DRAFT

Facility Plan

WWTP & Lift Station Improvements

Madeline Sanitary District

179787 | December 18, 2024

SEH

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Building a Better World for All of Us®

December 18, 2024

RE: WWTP & Lift Station Improvements
Facility Plan
Madeline Sanitary District
SEH No. 179787 4.00

Mr. Zach Montagne, District Superintendent
Madeline Sanitary District
P.O. Box 267
La Pointe, WI 54850

Dear Mr. Montagne:

Attached you will find a draft copy of the WWTP & Lift Station Improvements Facility Plan for Madeline Sanitary District. Please do not hesitate to contact me with any questions.

Sincerely,

Samuel Bender, PE
Engineer V
(Lic. MI, WI)

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document1

DRAFT

Facility Plan

WWTP & Lift Station Improvements
Madeline Sanitary District

Prepared for:
Madeline Sanitary District
La Pointe, WI

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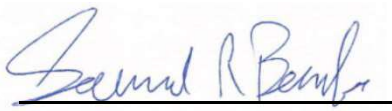

101213-6	December 18, 2024	
Samuel Bender, PE	PE Number	Date
Engineer V		

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WWTP & Lift Station Improvements

Prepared for Madeline Sanitary District

1 Introduction

1.1 Purpose and Scope

The Madeline Sanitary District (MSD) serves the entirety of Madeline Island, in Lake Superior. The boundaries of the MSD and the Town of La Pointe are shared however, they are distinct entities which operate entirely separate from each other. The MSD owns the sanitary sewer system and wastewater treatment plant (WWTP) on Madeline Island. Wastewater on Madeline Island is either conveyed through the sanitary sewer collection system or is trucked to the WWTP from private wastewater holding tanks.

The collection system consists of 4.3 miles of gravity mains and four sewage lift stations. Most of the system is composed of PVC pipe.

The WWTP consists of fine screening, fine bubble aeration in two lagoons that are divided into four zones using a floating curtain baffle system, ultraviolet (UV) disinfection, and effluent pumping. The WWTP is operating under WPDES Permit WI-0030759-10-0, which expired on June 30, 2024. A new permit will be issued soon. A copy of the current, expired permit is included as Appendix A.

Based on this Facility Plan and after approval from the Sanitary District and WDNR, design plans and specifications for the upgrade will be prepared. After approval, the project will be then bid for construction. The Sanitary District anticipates using The Clean Water Fund to finance the project.

This WWTP Facility Plan is prepared per the WDNR regulations (NR 110) at the request of the Madeline Sanitary District to guide them in planning and designing an upgraded facility. A 20-year planning design life is used, with the design year being 2045. This Facility Plan will examine the existing equipment to determine what upgrades, additional equipment, or revised processes will be necessary to meet future needs based on projected flows, loadings, and effluent requirements.

Alternatives for upgrades will be analyzed, which include planning level cost estimates and present worth analyses. Based on present worth, the lowest cost-effective alternative that will meet all requirements will be identified.

1.2 Location

The Town of LaPointe is located on Madeline Island, the only developed Apostle Island, in Lake Superior in Ashland County in northern Wisconsin. The WWTP is located east of the Madeline Island Airport, less than a mile from Lake Superior. The planning area is the corporate limits of the Town of La Pointe. The WWTP currently discharges treated effluent to Lake Superior.

1.3 Location History

The WWTP and collection system was originally constructed in 1974. The WWTP was upgraded in 2009 with a new Headworks Building, fine bubble aeration, and septage receiving station. The WWTP is rated for an average summer flow of 0.163 Million Gallons per Day (MGD), and a maximum month design flow of 0.196 MGD. The average daily flow from 2021-2023 was 0.058 MGD, and the maximum month flow was 0.129 MGD. The plant is designed for an average summer month biological oxygen demand (BOD) capacity of 394 lb/day.

2 Existing Conditions

2.1 Environmental Setting

2.1.1 Transportation

The Town of La Pointe, located on Madeline Island in Lake Superior, relies heavily on the Madeline Island Ferry Line for transportation to and from the mainland, operating from spring through early January. During winter, transportation includes windsleds and a well-managed ice road. The island can also be accessed year-round via the Madeline Island Airport, served by a 3,000-foot paved landing strip.

