 lb/day	3,333 gpd	960 lb CBOD <sub>5</sub> /day
Storage: 180 days <sup>1</sup>	460 lb/day	1,833 gpd	<420 lb CBOD <sub>5</sub> /day <sup>2</sup>
1: Assumes 50,000 gallons at 3 percent and 140,000 gallons at 6 percent for 180 days. 2: Equivalent treatment capacity including chemical phosphorus removal. Approximate treatment capacity of 708 lb. CBOD <sub>5</sub> /day without chemical phosphorus removal (0.65 lb solids/lb CBOD <sub>5</sub> removed).			

The relationship between biosolids capacity and the equivalent CBOD<sub>5</sub> treatment capacity also includes biosolids production based on chemical precipitation of phosphorus. Without chemical phosphorus removal, the treatment capacity per pound of biosolids is increased by approximately 70 percent.

The existing anaerobic digester system is in poor condition. Much of the ancillary equipment is not currently functioning including the mixing, recirculation and gas collection system. In addition, the existing system provides insufficient digestion capacity and storage for the projected biosolids production rate.

Conversion of the existing system to aerated storage followed by a minimum 180 days liquid biosolids storage and agricultural land application of Class ‘B’ biosolids is recommended. This conversion includes a positive displacement blower system with coarse bubble aeration in the digester and a recommended minimum 1.0-1.2 million gallons liquid biosolids storage to provide a minimum 180 days storage. The existing

140,000 gallon storage tank is in poor condition and may be removed from the treatment system.



**Figure 4.16 – Anaerobic Digester and Digester Control Building**



**Figure 4.17 – Solids Batching/Thickening Tank**



**Figure 4.18 – Digester Gas Piping and Heat Exchanger**



**Figure 4.19 – Biosolids Storage Tank**

C. Hydraulics and Process Control

The existing treatment facility is designed for a hydraulic flow of 0.80 MGD. It is anticipated that site revisions will be required to meet the increased hydraulic flow through the secondary processes (aeration basins and clarifiers) for implementation of a biological nutrient removal systems and associated internal recycle flows.

D. General Plant Conditions

Overall, the structures within the facility are structurally sound. The process and mechanical equipment within the facility have been operating in excess of the 20-year design life with minimal maintenance. In general, rehabilitation or repair is necessary for most major equipment items including many valves.

E. Laboratory/Office

With increased complexity associated with biological nutrient removal systems and additional monitoring requirements, the existing 320-sf lab/office space is insufficient for efficient operation. Expansion of the laboratory and office facilities are recommended.

F. Supervisory Control and Data Acquisition (SCADA)

The Watertown WWTF operation currently utilizes a supervisory control panel (SCP) and programmable logic control (PLC) to operate major process equipment. Current industry standards include a Supervisory Control and Data Acquisition system (SCADA) to monitor and control the treatment process through a series of data screens. An effective SCADA system can minimize the opportunity for upset conditions and provide energy and chemical savings through on-line monitoring and adjustment of aeration blowers and chemical feed based on flow and/or dissolved oxygen concentrations.



**Figure 4.20 – Lab/Office Filter Building**



**Figure 4.21 – Standby Diesel Generator**



**Figure 4.22 – Motor Control Center (MCC)**



**Figure 4.23 – Boiler Room**

**G. Summary**

Review of the existing wastewater facility indicates that in addition to deficiencies noted relative to the increased load and anticipated effluent limits, facility maintenance (rehabilitation/replacement) necessary throughout the facility. Capacity related limitations are summarized in Table 4.6.

<b>Table 4.6 - Wastewater Treatment Facility Capacity Evaluation</b>			
<b>Unit Process</b>	<b>Limiting Capacity</b>	<b>Existing Capacity</b>	<b>Design Requirement</b>
Influent Pumping	Peak Instantaneous Flow Rate	2.53 MGD	2.20 MGD
Preliminary Treatment	Equipment Capacity	0.80 MGD	1.26 - 2.00 MGD
Aeration	Organic (CBOD <sub>5</sub> ) Loading	780 lb CBOD <sub>5</sub> /day	1,224 lb CBOD <sub>5</sub> /day
Clarifiers	Surface Overflow, Solids Loading	0.43 MGD (w/ 1 out of service)	0.80 - 1.26 MGD
Filters	Hydraulic Loading	1.26 MGD	1.26 MGD
Chlorination	Detention Time	2.29 MGD	2.00 MGD
Anaerobic Digestion	Volatile Solids Loading	760 lb CBOD <sub>5</sub> /day	N/A
Biosolids Storage	Detention Time (180 day)	420 lb CBOD <sub>5</sub> /day	1,400 lb CBOD <sub>5</sub> /day
1: Chlorination capacity meets minimum requirements at reduced peak flow rates.			

## V. EVALUATION OF WWTF IMPROVEMENT ALTERNATIVES

### A. General

The following section provides a summary of alternatives and development of recommended improvements for the wastewater treatment facility as required to 1) address the condition of existing treatment facilities; 2) provide additional organic treatment capacity; and 3) achieve compliance with new, more stringent, effluent limits. Table 5.1 summarizes the general categories of improvements in a general order of relative priority.

Table 5.1 – Summary of Recommended Improvements			
Recommended Improvement	Condition	Capacity	Compliance <sup>1</sup>
Secondary Clarifier Mechanisms	X	X	
Biosolids Treatment and Storage			
Convert anaerobic digester to aerated storage tank	X		X
Provide dedicated aeration blower for sludge stabilization	X		X
Construct liquid biosolids storage and loadout facilities		X	X
RAS/WAS Pumping and Piping Improvements	X		
Replace Effluent Filtration (deep bed media or membrane)	X		X
Chemical Feed to Final Clarifiers for Chemical Phosphorus Removal			X
Biological Phosphorus (and Nitrogen) Removal			
Construct anaerobic and anoxic basins and mixers			X
Construct mixed liquor and nitrified recycle systems			X
Aeration Blower Replacement / Upgrade	X	X	
Replace/Upgrade Preliminary Treatment			
Screening	X		
Grit Removal	X		
Lab/Office	X		
Supervisory Control and Data Acquisition System (SCADA)	X		
Disinfection	X		
Salty Discharge Parameter Compliance (non-WWTF improvement)			X

In general, phosphorus removal technologies include chemical and biological removal processes designed to transfer the phosphorus from the liquid stream to the solids stream as either a biological solids or a metal phosphate precipitate. Chemical removal can reliably achieve low effluent phosphorus concentrations with limited capital improvements, however, chemical removal is associated with increased chemical costs and high sludge production rates. Biological removal requires a significant capital investment for additional basins, mixers and recycle pumping, however, the biosolids production rate is much lower and chemical use is limited. Effluent filtration is recommended to achieve effluent phosphorus concentrations of 0.5 mg/L or less.

#### B. Chemical Phosphorus Removal

Chemical phosphorus removal is the formation and precipitation of insoluble orthophosphate solids through the reaction of soluble orthophosphate anions with aluminum ( $Al^{3+}$ ) or ferric ( $Fe^{3+}$ ) cations. The insoluble precipitate is removed through the existing facility clarification processes.

A chemical storage and feed system with capacity to feed an estimated 100 gallons/day of 38.8 percent ferric chloride required to meet the 1,395 kg/yr 12-month rolling average limit. Projected usage of ferric chloride for chemical phosphorus removal is estimated at 35-50 gallons per day at the design load of 1,244 lb  $CBOD_5$ /day and 44 lb P/day.

In addition to increased solids production, additional concerns related to ferric chloride usage include 1) an increase in effluent chloride concentration; 2) a decrease in alkalinity concentration; 3) increase dosage requirements below an effluent phosphorus concentration of approximately 1.0 mg/L and 4) the potential for heavy metal contaminants as ferric chloride solutions may be generated as a byproduct of a metal manufacturing process.

#### C. Biological Phosphorus Removal

In general, the biological phosphorus removal process creates anoxic and anaerobic zones and utilizes changes in the dissolved oxygen concentration to encourage growth of specific organisms that uptake phosphorus in excess of that needed for normal cell growth.

Modification of the treatment facility to provide biological phosphorus removal requires significant infrastructure modifications of the existing aeration basins, blowers and diffusers, construction of an anoxic zone with mixing and internal recycle.

Additional improvements related to the biosolids treatment and storage will also be required as flow and load exceeds the currently permitted capacity.

#### D. Biological Nitrogen Removal

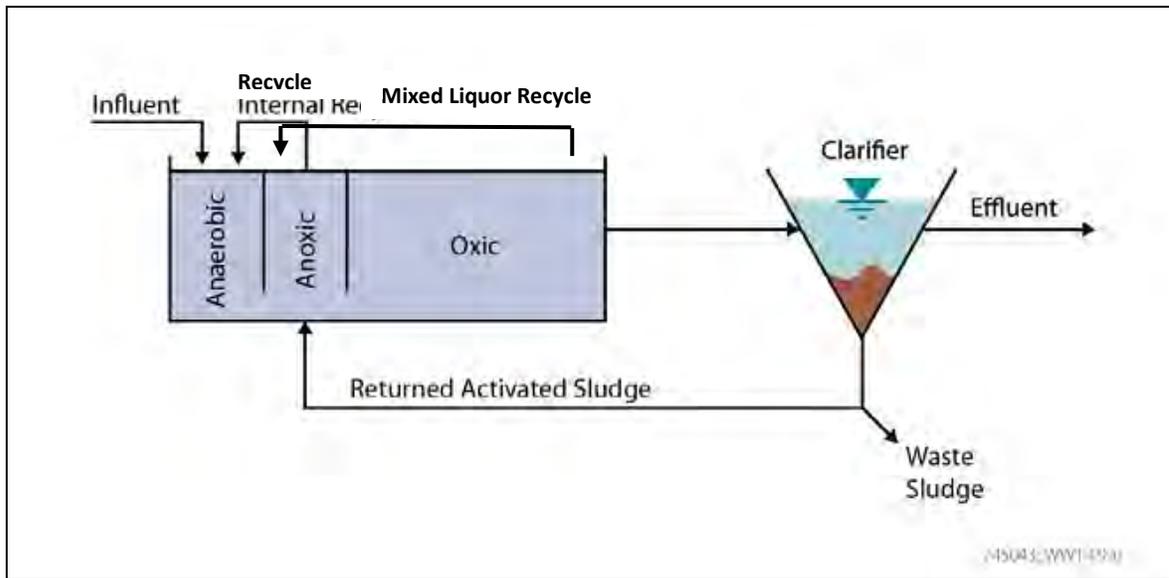
Enhancement of the biological phosphorus removal process to an enhanced biological nutrient removal (EBNR) process that also provides denitrification requires construction of two unaerated zones (anaerobic and anoxic) and an internal recycle of the nitrified (aeration basin effluent) wastewater to the anaerobic basin and mixed liquor recycle to the anoxic basin. A process flow diagram for the proposed improvements is included as Figure 5.1.

Additional benefits associated with nitrogen removal include alkalinity recovery, compliance with anticipated total nitrogen effluent limits and reduced aeration demand.

It is recommended that future facility improvements are designed to incorporate biological phosphorus removal. This will reduce annual chemical and biosolids processing expenditures as well as minimize impact of chloride ions on effluent quality and alkalinity demand.

Driving factors associated with major facility improvements include the condition of the

existing activated sludge processes and increases in flow and load beyond the current permitted conditions.



**Figure 5.1 – Biological Nutrient Removal Process Flow Diagram**

E. Facility Classification

Based on the proposed improvements, the Watertown WWTF will become a Class A treatment facility.

The current facility is classified as Class B. Additional requirements for a Class A facility include a Class A operator, an additional 8 hours of operator training every three years, and more frequent analytical sampling and analysis. In addition, a Type IV certified operator is required for land application of biosolids.

## VI. COST OPINIONS

### A. General

In order to prepare the preliminary construction cost opinions presented herein, various material and equipment manufacturers and suppliers were contacted. Published and unpublished data on costs for similar kinds of construction were also utilized.

The cost opinion generated is based on 2017 unit prices. Increases in construction costs due to inflation are not taken into account. Annual inflation rates for this type of construction have ranged from approximately 4-6 percent in recent years. The cost opinions presented are intended for use as a guideline in the decision process.

### B. Capital Cost

The estimated capital cost for the three phases of recommended improvements discussed in Section 4 are presented in Table 6.1. Engineering, construction observation, staking and administration have been included. A 15 percent contingency has also been applied. A more detailed cost opinion will be developed in conjunction with preparation of detailed plans and specifications.

Table 6.1: Preliminary Opinion of Costs Wastewater Treatment Facility City of Watertown, MN	
Upgrade Item	Estimated Cost
Replace existing secondary clarifier mechanisms	\$350,000
Convert anaerobic digester to aerated storage tank	\$450,000
Provide a dedicated sludge storage tank blower	\$250,000
Construct biosolids storage and loadout facility	\$1,000,000
RAS/WAS pumping improvements	\$550,000
Replace effluent Filtration	\$2,900,000
Chemical storage and feed for phosphorus removal	\$150,000
Expanded aeration basin	\$790,000
New anaerobic and anoxic basin for nutrient removal	\$900,000
Replace aeration blowers	\$350,000
Construct additional final clarifier(s)	\$400,000
Replace preliminary treatment	\$1,000,000
Disinfection upgrade	\$700,000
Refurbish lab and office area	\$250,000
New SCADA system	\$300,000
Modify lagoon return system	\$90,000
<b>Total</b>	<b>\$10,430,000</b>

### C. Operations and Maintenance

Primary increased operations and maintenance expenditures include electricity for pumping and aeration, chemicals for phosphorus removal, increased sampling and monitoring, labor and biosolids treatment and disposal. The estimated annual increase in O&M expenditures should be added to the current annual O&M budget.

## VII. RECOMMENDATIONS AND IMPLEMENTATION

### A. Recommendations

It is recommended that the Watertown Treatment Facility undertake a major capital project that addresses the items listed in Table 5.1 to meet future capacity, permit demands and to maintain current equipment. compliance requirements.

### B. Project Funding

The City of Watertown will construct and operate the proposed treatment facility improvements and may request loan and grant participation from various funding agencies. The Minnesota Public Facilities Authority (PFA) provides funding for municipal wastewater projects through the Clean Water Revolving Fund, Point Source Implementation Grants and the Wastewater Infrastructure Fund (WIF).

The **Clean Water Revolving Fund** helps communities build or upgrade wastewater treatment plants to comply with discharge standards in the federal Clean Water Act. Allowable costs include site preparation, construction, engineering, equipment and machinery, bond issuance and fees. Projects must be listed on the Minnesota Pollution Control Agency's Project Priority List (PPL) and the PFA's Intended Use Plan (IUP). This is a loan program with a typical 20-year amortization term and a discounted interest rate.

**Point Source Implementation Grants** provide assistance with wasteload reductions associated with a total maximum daily load (TMDL) or other water quality based effluent limits that are incorporated into a NPDES/SDS permit that exceed secondary treatment limits. Eligible project costs are calculated and a maximum 80 percent of the associated project requirements are eligible for grant funds, up to \$7,000,000. Items associated with phosphorus, nitrogen and perhaps mercury removal may be eligible for the Point Source Implementation Grant.

The **Wastewater Infrastructure Fund** provides supplemental grants based on affordability criteria to address existing environmental or public health problems. This program is similar to the Clean Water Revolving Fund in that the project must be listed on the PPL and IUP, however, eligible cost for WIF funds are those necessary to meet an existing wastewater treatment need. Costs related to future residential, commercial and industrial growth are not eligible. Municipalities not receiving funding from Rural Development may receive a WIF grant in conjunction with the CWRF loan when the average per household system costs exceed 1.4 percent of the median household income, or approximately \$900 annually based on a median household income of \$63,333. WIF grants are capped at \$4.0 million or \$15,000 per connection, whichever is less.

### C. User Fees and Allocations

Wastewater user fees are typically designed to support the wastewater collection and treatment system without support from local taxes or operating budgets. In addition, user rates should be designed such that each user pays a representative share for both the capital and operations, maintenance and replacement (O, M & R) expenses reflective of the actual flow and loading discharged to the system.

Rate structure specifics must be designed around the final terms and conditions associated with project funding and operation and maintenance.

D. Project Implementation

A range of project schedule dates is proposed below. The actual project schedule will depend on the availability of funding and a permit compliance schedule that has not yet been negotiated at the time of writing. The proposed recommendations do not address the anticipated chloride reduction requirements.

	<b>Quickest Project Schedule</b>	<b>Preferred Project Start Schedule</b>
Submit Facility Plan to MPCA	March 2018	March 2018
Request placement on the 2018 Intended Use Plan (IUP)	April 2018	April 2018
Submit PSIG application	July 2018	July 2018
Funding package determination	September 2018	September 2019
Submit Plans and Specifications to the MPCA	January 2019	January 2020
Start Construction	July 2019	July 2020
Finish Construction	December 2020	December 2021

## Appendix A: NPDES Discharge Permit



STATE OF MINNESOTA  
**Minnesota Pollution Control Agency**

**Municipal Division**

**National Pollutant Discharge Elimination System (NPDES)/  
State Disposal System (SDS) Permit MN0020940**

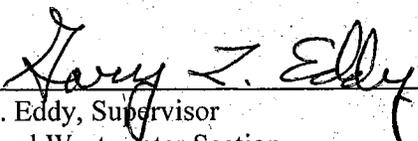
**PERMITTEE:** City of Watertown  
**FACILITY NAME:** Watertown WWTP  
**RECEIVING WATER:** South Fork of Crow River (Class 2B,3B,4A,4B,5,6 water)

**CITY OR TOWNSHIP:** City of Watertown      **COUNTY:** Carver  
**ISSUANCE DATE:** October 30, 2009      **EXPIRATION DATE:** September 30, 2014

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 protect water quality in accordance with Minnesota and US statutes and rules, including Minn. Stat. chs. 115 and 116, Minn. R. chs. 7001, 7041, 7048, 7049, 7050, 7053, 7060 and the US Clean Water Act.

This permit is effective on the issuance date identified above, and supersedes the previous permit that was issued for this facility on October 1, 2004. This permit expires at midnight on the expiration date identified above.

Signature:   
Gary L. Eddy, Supervisor      for The Minnesota Pollution Control Agency  
Municipal Wastewater Section  
Municipal Division

**Submit DMRs to:**

Attention: Discharge Monitoring Reports  
Minnesota Pollution Control Agency  
520 Lafayette Rd N  
St Paul, MN 55155-4194

**Submit Other WQ Reports to:**

Attention: WQ Submittals Center  
Minnesota Pollution Control Agency  
520 Lafayette Rd N  
St Paul, MN 55155-4194

**Questions on this permit?**

- For DMR and other permit reporting issues, contact:  
Belinda Nicholas, 651-757-2613.
- For specific permit requirements or permit compliance status, contact:  
Charly Wojtysiak, 651-757-2831.
- General permit or NPDES program questions, contact:  
MPCA, 651-282-6143 or 1-800-657-3938.

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## **Facility Description**

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The application and plans indicate that the existing Watertown Wastewater Treatment System (Facility) consists of a lift station, mechanical bar screen, flow equalization basin, three extended aeration basins, two final clarifiers, two traveling bridge sand filters, chlorine disinfection, anaerobic digester, a sludge storage tank and two solids storage bags (geotubes). This is a Class B facility.

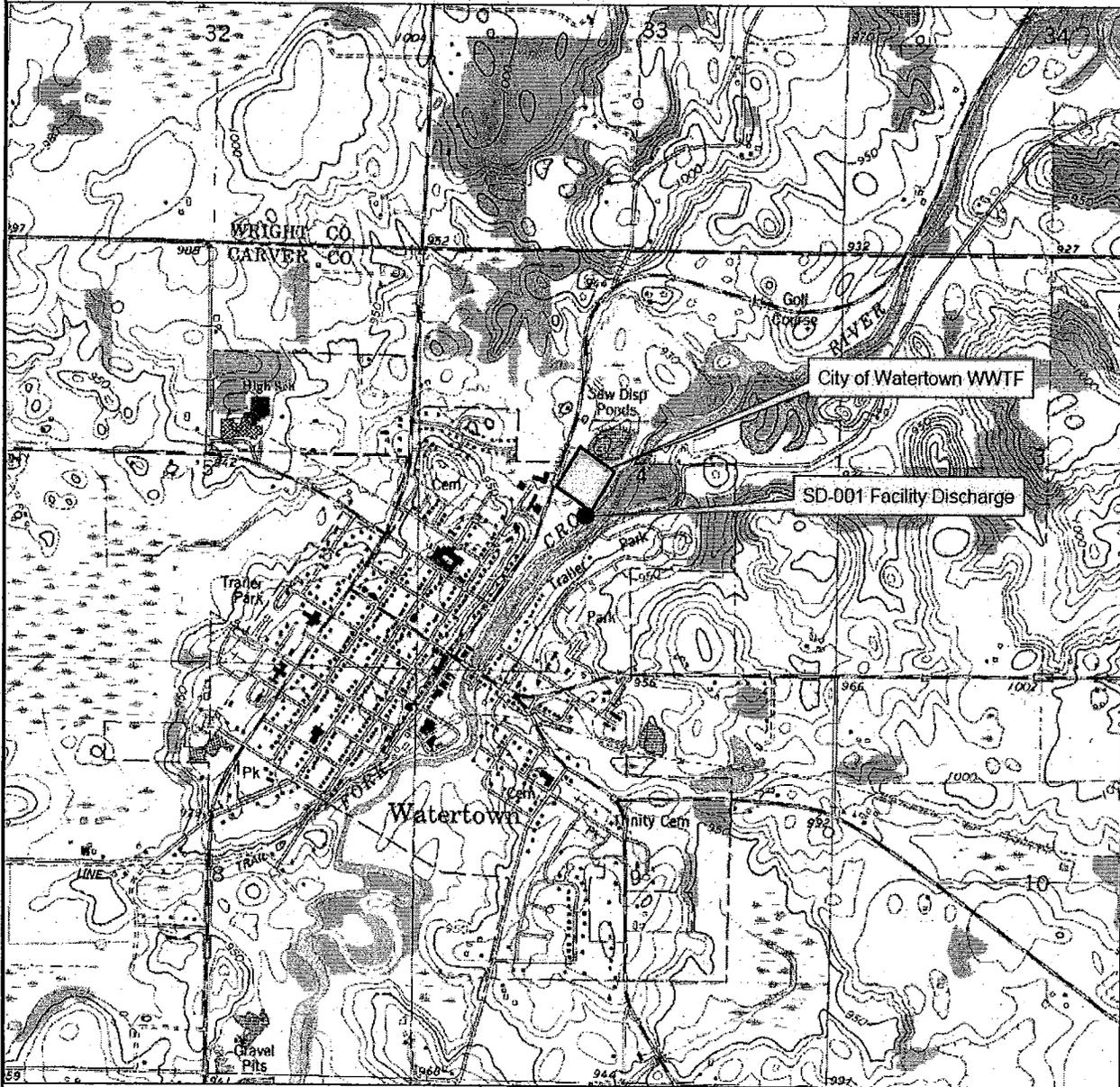
The Facility is designed to treat an average wet weather flow of 1,200,000 gallons per day (gpd), an average dry weather flow of 800,000 gpd, and a 5-day biochemical oxygen demand (BOD<sub>5</sub>) strength of 577 pounds per day. The discharge is continuous to the south fork of the Crow River (Class 2B, 3B, 4A, 4B, 5, 6 Water).

There are no known designed bypass or overflow points in the treatment system. The location of designated monitoring stations is specified on the attached "Summary of Stations and Station Locations" report. The location of the facility is shown on the attached topographical map.