2.1.2 Climate

The average annual temperature for the Town of La Pointe is 51.3 degrees Fahrenheit. The average summer high is 78 degrees Fahrenheit, and the average winter low is 6 degrees Fahrenheit. Average annual precipitation is 33 inches. Average annual snowfall is 73 inches

2.1.3 Geography and Geology and Hydrology

Madeline Island spans 14 miles in length and 3 miles in width, featuring a mix of sandy beaches, dense forests, and rocky shorelines. The island's geology is characterized by high bluffs of glacial material that erode to form sandspits, beaches, and other coastal features.

According to the United States Geological Survey (USGS) Topographical Maps of Madeline Island, the elevation varies between 600 and 800 feet Mean Sea Level. According to NRCS Soil Survey Data, the area around the WWTP is composed of Lerch-Herbster-Portwing components. These soils are typified by clayey till over underlying stratified loamy and sandy lacustrine deposits and characterized by their poor drainage and frequent ponding.

Hydrologic features of the Island include streams, isolated wetlands and coastal wetlands, namely the Big Bay Lagoon sand spit and bog area.

2.1.4 Surface and Ground Water Quality, Water Supply and Use

Madeline Island is located in Lake Superior. According to the Wisconsin DNR Lake Superior Action Plan 2022-2024, Lake Superior continues to be in overall good condition and is the least environmentally impacted of all the Lakes. Key indicators identified in the report are all improving, unchanged, or undetermined.

The groundwater in Ashland County is obtained from sand and gravel aquifers. Groundwater in Ashland County is generally of good quality and is suitable for most purposes.

The Town of La Pointe is mostly served by private wells. There is one community well, which serves approximately 15 properties. Water use is for residential, commercial, and municipal purposes. No major industrial users are located on the island.

2.1.5 Air Quality

A review of USEPA Air Quality map indicates the planning area is classified as attainment/unclassified, indicating that the area meets primary, secondary, and national standards for ambient air quality.

2.2 Demographics and Land Use

Demographic data for the Town was compiled from the recently completed Town of La Pointe Comprehensive Plan Amendment 2024 ("2024 Amendment") which references US Census Data from the 2020 Census and Wisconsin Department of Administration Population Estimates and Projections.

According to the 2020 Census there were 848 housing units in La Pointe: 199 are classified as occupied and the remainder as "vacant" – a term that includes seasonal residences. The Town has 47 parcels with commercial improvements. The 2024 Amendment included results from Lightcast (supplied by the Northwest Regional Planning Commission) which calculated that in 2022, there were 16 businesses with 1-4 employees, 19 businesses with 5-9 employees, 6 businesses with 10-19 employees, and 3 businesses with 20-49 employees. There are no industrial users within the service area.

Typically, water usage by user class (Residential, Commercial, Industrial, and Institutional) can be determined using data from the Public Service Commission (PSC). However, no data exists for the service area because the Town of La Pointe does not have a public water utility. Total wastewater flows for 2021 through 2023 for all user classes are used to forecast average daily base flows with considerations for inflow and infiltration as detailed in subsequent sections.

2.3 Population

The 2020 US Census estimated the Town of La Pointe's population as 428 persons. Applying the most recent DOA projections to the 2020 Census population yields a population of 452 persons for 2024. The Town of La Pointe's website reports that the summer population is 2,500 persons. For purposes of determining future service flows for the alternatives considered, guidance in Wisconsin Code NR 110.09 (2) (j) was followed to convert seasonal population to equivalent full-time residents. A factor of 0.3 was used for persons included in the summer population that are not year-round residents. The resulting equivalent full-time population of 1,066 will be used as the current population for the purposes of population projections.

2.4 Existing Collection System

The Sanitary District has approximately 4.3 miles of sanitary sewer and four lift stations. The 2023 Compliance Maintenance Annual Report (CMAR) for the Sanitary District reports no lift station failures, sewer pipe failures, overflows, basement backups, or complaints from customers in the last year.

The Sanitary District received a grant from Wisconsin Coastal Management Program which included funding to assess the condition of the existing collection system via cleaning and televising. Approximately 70 percent of the system was cleaned and televised. There were

35 defects identified. The list of defects with locations, and severities is included as Appendix B. More than a third of the defects were “sag in line” with the next most numerous types tied between “cracks” and “infiltration in manhole or lift station” (five each). The severity of the defects ranged from light (1) to severe (5) with two thirds being average (3) or less in severity.

The 2022-2023 winter included record snowfall coupled with a late thaw and spring rains; this caused significant inflow and infiltration (I/I) at the WWTP. The Sanitary District plans to follow the recently completed cleaning and televising work with smoke testing and private lateral testing in areas of concern. The Sanitary District sewer use ordinance prevents the discharge of storm, drainage, ground, and unpolluted water into the sanitary sewers. The 2023 CMAR report is included as Appendix C.