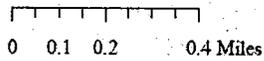
The January 1, 1988, calculated design average wet weather flow for this facility is 1.262 mgd. In accordance with MPCA rules regarding nondegradation for all waters, the design average wet weather flow of the facility as of January 1, 1988, and associated mass loading are the baseline design flow and mass loading. This baseline flow and mass loading will be used to determine whether nondegradation review is required for any change in the discharge. Any change that results in an increase in design flow greater than 0.2 mgd and an increased loading of one or more pollutants, or any change in a discharge containing a toxic pollutant that results in a mass loading rate likely to increase the concentration of the toxicant in the receiving water by greater than one percent over the baseline quality, is subject to nondegradation review in accordance with Minn. R. 7050.0185.

### Topographic Map of Permitted Facility

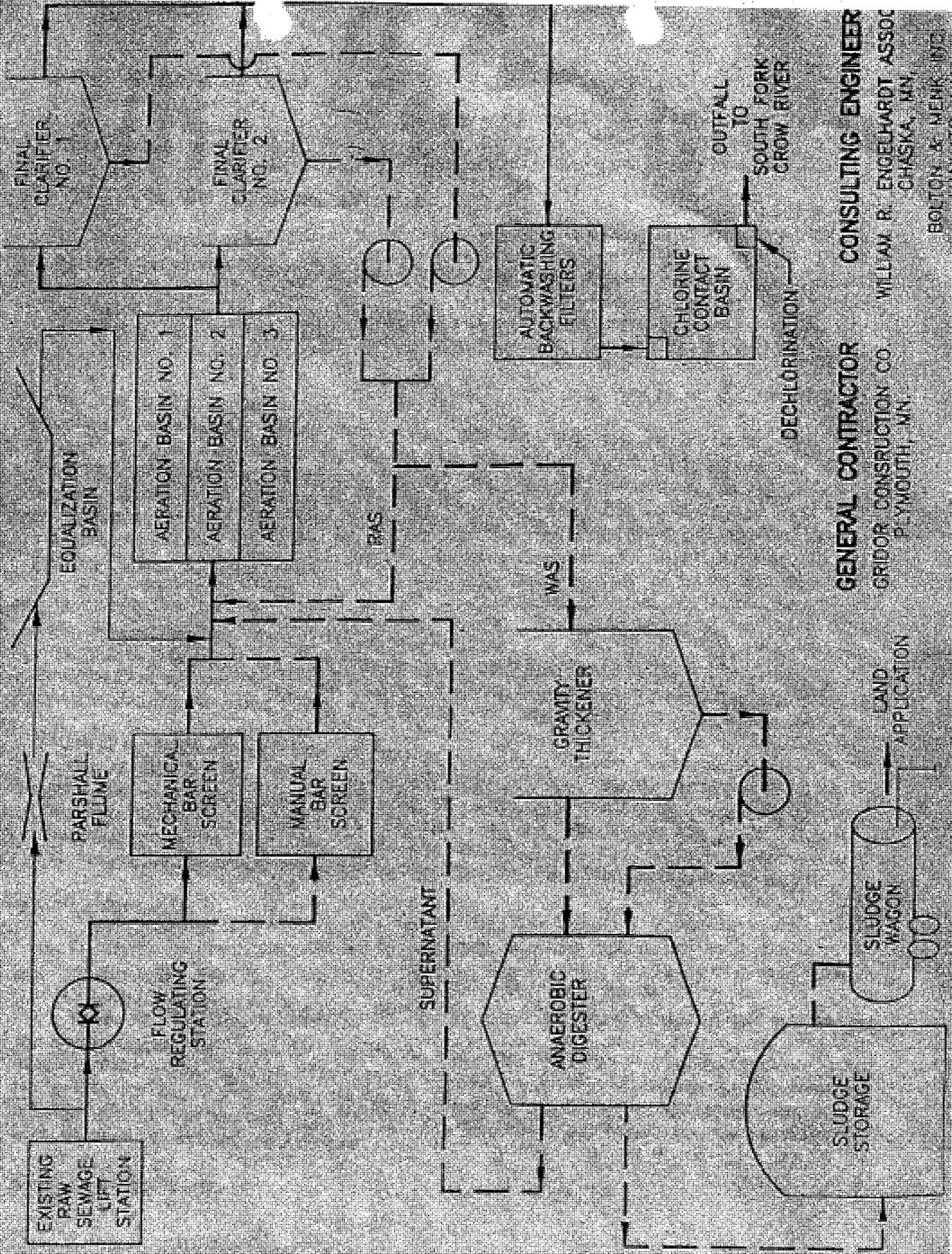
MN0020940: City of Watertown Waste Water Treatment Facility  
SE Quarter of T117N, R25W, Section 4  
Watertown, Carver County, Minnesota



Map produced by: MPCA Staff, 3/31/2009  
Source: USGS Watertown Quad  
Scale: 1:20,000



**PROCESS FLOW DIAGRAM  
WASTEWATER TREATMENT FACILITIES  
CITY OF WATERTOWN, MINNESOTA**



**GENERAL CONTRACTOR** GRIDOR CONSTRUCTION CO. PLYMOUTH, MN.

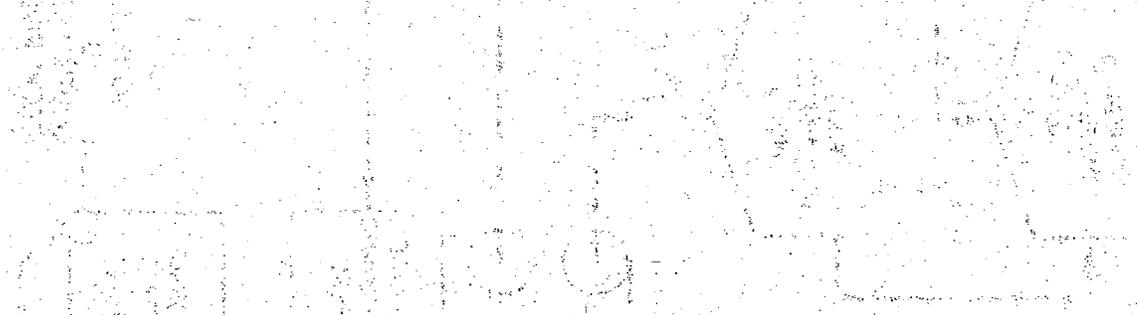
**CONSULTING ENGINEER** WILLIAM R. ENGELHARDT ASSOC. CHASKA, MN.

BOLTON & MENK, INC. WANKATO, MN.

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11



# Watertown WWTP Summary of Stations

## Surface Discharge Stations

<u>Station</u>	<u>Type of Station</u>	<u>Local Name</u>	<u>PLS Location</u>
SD001	Effluent To Surface Water	Total Facility Discharge	SE Quarter of Section 4, Township 117 North, Range 25 West

## Waste Stream Stations

<u>Station</u>	<u>Type of Station</u>	<u>Local Name</u>	<u>PLS Location</u>
WS001	Influent Waste	Influent waste stream	SE Quarter of Section 4, Township 117 North, Range 25 West



## Watertown WWTP Limits and Monitoring Requirements

The Permittee shall comply with the limits and monitoring requirements as specified below.

## SD 001: Total Facility Discharge

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency	Notes
Bicarbonates	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month	3
BOD, Carbonaceous 05 Day (20 Deg C)	23.9	kg/day	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C)	5	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C)	47.7	kg/day	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C)	10	mg/L	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C) Percent Removal	85	%	Minimum Calendar Month Average	Jan-Dec	Calculation	1 x Week	
Calcium, Total (as Ca)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month	3
Chloride, Total	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month	3
Chlorine, Total Residual	0.038	mg/L	Daily Maximum	Jan-Dec	Grab	1 x Day	4
Fecal Coliform, MPN or Membrane Filter 44.5C	200	#100ml	Calendar Month Geometric Mean	Apr-Oct	Grab	1 x Week	
Flow	Monitor Only	mgd	Calendar Month Average	Jan-Dec	Measurement, Continuous	1 x Day	
Flow	Monitor Only	mgd	Calendar Month Maximum	Jan-Dec	Measurement, Continuous	1 x Day	
Flow	Monitor Only	MG	Calendar Month Total	Jan-Dec	Measurement, Continuous	1 x Day	
Hardness, Carbonate (as CaCo3)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month	3
Magnesium, Total (as Mg)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month	3
Mercury, Total (as Hg)	Monitor Only	ng/L	Calendar Month Average	Jan, July	Grab	1 x Month	2
Nitrite Plus Nitrate, Total (as N)	Monitor Only	mg/L	Calendar Month Average	Apr, Sep	24-Hour Flow Composite	1 x Month	
Nitrogen, Ammonia, Total (as N)	36.7	kg/day	Calendar Month Average	Dec-Mar	24-Hour Flow Composite	1 x Week	
Nitrogen, Ammonia, Total (as N)	7.7	mg/L	Calendar Month Average	Dec-Mar	24-Hour Flow Composite	1 x Week	
Nitrogen, Ammonia, Total (as N)	114.5	kg/day	Calendar Month Average	Apr-May	24-Hour Flow Composite	1 x Week	
Nitrogen, Ammonia, Total (as N)	24	mg/L	Calendar Month Average	Apr-May	24-Hour Flow Composite	1 x Week	
Nitrogen, Ammonia, Total (as N)	6.7	kg/day	Calendar Month Average	Jun-Sep	24-Hour Flow Composite	1 x Week	
Nitrogen, Ammonia, Total (as N)	1.4	mg/L	Calendar Month Average	Jun-Sep	24-Hour Flow Composite	1 x Week	
Nitrogen, Ammonia, Total (as N)	24.3	kg/day	Calendar Month Average	Oct-Nov	24-Hour Flow Composite	1 x Week	
Nitrogen, Ammonia, Total (as N)	5.1	mg/L	Calendar Month Average	Oct-Nov	24-Hour Flow Composite	1 x Week	
Nitrogen, Kjeldahl, Total	Monitor Only	mg/L	Calendar Month Average	Apr, Sep	24-Hour Flow Composite	1 x Month	
Oxygen, Dissolved	Monitor Only	mg/L	Calendar Month Minimum	Jan-Dec	Grab	1 x Day	1
pH	9.0	SU	Calendar Month Maximum	Jan-Dec	Grab	1 x Week	1

## Watertown WWTP Limits and Monitoring Requirements

The Permittee shall comply with the limits and monitoring requirements as specified below.

**SD 001: Total Facility Discharge**

Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency	Notes
pH	6.0	SU	Calendar Month Minimum	Jan-Dec	Grab	1 x Week	1
Phosphorus, Total (as P)	Monitor Only	kg/day	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Phosphorus, Total (as P)	Monitor Only	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Potassium, Total (as K)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month	
Salinity, Total	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month	3
Sodium, Total (as Na)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month	3
Solids, Total Dissolved (TDS)	Monitor Only	mg/L	Calendar Month Average	Apr, Sep	24-Hour Flow Composite	1 x Month	
Solids, Total Suspended (TSS)	143	kg/day	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	30	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	214	kg/day	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	45	mg/L	Maximum Calendar Week Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS) Percent Removal	85	%	Minimum Calendar Month Average	Jan-Dec	Calculation	1 x Week	
Specific Conductance	Monitor Only	umh/cm	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month	3
Sulfate, Total (as SO4)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Month	3

**WS 001: Influent waste stream**

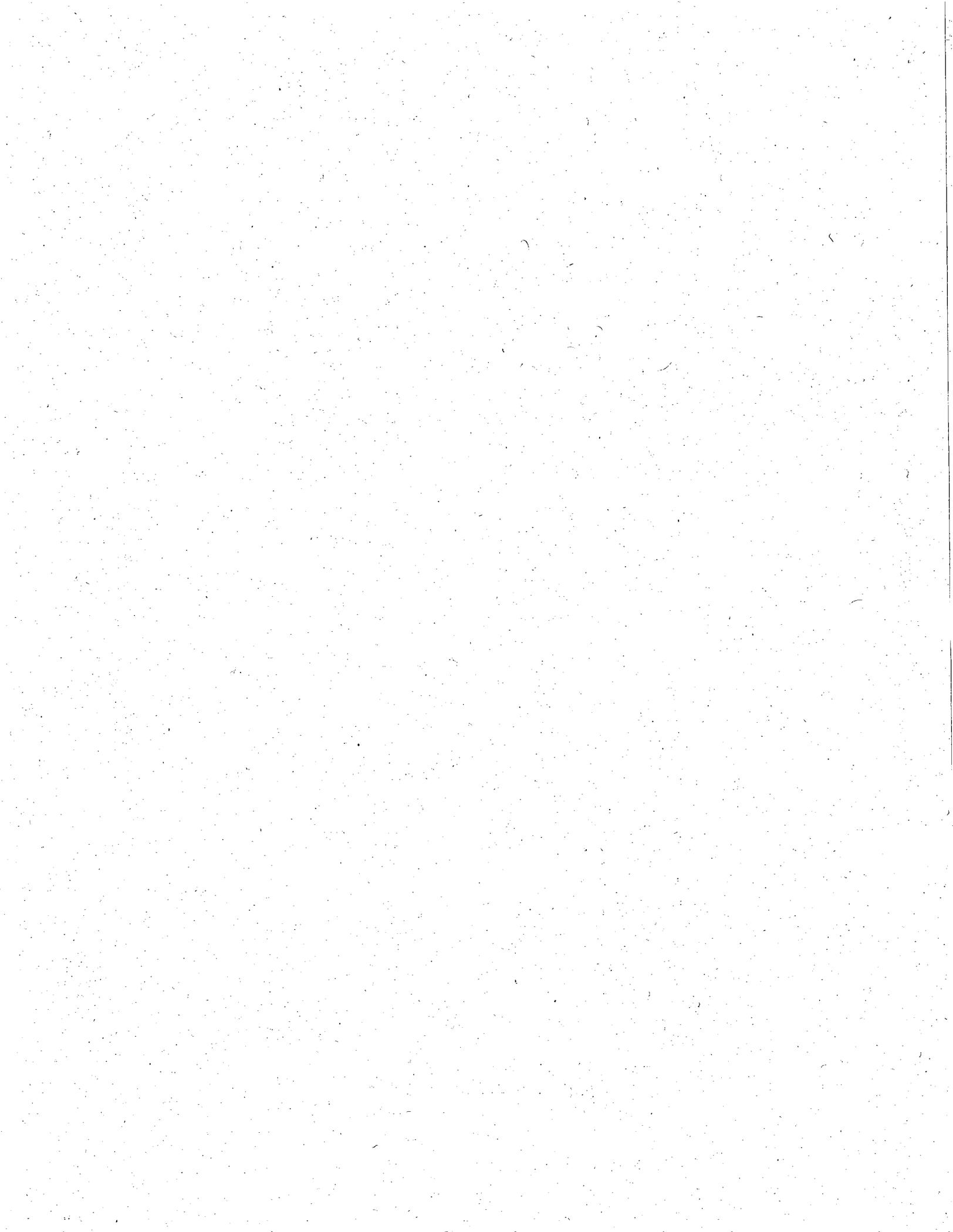
Parameter	Limit	Units	Limit Type	Effective Period	Sample Type	Frequency	Notes
BOD, Carbonaceous 05 Day (20 Deg C)	Monitor Only	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
BOD, Carbonaceous 05 Day (20 Deg C)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Week	
Mercury, Total (as Hg)	Monitor Only	ng/L	Calendar Month Average	Jan, July	Grab	1 x Month	2
pH	Monitor Only	SU	Calendar Month Maximum	Jan-Dec	Grab	1 x Week	1
pH	Monitor Only	SU	Calendar Month Minimum	Jan-Dec	Grab	1 x Week	1
Phosphorus, Total (as P)	Monitor Only	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Precipitation	Monitor Only	in	Calendar Month Total	Jan-Dec	Measurement	1 x Day	
Solids, Total Suspended (TSS)	Monitor Only	mg/L	Calendar Month Average	Jan-Dec	24-Hour Flow Composite	1 x Week	
Solids, Total Suspended (TSS)	Monitor Only	mg/L	Calendar Month Maximum	Jan-Dec	24-Hour Flow Composite	1 x Week	

**Watertown WWTP**  
**Limits and Monitoring Requirements**

The Permittee shall comply with the limits and monitoring requirements as specified below.

Notes:

- 1 -- Analyze immediately.
- 2 -- EPA method 1631, with clean techniques method 1669, and any revisions to those methods. Please refer to Chapter 3, Mercury Minimization plan for further information.
- 3 -- The Permittee may request a reduction in monitoring if after two years of data ( a minimum of 10 data points), the monitoring does not indicate a reasonable potential to exceed a limit.
- 4 -- Whenever chlorine is added. Analyze immediately. This means within 15 minutes or less of sample collection. A Method Detection Limit and a Reporting Limit must be established for this parameter. The Reporting Limit cannot be greater than 0.1 mg/L.



## Chapter 1. Special Requirements

### 1. Special Requirements

- 1.1 This permit includes monitoring requirements for ten parameters associated with a salty discharge. These parameters must be sampled for once per month. After two years of monitoring, data will be reviewed for reasonable potential to exceed a limit. If the monitoring does not indicate a potential to exceed a limit, the Permittee may request a reduction in monitoring.
- 1.2 Additional ammonia and nitrogen monitoring is required by 40 Code of Federal Regulations 122.21j. Effluent monitoring is required two times per year, in April and September for Total Nitrite + Nitrate as (N), Total Nitrogen Kjeldahl and Total Dissolved Solids. Samples shall be collected from the final cell outlet control structure. The results of the monitoring will be recorded on a Nitrogen Supplemental Form.

## Chapter 2. Surface Discharge Stations

### 1. Requirements for Specific Stations

- 1.1 SD 001: Submit a monthly DMR monthly by 21 days after the end of each calendar month following permit issuance.

### 2. Sampling Location

- 2.1 Samples for Station SD-001 shall be taken at a point representative of the total facility discharge.
- 2.2 Samples and measurements required by this permit shall be representative of the monitored activity.

### 3. Surface Discharges

- 3.1 Floating solids or visible foam shall not be discharged in other than trace amounts.
- 3.2 Oil or other substances shall not be discharged in amounts that create a visible color film.
- 3.3 The Permittee shall install and maintain outlet protection measures at the discharge stations to prevent erosion.

### 4. Winter Sampling Conditions

- 4.1 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.

### 5. Discharge Monitoring Reports

- 5.1 The Permittee shall submit monitoring results for discharges in accordance with the limits and monitoring requirements for this station. If no discharge occurred during the reporting period, the Permittee shall check the "No Discharge" box on the Discharge Monitoring Report (DMR).

## Chapter 3. Waste Stream Stations

### 1. Requirements for Specific Stations

- 1.1 WS 001: Submit a monthly DMR monthly by 21 days after the end of each calendar month following permit issuance.

### 2. Sampling Location

- 2.1 Samples for Station WS-001 shall be taken at a point representative of the total facility influent flow.

## Chapter 4. Non-waste Streams -- Mercury Minimization Plan

### 1. Mercury Pollutant Minimization Plan

- 1.1 Mercury is present in all municipal and many industrial wastewater discharges. Mercury is a powerful neurotoxin that affects human health and the environment. A naturally-occurring element, mercury does not break down into less-harmful substances over time. Instead, mercury released into the environment accumulates in fish and animal tissues, a process known as bioaccumulation. Widespread mercury contamination has prompted the Minnesota Department of Health (MDH) to issue fish consumption advisories throughout the state. Most of Minnesota's impaired waters are contaminated by mercury and other bioaccumulative toxins. The MPCA is carefully evaluating all mercury discharges in the state.
- 1.2 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 must 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.
- 1.3 The Permittee shall submit a Pollutant Minimization Plan by 180 days before permit expiration. At a minimum, the MMP must 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, and industries with potential for mercury contributions). You should also consider other influent mercury sources, such as stormwater inputs, ground water (inflow & infiltration) inputs, 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.
- 1.4 In addition to the sampling required in the Limits and Monitoring section of this permit, the Permittee shall sample effluent from the total facility discharge station for Dissolved Mercury and TSS twice per year throughout the life of this permit. The sampling method is a concurrent grab sample for the two parameters. Dissolved Mercury shall be analyzed using an EPA approved low level mercury analysis method. Samples shall be taken in January and July and reported on the custom supplemental form provided by the MPCA. The custom supplemental form must be submitted with the DMR for the month when sample is collected.

## Chapter 5. Phosphorus Management Plan

### 1. General Requirements

- 1.1 Phosphorus is a common constituent in many wastewater discharges and a pollutant that has the potential to negatively impact the quality of Minnesota's lakes, wetlands, rivers and streams. Therefore, phosphorus discharges are being carefully evaluated throughout the state.

The Permittee is required to complete and submit a Phosphorus Management Plan (PMP) to the MPCA as detailed in this section. If the Permittee has already submitted a PMP, the Permittee must update that PMP and submit the updated PMP to the MPCA as detailed in this section.

While the PMP does not require specific reductions at this time, the MPCA strongly encourages the Permittee to identify and eliminate/reduce sources of phosphorus to, and improve phosphorus management within, the permitted wastewater treatment facility. However, be aware that new or expanding discharges may be required to actively manage and reduce phosphorus, including complying with new or tighter phosphorus effluent limits.

For additional information about completing the PMP below, please contact the MPCA at 651-282-6143 or 800-657-3864.

- 1.2 The Permittee shall submit a Phosphorus Management Plan (PMP) or an updated PMP to the MPCA 180 days prior to permit expiration.

At a minimum, the PMP shall include the following:

- a. A summary of influent and effluent concentrations, mass loadings, and percent removal calculations using the most recent five years of monitoring data, if available.
- b. Identification of existing and potential sources of elevated phosphorus concentrations and/or loading to the facility. As appropriate for the facility, consider residential, institutional, municipal, and commercial sources.
- c. An evaluation of past and present WWTF operations to determine those operating procedures that maximize phosphorus removal.
- d. A summary of any phosphorus reduction activities implemented during the last five years.
- e. Phosphorus management and reduction goals for the next five years using the information collected in A through D above.
- f. A plan to implement phosphorus management and reduction measures during the next five years.

## Chapter 6. Total Residual Oxidants - Domestic

### 1. General Requirements

1.1 "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, or below the Reportable Limit (RL).
  - b. If the concentration of TRC in the first sample is greater than 0.038 mg/L or greater than the RL, reporting the average of two to twelve samples analyzed in a 24-hour period is allowed. The second sample must 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 Reportable Limit for TRC are assumed to be zero for averaging purposes only. Whenever daily TRC values are averaged, the 0.038 mg/L limit must be met and the average value must be reported, not < the RL.
  - c. The average value of multiple daily TRC effluent sample analyses must meet the 0.038 mg/L limit to be in compliance.
- 1.2 Total Residual Chlorine must be analyzed immediately. This means within 15 minutes or less of sample collection. (40 CFR Part 136 and Standard Methods for the Examination of Water and Wastewater, Latest Edition)
- 1.3 A Method Detection Limit (MDL) must be established for this parameter.
- 1.4 The Reportable Limit must be established for this parameter. This should be based on the Method Detection Limit and laboratory, analyst, and equipment used in the analysis. The Reportable Limit cannot be greater than 0.1 mg/L.
- 1.5 The Method Detection Limit and Reportable Limit should be reassessed when the method, equipment, laboratory, or analyst changes.
- 1.6 Monitoring results below the Reportable Limit should be reported as "<" the Reportable Limit. For example, if the Reportable Limit is 0.01 mg/L and a parameter is not detected at a value of 0.01 mg/L or greater, the concentration shall be reported as "<0.01mg/L." The symbol "<" means "less than."
- 1.7 The equipment should be checked against a known standard at least monthly.

## Chapter 7. Domestic Wastewater -- Mechanical System

### 1. Bypass Structures

- 1.1 All structures capable of bypassing the treatment system shall be manually controlled and kept locked at all times.

### 2. Sanitary Sewer Extension Permit

- 2.1 The Permittee may be required to obtain a Sanitary Sewer Extension Permit from the MPCA prior to the start of construction of any addition, extension or replacement to the sanitary sewer. If a sewer extension permit is required, no construction of any part of the system may begin until that permit has been issued.

### 3. Operator Certification

- 3.1 The Permittee shall provide a Class B 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.
- 3.2 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.

## Chapter 7. Domestic Wastewater -- Mechanical System

### 3. Operator Certification

- 3.3 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.
- 3.4 The Permittee shall notify the MPCA within 30 days of a change in operator certification or contract status.

## Chapter 8. Pretreatment

### 1. Pretreatment - Definitions

- 1.1 An "Individual Control Mechanism" is a document, such as an agreement or permit, that imposes limitations or requirements on an individual industrial user of the POTW.
- 1.2 "Significant Industrial User" (SIU) means any industrial user that:
- discharges 25,000 gallons per day or more of process wastewater;
  - contributes a load of five (5) % or more of the capacity of the POTW; or
  - is designated as significant by the Permittee or the MPCA on the basis that the SIU has a reasonable potential to adversely impact the POTW, or the quality of its effluent or residuals. (Minn. R. 7049.0120, Subp. 24)

### 2. Pretreatment - Permittee Responsibility to Control Users

- 2.1 It is the Permittee's responsibility to regulate the discharge from users of its wastewater treatment facility. The Permittee shall prevent any pass through of pollutants or any inhibition or disruption of the Permittee's facility, its treatment processes, or its sludge processes or disposal that contribute to the violation of the conditions of this permit or any federal or state law or regulation limiting the release of pollutants from the POTW. (Minn. R. 7049.0600)
- 2.2 The Permittee shall prohibit the discharge of the following to its wastewater treatment facility:
- pollutants which create a fire or explosion hazard, including any discharge with a flash point less than 60 degrees C (140 degrees F);
  - pollutants which would cause corrosive structural damage to the POTW, including any waste stream with a pH of less than 5.0;
  - solid or viscous pollutants which would obstruct flow;
  - heat that would inhibit biological activity, including any discharge that would cause the temperature of the waste stream at the POTW treatment plant headworks to exceed 40 degrees C (104 degrees F);
  - pollutants which produce toxic gases, vapors, or fumes that may endanger the health or safety of workers; or
  - any pollutant, including oxygen demanding pollutants such as biochemical oxygen demand, released at a flow rate or pollutant concentration that will cause interference or pass through. (Minn. R. 7049.0140)

## Chapter 8. Pretreatment

### 2. Pretreatment - Permittee Responsibility to Control Users

- 2.3 The Permittee shall prohibit new discharges of non-contact cooling waters unless there is no cost effective alternative. Existing discharges of non-contact cooling water to the Permittee's wastewater treatment facility shall be eliminated, where elimination is cost-effective, or where an infiltration/inflow analysis and sewer system evaluation survey indicates the need for such removal.
- 2.4 If the Permittee accepts trucked-in wastes, the Permittee shall evaluate the trucked in wastes prior to acceptance in the same manner as it monitors sewered wastes. The Permittee shall accept trucked-in wastes only at specifically designated points. (Minn. R. 7049.0140, Subp. 4)
- 2.5 Pollutant of concern means a pollutant that is or may be discharged by an industrial user that is, or reasonably should be of concern on the basis that it may cause the permittee to violate any permit limits on the release of pollutants. The following pollutants shall be evaluated to determine if they should be pollutants of concern: pollutants limited in this permit, pollutants for which monitoring is required in this permit, pollutants that are likely to cause inhibition of the Permittee's POTW, pollutants which may interfere with sludge disposal, pollutants for which the Permittee's treatment facility has limited capacity, and pollutants which may contribute to a downstream water impairment. (Minn. R. 7049.0120, Subp. 13)

### 3. Control of Significant Industrial Users

- 3.1 The Permittee shall impose pretreatment requirements on SIUs which will ensure compliance with all applicable effluent limitations and other requirements set forth in this permit or any federal or state law or regulation limiting the release of pollutants from the POTW. These requirements shall be applied to SIUs by means of an individual control mechanism. (Minn. R. 7049.0600)
- 3.2 The Permittee shall not knowingly enter into an individual control mechanism with any user that would allow the user to contribute an amount or strength of wastewater that would cause violation of any limitation or requirement in the permit, or any applicable federal, state or local law or regulation. (Minn. R. 7049.0600 Subp. 3)

### 4. Monitoring of Significant Industrial Users

- 4.1 The Permittee shall obtain from SIUs specific information on the quality and quantity of the SIU's discharges to the Permittee's POTW. Except where specifically requested by the Permittee and approved by the MPCA, this information shall be obtained by means of representative monitoring conducted by the Permittee or by the SIU under requirements imposed by the Permittee in the SIU's individual control mechanism. Monitoring performed to comply with this requirement shall include all pollutants for which the SIU is significant and shall be done at a frequency commensurate with the significance of the SIU. (Minn. R. 7049.0710)

### 5. Reporting and Notification

- 5.1 If a SIU discharges to the POTW during a given calendar year, the Permittee shall submit a Pretreatment Annual Report for that calendar year, due by January 31 of the following year. The Pretreatment Annual Report shall be submitted on forms provided by the agency or shall provide equivalent information.

The Permittee shall submit the pre-treatment report to the following address:

MPCA  
Attn: WQ Submittals Center  
520 Lafayette Road North  
St. Paul, Minnesota 55155-4194 (Minn. R. 7049.0720)

## **Chapter 8. Pretreatment**

### **5. Reporting and Notification**

5.2 The Permittee shall notify the MPCA in writing of any:

- a. SIU of the Permittee's POTW which has not been previously disclosed to the MPCA;
- b. anticipated or actual changes in the volume or quality of discharge by an industrial user that could result in the industrial user becoming an SIU as defined in this chapter; or
- c. anticipated or actual changes in the volume or quality of discharges by a SIU that would require changes to the SIU's required local limits.

This notification shall be submitted within 30 days of identifying the IU as a SIU. Where changes are proposed, they must be submitted prior to changes being made. (Minn. R. 7049.0700, Subp. 1)

5.3 Upon notifying the MPCA of a SIU or change in a SIU discharge as required above, the Permittee shall submit the following information on forms provided by the agency or in a comparable format:

- a. the identity of the SIU and a description of the SIU's operation and process;
- b. a characterization of the SIU's discharge;
- c. the required local limits that will be imposed on the SIU;
- d. a technical justification of the required local limits; and
- e. a plan for monitoring the SIU which is consistent with monitoring requirements in this chapter. (Minn. R. 7049.0700)

5.4 In addition, the Permittee shall, upon request, submit the following to the MPCA for approval:

- a. additional information on the SIU, its processes and discharge;
- b. a copy of the individual control mechanism used to control the SIU;
- c. the Permittee's legal authority to be used for regulating the SIU; and
- d. the Permittee's procedures for enforcing the requirements imposed on the SIU. (Minn. R. 7049.0700, Subp. 3)

5.5 The permittee shall notify MPCA of any of its industrial users that may be subject to national categorical pretreatment standards.

5.6 This permit may be modified in accordance with Minnesota Rules, ch. 7001 to require development of a pretreatment program approvable under the Federal General Pretreatment Regulation (40 CFR 403).

## **Chapter 9. Biosolids Land Application**

### **1. Authorization**

1.1 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.

1.2 Permittees who prepare bulk biosolids must 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 Minnesota Rules, pt. 7041.0800.

## Chapter 9. Biosolids Land Application

### 2. Compliance Responsibility

- 2.1 The Permittee is responsible for ensuring that the applicable requirements in this chapter and Minnesota Rules ch. 7041 are met when biosolids are prepared, distributed, or applied to the land.

### 3. Notification Requirements

- 3.1 The Permittee shall provide information needed to comply with the biosolids requirements of Minnesota Rules, ch. 7041 to others who prepare or use the biosolids.

### 4. Pollutant Limits

- 4.1 Biosolids which are applied to the land must not exceed the ceiling concentrations in Table 1 and must 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

### 5. Pathogen and Vector Attraction Reduction

- 5.1 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.
- 5.2 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 must also be met.

## Chapter 9. Biosolids Land Application

### 5. Pathogen and Vector Attraction Reduction

5.3 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.

### 6. Management Practices

6.1 The management practices for the land application of biosolids are described in detail in Minnesota Rules, pt. 7041.1200 and must be followed unless specified otherwise in a site approval letter or a permit issued by the MPCA.

6.2 Overall management requirements:

- a. Biosolids must 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 must not be applied to flooded, frozen or snow covered ground so that the biosolids enter wetlands or other waters of the state.
- c. Biosolids must 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.

### 7. Monitoring Requirements

7.1 Representative samples of biosolids applied to the land must 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.

## Chapter 9. Biosolids Land Application

### 7. Monitoring Requirements

7.2 At a minimum, biosolids must be monitored at the frequencies specified in Table 3 for the parameters listed above, and any pathogen or vector attraction reduction requirements in Minnesota Rules, 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).

7.3 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.

7.4 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

### 8. Records

8.1 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.

### 9. Reporting Requirements

9.1 By December 31 following the end of each cropping year, the Permittee shall submit a Biosolids Annual Report for the land application of biosolids on a form provided by or approved by the MPCA. The report shall include the requirements in Minnesota Rules, part 7041.1700.

## Chapter 9. Biosolids Land Application

### 9. Reporting Requirements

- 9.2 If, during any cropping year, biosolids were transferred, or not land applied, the Permittee shall submit a Biosolids Annual Report by December 31 following the end of the cropping year. The report shall state that biosolids were not land applied, how much was generated, and where they were transferred to.
- 9.3 For biosolids that are stored for more than two years, the Biosolids Annual Report must also include the analytical data from the representative sample of the biosolids generated during the cropping year.
- 9.4 The Permittee shall submit the Biosolids Annual Report to:
- Biosolids Coordinator  
Minnesota Pollution Control Agency  
520 Lafayette Road North  
St. Paul, Minnesota 55155-4194
- 9.5 The Permittee must 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.

## Chapter 10. Total Facility Requirements

### 1. General Requirements

#### General Requirements

- 1.1 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. Sec. 115 and 116.
- 1.2 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, item E)
- 1.3 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, item A)
- 1.4 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)
- 1.5 Property Rights. This permit does not convey a property right or an exclusive privilege. (Minn. R. 7001.0150, subp. 3, item C)
- 1.6 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, item O)
- 1.7 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, item D)

## Chapter 10. Total Facility Requirements

### 1. General Requirements

- 1.8 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, item A)
- 1.9 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, item B)
- 1.10 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, is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.
- 1.11 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.
- 1.12 Inspection and Entry. When authorized by Minn. Stat. Sec. 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, item I)
- 1.13 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.

#### Sampling

- 1.14 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))
- 1.15 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, item E)
- 1.16 Certified Laboratory. A laboratory certified by the Minnesota Department of Health shall conduct analyses required by this permit. Analyses of dissolved oxygen, pH, temperature 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. Stat. Sec. 144.97 through 144.98 and Minn. R. 4740.2010 and 4740.2050 through 4740.2120) (Minn. R. 4740.2010 and 4740.2050 through 2120)
- 1.17 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.
- 1.18 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, subp. 2, items B and C)

## Chapter 10. Total Facility Requirements

### 1. General Requirements

- 1.19 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 (Minn. R. 7001.0150, subp. 2, item C):
- 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; and
  - d. The analytical techniques, procedures and methods used; and
  - e. The results of the analysis.
- 1.20 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. (Minn. R. 7001.1090, subp. 1, item D; Minn. R. 7001.0150, subp. 2, item B)

Required forms may include:

#### Supplemental Report Form (Supplemental)

Individual values for each sample and measurement must be recorded on the Supplemental which, if required, will be provided by the MPCA. Supplementals shall be submitted with the appropriate DMRs. You may design and use your own Supplemental; however it must be approved by the MPCA. Note: Required Summary information MUST also be recorded on the DMR. Summary information that is submitted ONLY on the Supplemental does not comply with the reporting requirements.

- 1.21 Submitting Reports. DMRs and Supplementals shall be submitted to:

MPCA

Attn: Discharge Monitoring Reports  
520 Lafayette Road North  
St. Paul, Minnesota 55155-4194.

DMRs and Supplementals shall be postmarked by 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. (Minn. R. 7001.0150, subps. 2.B and 3.H)

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

## Chapter 10. Total Facility Requirements

### 1. General Requirements

- 1.22 Incomplete or Incorrect Reports. The Permittee shall immediately submit an 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. (Minn. R. 7001.0150 subp. 3, item G)
- 1.23 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 must 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, must be certified by a registered professional engineer. (Minn. R. 7001.0540)
- 1.24 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. (Minn. R. 7001.0150, subp. 2, item B)

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, subp. 2, item B)
- 1.25 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, subp. 3, item H)
- 1.26 Confidential Information. Except for data determined to be confidential according to Minn. Stat. Sec. 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 must follow Minn. R. 7000.1300.

### Noncompliance and Enforcement

- 1.27 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. Sec. 115.071 and 116.072, including monetary penalties, imprisonment, or both. (Minn. R. 7001.1090, subp. 1, item B)
- 1.28 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, subp.3, item G., 7001.1090, subps. 1, items G and H and Minn. Stat. Sec. 609.671)

## Chapter 10. Total Facility Requirements

### 1. General Requirements

- 1.29 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))
- 1.30 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. Violations that are determined to pose a threat to human health or a drinking water supply, or represent a significant risk to the environment shall be immediately reported to the Minnesota Department of Public Safety Duty Officer at 1(800)422-0798 (toll free) or (651)649-5451 (metro area). In addition, you may also contact the MPCA during business hours. Otherwise the violations and the results of any additional sampling shall be recorded on the next appropriate DMR or report.
- 1.31 Unauthorized Releases of Wastewater Prohibited. Except for conditions specifically described in Minn. R. 7001.1090, subp. 1, items J and K, all unauthorized bypasses, 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 and Minn. Stat. Sec 115.061)
- 1.32 Discovery of a release. Upon discovery of a release, the Permittee shall:
- Take all reasonable steps to immediately end the release.
  - Notify the Minnesota Department of Public Safety Duty Officer at 1(800)422-0798 (toll free) or (651)649-5451 (metro area) immediately upon discovery of the release. In addition, you may also contact the MPCA during business hours at 1(800) 657-3864.
  - 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.
  - 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.
  - Submit the sampling results as directed by the MPCA. At a minimum, the results shall be submitted to the MPCA with the next DMR.

## Chapter 10. Total Facility Requirements

### 1. General Requirements

- 1.33 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:
- The specific cause of the upset;
  - That the upset was unintentional;
  - 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;
  - That at the time of the upset the facility was being properly operated;
  - That the Permittee properly notified the Commissioner of the upset in accordance with Minn. R. 7001.1090, subp. 1, item I; and
  - That the Permittee implemented the remedial measures required by Minn. R. 7001.0150, subp. 3, item J.

### Operation and Maintenance

- 1.34 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.
- 1.35 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, subp. 1, item C)
- 1.36 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 and Minn. R. 7041 and applicable federal and state solid waste rules)
- 1.37 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. subp. 3, item F and Minn. R. 7001.0150. subp. 2, item B)
- 1.38 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. subp. 3, item F and Minn. R. 7001.0150. subp. 2, item B)

## Chapter 10. Total Facility Requirements

### 1. General Requirements

#### Changes to the Facility or Permit

- 1.39 Permit Modifications. 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. (Minn. R. 7001.0030)

Permittees that propose to make a change to the facility or discharge that requires a permit modification must follow Minn. R. 7001.0190. If the Permittee cannot determine whether a permit modification is needed, the Permittee must 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.

- 1.40 Construction. No construction shall begin until the Permittee receives written approval of plans and specifications from the MPCA (Minn. Stat. Sec. 115.03(f)).

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.

- 1.41 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, subp. 3, item M)

## Chapter 10. Total Facility Requirements

### 1. General Requirements

1.42 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. Material Safety Data Sheet (MSDS) which shall include aquatic toxicity, human health, and environmental fate information for the proposed additive;
- 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)

- 1.43 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.
- 1.44 TMDL Impacts. Facilities that discharge to an impaired surface water, or to a watershed or drainage basin that contains impaired waters, may be required, at some future date, 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 122.44.1.2.i, based on the conclusions of any applicable US EPA approved Total Maximum Daily Load (TMDL) studies, their associated implementation plans or additional sampling or monitoring.
- 1.45 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, subp. 3, item N)

## Chapter 10. Total Facility Requirements

### 1. General Requirements

- 1.46 Facility Closure. The Permittee is responsible for closure and postclosure 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.

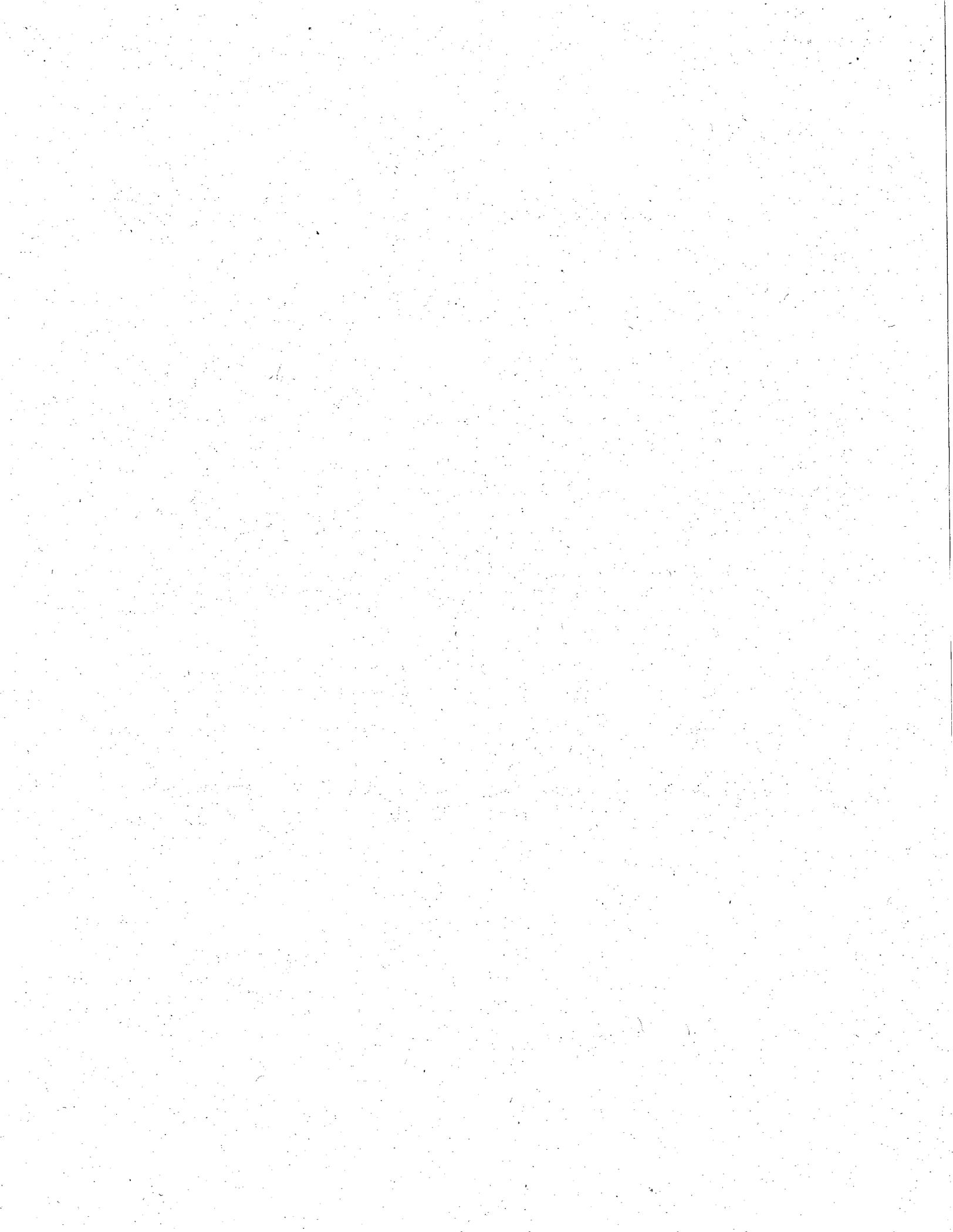
Facility closure that could result in a potential long-term water quality concern, such as the ongoing discharge of wastewater to surface or ground water, may require a permit modification or reissuance.

The MPCA may require the Permittee to establish and maintain financial assurance to ensure performance of certain obligations under this permit, including closure, postclosure 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. Sec. 116.07, subd. 4)

- 1.47 Permit Reissuance. If the Permittee desires to continue permit coverage beyond the date of permit expiration, the Permittee shall submit an application for reissuance at least 180 days before 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.



# Submittals and Actions Checklist

## Watertown WWTP

This checklist is intended to assist you in tracking the reporting requirements of your permit. However, it is only an aid. PLEASE CONSULT YOUR PERMIT FOR THE EXACT REQUIREMENTS.

Please note: This checklist only details submittal requirements for the next five years. DMRs, Annual Reports, and many other submittals are required even after the expiration date of this permit, and continue to be due until the permit is either reissued or terminated.

### Submit DMRs to:

Attention: Discharge Monitoring Reports  
Minnesota Pollution Control Agency  
520 Lafayette Rd N  
St. Paul, MN 55155

### Submit other WQ reports to:

Attention: Submittals Center  
Minnesota Pollution Control Agency  
520 Lafayette Rd N  
St. Paul, MN 55155

### MPCA Staff Contacts:

For DMR-related questions:  
Belinda Nicholas at (651)757-2613  
For other questions:  
Charly Wojtysiak at (651)757-2831

### 2009

Submit DMR (due before Dec 22)

### 2010

Submit DMR (due before Jan 22)

Submit DMR (due before Feb 22)

Submit DMR (due before Mar 22)

Submit DMR (due before Apr 22)

Submit DMR (due before May 22)

Submit DMR (due before Jun 22)

Submit DMR (due before Jul 22)

Submit DMR (due before Aug 22)

Submit DMR (due before Sep 22)

Submit DMR (due before Oct 22)

Submit DMR (due before Nov 22)

Submit DMR (due before Dec 22)

### 2011

Submit DMR (due before Jan 22)

Submit DMR (due before Feb 22)

Submit DMR (due before Mar 22)

Submit DMR (due before Apr 22)

Submit DMR (due before May 22)

Submit DMR (due before Jun 22)

Submit DMR (due before Jul 22)

Submit DMR (due before Aug 22)

Submit DMR (due before Sep 22)

Submit DMR (due before Oct 22)

Submit DMR (due before Nov 22)

Submit DMR (due before Dec 22)

### 2012

Submit DMR (due before Jan 22)

Submit DMR (due before Feb 22)

Submit DMR (due before Mar 22)

Submit DMR (due before Apr 22)

Submit DMR (due before May 22)

Submit DMR (due before Jun 22)

Submit DMR (due before Jul 22)

Submit DMR (due before Aug 22)

Submit DMR (due before Sep 22)

Submit DMR (due before Oct 22)

Submit DMR (due before Nov 22)

Submit DMR (due before Dec 22)

## Submittals and Actions Checklist Watertown WWTP

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St. Paul, MN 55155

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Attention: Submittals Center  
Minnesota Pollution Control Agency  
520 Lafayette Rd N  
St. Paul, MN 55155

### MPCA Staff Contacts:

For DMR-related questions:  
Belinda Nicholas at (651)757-2613  
For other questions:  
Charly Wojtysiak at (651)757-2831

### 2013

- Submit DMR (due before Jan 22)
- Submit DMR (due before Feb 22)
- Submit DMR (due before Mar 22)
- Submit DMR (due before Apr 22)
- Submit DMR (due before May 22)
- Submit DMR (due before Jun 22)
- Submit DMR (due before Jul 22)
- Submit DMR (due before Aug 22)
- Submit DMR (due before Sep 22)
- Submit DMR (due before Oct 22)
- Submit DMR (due before Nov 22)
- Submit DMR (due before Dec 22)

### 2014

- Submit DMR (due before Jan 22)
- Submit DMR (due before Feb 22)
- Submit DMR (due before Mar 22)
- Submit a Mercury Pollutant Minimization Plan (due before Apr 3) {Permit Req't. 4.1.3}
- Submit a Phosphorus Management Plan (due before Apr 3) {Permit Req't. 5.1.2}
- Submit an application for permit reissuance (due before Apr 3) {Permit Req't. 10.1.47}
- Submit DMR (due before Apr 22)
- Submit DMR (due before May 22)
- Submit DMR (due before Jun 22)
- Submit DMR (due before Jul 22)
- Submit DMR (due before Aug 22)
- Submit DMR (due before Sep 22)

### Other Submittals

- If, during any cropping year, biosolids were transferred, or not land applied, the Permittee shall submit a Biosolids Annual Report by December 31 following the end of the cropping year. The report shall state that biosolids were not land applied, how much was generated, and where they were transferred to. {Permit Req't. 9.9.2}

MERCURY CUSTOMIZED SUPPLEMENTAL REPORT FORM

Permit #: MN0020940

Year:

Facility: Watertown WWTF

Month:

Additional Information

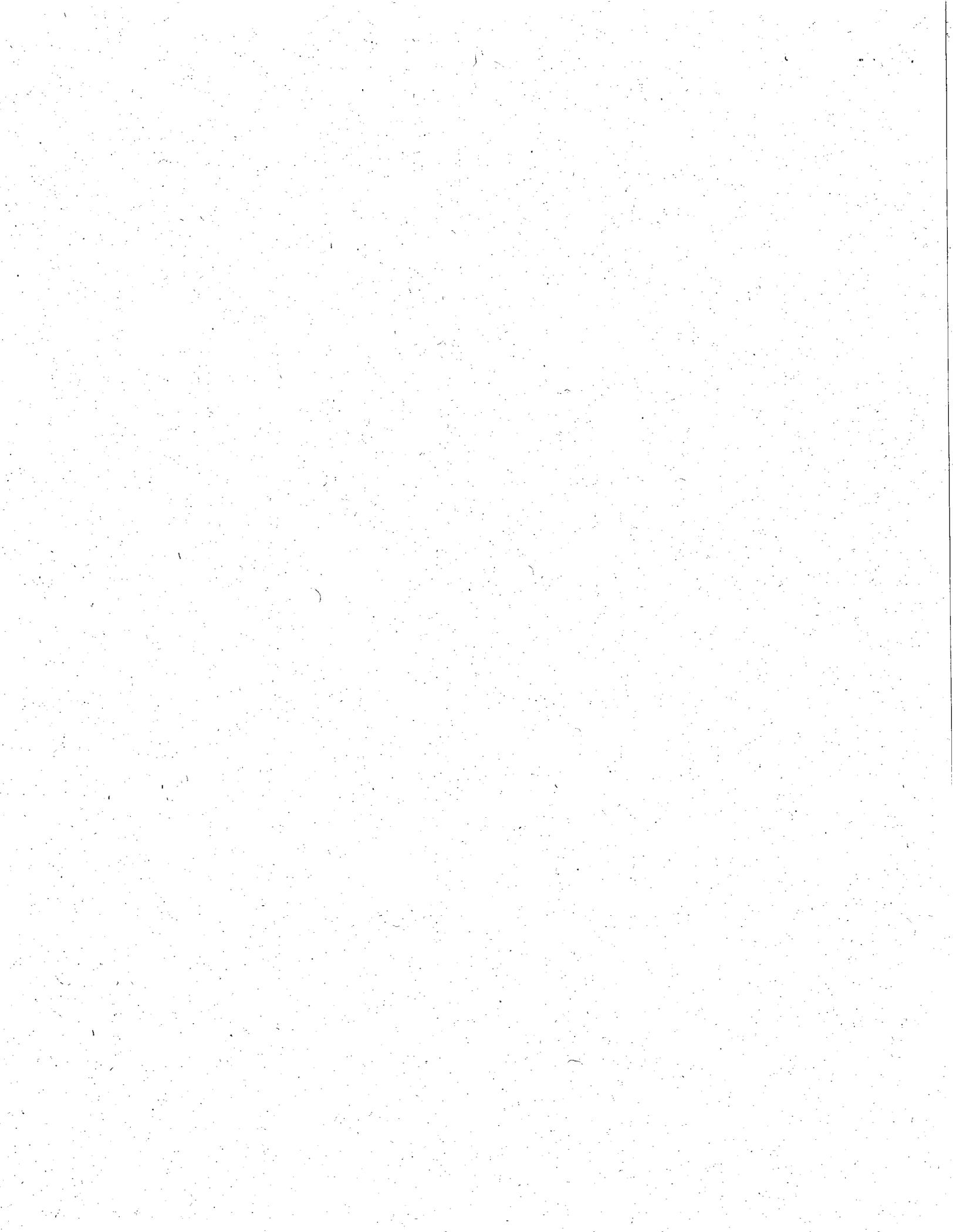
SD002 TOTAL FACILITY DISCHARGE

Dissolved Mercury  
(ng/L)  
grab sample

TSS  
(mg/L)  
grab sample

DATE

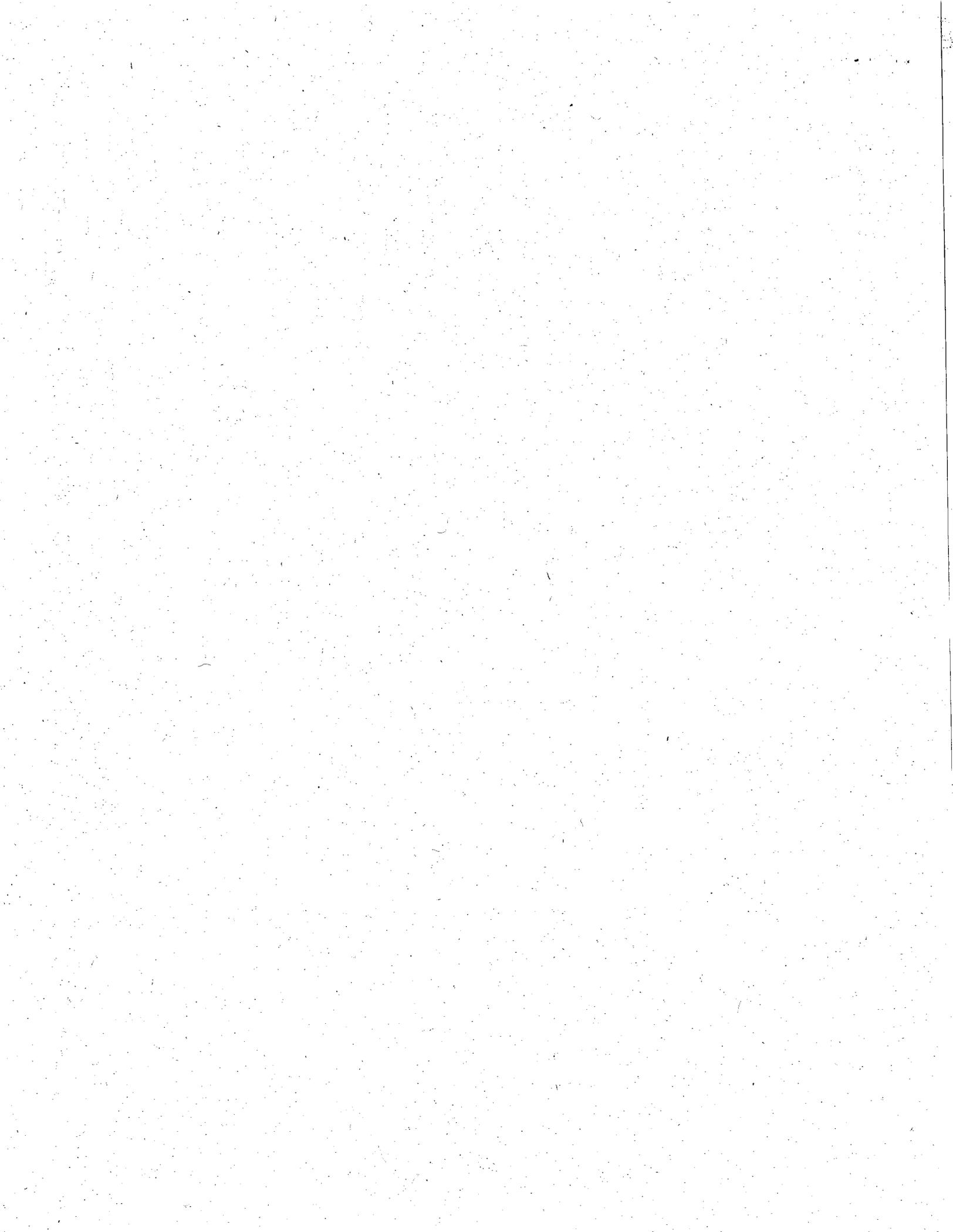
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**NITROGEN CUSTOMIZED SUPPLEMENTAL REPORT FORM**

<b>SD002 TOTAL FACILITY DISCHARGE</b>		Permit #:MN0020940
Facility: Watertown WWTF		Year:
Month:		Additional Information
<b>DATE</b>	<b>Total Nitrogen (mg/L) 24 hour composite</b>	<b>Total Nitrogen Kjeldahl (mg/L) 24 hour composite</b>
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Send with DMRs to: Discharge Monitoring Reports, MN Pollution Control Agency, 520 Lafayette Road North, St. Paul, MN 55155



Salty Discharge Monitoring Customized Supplemental Report Form

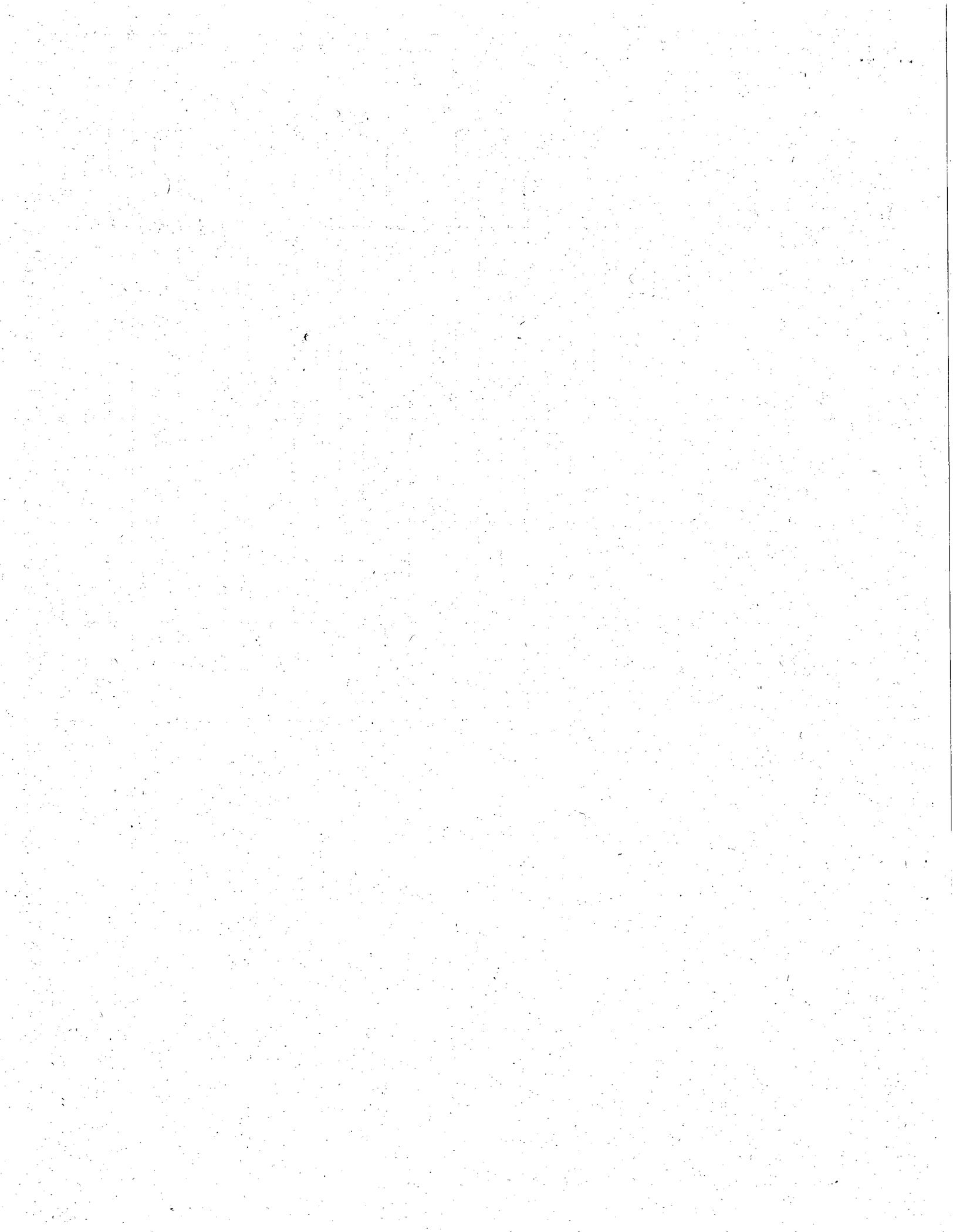
Facility: Watertown WWTP

Permit #: MN0020940

Month:

Year:

DATE	Bicarbonates (mg/L)	Total Calcium (mg/L)	Total Chloride (mg/L)	Hardness as CaCO <sub>3</sub> , Calcium & Magnesium (mg/L)	Total Magnesium (mg/L)	Total Potassium (mg/L)	Total Salinity (mg/L)	Total Sodium as Na (mg/L)	Total Dissolved Solids (mg/L)	Specific Conductance (umh/cm)	Total Sulfate as SO <sub>4</sub> (mg/L)
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# Appendix B: Draft Limits Summary

Fill in white portion of form only

ELR staff will complete shaded areas

Attach map marking outfall to receiving water

# Effluent Limitations Summary

Domestic /Sewage

Version 130930

Target completion date: 6/1/2014

<b>TO:</b> Steven Weiss		Assigned ELR staff: Gbolahan Gbadamosi		<b>Submittal Date:</b> 5/1/2014	
<b>From:</b> Permit Writer / Rev.Engineer		Shauna Bendt / Corey Mathisen		<b>Phone:</b> 2282	
<b>Permit number:</b>		MN0020940	<b>Outfall #:</b>	SD001	<b>Exp.date:</b> 9/30/2015
<b>Permittee name:</b>		City of Watertown			
<b>Facility name/location:</b>		Watertown WWTP			
<b>Outfall location (PLS coordinates):</b>		NE 1/4 of SW 1/4 of Section 4, T117N, R25W		<b>County:</b> Carver	

## Design Parameters

<b>Reason:</b> reissuance	<b>Existing Facility</b> EPA Major: <input type="checkbox"/> Class: <b>B</b>	<b>Proposed Facility</b> EPA Major: <input checked="" type="checkbox"/> Class: <b>A</b>
<b>Type of Facility / Disinfection</b>	Activated Sludge/Chlorine	Activated Sludge/Chlorine
<b>Stab Ponds: discharge pond acreage (mid-depth)</b>		
<b>Waste Flow Type</b>	continuous	continuous
<b>Nondeg Design Flow date:</b> Jan 1, 1988	0.28	0.28
<b>Avg Wet Weather Design Flow (mgd)</b>	1.262	1.262
<b>Avg Dry Weather Design Flow (mgd)</b>	0.8	0.8
<b>Avg Annual Design Flow (mgd)</b>	0.362	0.362
<b>Receiving water</b>	South Fork of the Crow River	South Fork of the Crow River

<b>Applicable State Regulations:</b> 7050.0140;0430 7053.0215;0235	<b>Receiving Water Use Class:</b> 2B,3C,4A,4B,5,6	<b>Designation Date:</b> ORVW (Y/N): No
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## Effluent Limitations

Substance or Characteristic	Final Limits for Existing Permit				Final Limits for Proposed Permit			
	mg/L		kg/day		mg/L		kg/day	
	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
	monthly	daily	monthly	daily	monthly	daily	monthly	daily
<b>CBOD<sub>5</sub></b>	5		23.9		5	TBEL	23.9	
<b>Total Suspended Solids</b>	30		143		30	TBEL	143	
<b>Fecal Coliform (Geometric mean):</b>	200 orgs/100mL		NA		200 orgs/100mL		SDR	
Apr-Oct May-Oct Jan-Dec	Apr-Oct				Apr-Oct			
<b>Ammonia-N:</b> Jun 1 - Sep 30	1.4		6.7		1.4	WQBEL	6.7	
Oct 1 - Nov 30	5.1		24.3		5.1	WQBEL	24.3	
Dec 1 - Mar 31	7.7		36.7		7.7	WQBEL	36.7	
Apr 1 - May 31	24		114.5		24	WQBEL	114.5	
<b>pH (Range) (Standard Units)</b>	6.0-9.0		NA		6.0-9.0		TBEL NA	
<b>Dissolved Oxygen (daily minimum)</b>	monitor only		NA				NA	
<b>TOXICS (units µg/L) unless otherwise specified</b>	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
	monthly	daily	monthly	daily	monthly	daily	monthly	daily
<b>Residual Chlorine (dechlorination required)</b>	NA	38	NA	NA	NA	38	NA	NA
<b>Class 2 Chloride</b>	none	none			229	273		
<b>Total hardness CaCO<sub>3</sub></b>	none	none			559	667		
<b>Bicarbonates (HCO<sub>3</sub>)</b>	none	none			272	312		
<b>Specific conductivity (umhos/cm)</b>					1088	1244		
<b>Total Dissolved Salts</b>					739	805		
** see chloride linkage option								
<b>Mercury (units are ng/L and mg/day)</b>	CalMoAvg	12MoAvg	CalMoAvg	Basis:	CalMoAvg	12MoAvg	CalMoAvg	Basis:

(enter remarks at bottom of form)  
SDR: State Discharge Restriction

Completed by: G. Gbadamosi Date: 5-13-14  
 Completed by: D.White Date: 8-10-17  
 Completed by: \_\_\_\_\_ Date: \_\_\_\_\_

Fill in white portion of form only

Domestic/Sewage

# Effluent Limitations Summary

Outfall#: SD001

## Effluent Limitations

Final Limits for Existing Permit

Final Limits for Proposed Permit

Substance or Characteristic	mg/L		kg/day		mg/L		kg/day	
	AVG monthly		AVG monthly		AVG monthly		AVG monthly	
Phosphorus Management Plan (PMP)	<b>Required</b>							
Is mass limit frozen by nondeg? <b>No</b>	Phosphorus Limit Basis:				<b>WQBEL: Water Quality Based Limit</b>			
Does this facility participate in a Phosphorus trading agreement? <b>No</b>	CalMoAvg mg/L	12MoAvg mg/L	CalMoAvg kg/day	(kg/yr)	CalMoAvg mg/L	mg/L	CalMoAvg kg/day	12MoMTot (kg/yr)
Phosphorus, Total					*0.53			1,395
Effective Period								<b>Jan-Dec</b>
Completed by: <b>MJL</b>	Date: 3/6/15		Remarks: *mg/L Limit is June- Sept See comment below					

### Significant Industrial Users of municipal system (contact Regional office staff for input)

Pollutant/Analyte (if known)	Industry (name and type)
none	

### Monitoring for Toxics

Pollutant/Analyte	Information source: (DMR, special requirements, priority pollutants, leachate, etc.)
None	

Reviewed by: **D.White** Date: 8-10-17

### Wetland Impacts

Location of impacted wetland (PLS coordinates):	Effluent limit review Date:
Potential impact: <input type="checkbox"/> filling <input type="checkbox"/> excavation <input type="checkbox"/> drainage <input type="checkbox"/> discharge to	Completed by: _____

### Variiances see attached documentation

Parameter	Date granted / Comments	Date reviewed / Comments
none		

Reviewed by: \_\_\_\_\_ Date:

### TMDL Requirements see Comments section at end of Checklist

Parameter	TMDL Name and EPA approval date	Comments

# Effluent Limitations Summary

Outfall#: SD001

## Additional Monitoring Requirements (List effluent monitoring only if an effluent limit is **not** assigned)

**I** = Influent **E** = Effluent **S** = Receiving water (Attach Information Protocol with detailed requirements for receiving water monitoring)

Parameter	I/E/S	Monitoring frequency/duration	I/E/S	Monitoring frequency/duration
Phosphorus	I/E	1x/week	I/E	maintain current monitoring frequency
Salty Discharge Parameters	E	1x/month	E	1x/month
Total Mercury	I/E	2x/year (Jan, July)		see below
Nitrite+Nitrate, TKN	E	Apr, Sept		
Ammonia Nitrogen			E	Apr, Sep
Total Kjeldahl Nitrogen			E	Apr, Sep
Nitrite/Nitrate Nitrogen			E	Apr, Sep
Total Dissolved Solids			E	Apr, Sep
Total Residual Chlorine			E	Apr, Sep
Mercury-total grab sample	I/E	2x/year (Jan, July)	E	Jan, July
Mercury dissolved grab sample	none	none	E	Jan, July
TSS sample assoc w merc. grab sample	none	none	E	Jan, July

Dissolved Oxygen: effluent data not reviewed; standard effluent monitoring requirement

Reviewed by: G. Gbadamosi

Date: 5-23-14

Reviewed by: MJL

Date: 3/6/2015

Reviewed by: D.White

Date: 3/23/2015

Remarks:

\* Phosphorus limits based on Lake Pepin TMDL and River Eutrophication standards. See analysis in Greater Crow Memo (Lindon 2015) . X:\Agency\_Files\Water\Standards\P Effluent Limit Review\~Basins of Minnesota\Upper Mississippi\Greater Crow.

\*\*See chloride linkage option in the toxics review and the chloride linkage document. this is in regards to the salty parameters which need limits D.White (8-10-2017)

# Appendix C: Public Hearing Notice

# Appendix D: Approval Resolution

# Appendix E: Public Hearing Comments

# Appendix F: SERP Mailing List

Appendix G: Council Resolution

## Appendix H: Environmental Information Worksheet

Appendix I: Project Priority List (PPL) Scoring  
Worksheet

# Appendix J: Clean Water Revolving Fund Administrative Checklist for Wastewater Collection and Treatment Projects

# Appendix K: Cost Effectiveness Certification Form



**Minnesota Pollution Control Agency**

520 Lafayette Road North  
St. Paul, MN 55155-4194

# Cost and Effectiveness Certification Form

State Revolving Fund  
Federal Water Pollution Control Act Section 602(b)(13)  
and Minn. R. 7077.0272, subp. 2.D. or 7077.0277, subp. 2.C.

**Instructions:** The project representative must check both boxes below and the form must be signed by both the project representative and the professional engineer for the project.

- 1) The municipality has studied and evaluated the cost and effectiveness of the processes, materials, techniques, and technologies for carrying out the proposed project or activity for which the assistance is sought under the Clean Water Revolving Fund (Minnesota Statute 446.07); and
- 2) The municipality has selected, to the maximum extent practicable, a project or activity that maximizes the potential for efficient water use, reuse, recapture, and conservation, and energy conservation, taking into account:
  - a) The cost of constructing the project or activity.
  - b) The cost of operating and maintaining the project or activity over the life of the project or activity.
  - c) The cost of replacing the project or activity.

## Project Information

Municipality name: City of Watertown

Project number: \_\_\_\_\_

## Certification

We certify that the project has completed both requirements (1) and (2) as checked above.

### Project Representative

Print name: \_\_\_\_\_

Signature: \_\_\_\_\_

Date (mm/dd/yyyy): \_\_\_\_\_

### Professional Engineer

Print name: Seth Peterson

Signature: \_\_\_\_\_

Date (mm/dd/yyyy): 2/14/2018