The Town of La Pointe recently completed a Comprehensive Plan Amendment earlier in 2024. The plan was, as its name suggests, comprehensive in reflecting the goals of the community. One of the critical priorities of the plan, “Removing barriers to family success,” included the goal of adding additional affordable housing. In concert with the Comprehensive Plan Amendment, the Town solicited letters of interest for adorable workforce housing development. One pair of parcels the Town put forward for consideration is presently available for sanitary sewer connection. The other parcel would require roughly one-half mile of interceptor sewer to be constructed. A previous sewer extension study determined that extension of sewer in this area would be feasible. The existing collection system is expected to handle the development of these parcels. Additional flows and loadings from these developments are included within the projections described below.

The Facility Plan will address improvements to the WWTP for the expected flows and loadings for the next 20-years, including I/I as it is calculated today (See Section 2.5.1).

2.5 Existing Wastewater Loading

Wastewater flows and loadings are taken from an average of the last three years of data (2021-2023) from the Monthly Discharge Monitoring Reports (DMRs) supplied by the Sanitary District and WDNR. Table 1 summarizes the loadings from this period. A graphic summary of monthly influent flow is presented in Figure 1. A graphical summary average basis for influent TSS and BOD is presented in Figure 2.

Table 1 – WWTP Influent Flow and Loading Summary

Influent Summary	Units	2021	2022	2023	Values Used for Upgrade
Flow					
Minimum Month	MGD	0.030	0.027	0.039	0.027
Average Annual	MGD	0.052	0.060	0.061	0.058
Maximum Month	MGD	0.120	0.092	0.129	0.114
Peak Day	MGD	0.141	0.270	0.381	0.381
BOD (lb/d)					
Average Annual	lb/d	45	55	55	52
Maximum Month	lb/d	119	160	205	161
Peak Day	lb/d	167	270	293	293

Table 1 Continued – WWTP Influent Flow and Loading Summary

Influent Summary	Units	2021	2022	2023	Values Used for Upgrade
TSS (lb/d)					
Average Annual	lb/d	61	75	73	68
Maximum Month	lb/d	144	189	218	167
Peak Day	lb/d	237	532	308	532
BOD (mg/L)					
Average Annual	mg/L	94	105	99	99
Maximum Month	mg/L	206	214	302	302
Peak Day	mg/L	286	465	386	465
TSS (mg/L)					
Average Annual	mg/L	132	151	133	139
Maximum Month	mg/L	245	300	324	324
Peak Day	mg/L	400	1120	445	1120

The average daily wastewater divided out over the population of La Pointe results in a per capita flow of 55 gpd, a per capita BOD of 0.05 lb/day, and a per capita TSS of 0.07 lb/day. These values fall on the low end for expected values for a mainly residential community.

The values above are based on influent flow, but it is worth noting that the historical data for effluent flow does not align with influent flow. Influent flow is monitored via a magnetic meter in the Headworks Building. Effluent flow is estimated based on effluent pump capacity and run time. Recently an effluent flow transducer was procured by the Sanitary District and installed in an existing flume to more accurately monitor flows. Further analysis is provided below.

2.5.1 Infiltration and Inflow Analysis

An evaluation of infiltration and inflow (I/I) into the Sanitary District collection System has been studied and described below. The I/I study was conducted to determine if excess waters from groundwater and storm water are significant enough to raise concern.

Infiltration and inflow can enter the system in two ways. Infiltration occurs when groundwater seeps into sewer pipes through cracks or leaks, while inflow occurs when stormwater enters the sewer system though rain leaders, basement sump pumps, or manholes. These two sources can make the total quantity of water entering a treatment plant difficult to accurately predict.

The United States Environmental Protection Agency (EPA) provides several documents to assist in determining whether I/I at wastewater treatment plants should be considered excessive. The following passages utilize the EPA's guide for calculating infiltration and inflow.

Calculating Inflow/Infiltration (I/I) is challenging for the Sanitary District without additional flow monitoring. This difficulty arises from significant population fluctuations between summer and winter months, as well as a substantial number of users utilizing hauled waste disposal services. The combination of these factors and the absence of a centralized drinking water system hinders the determination of a base flow. Hauled waste disposal also distorts flow measurements

following rainfall events. Analysis approximating baseflow and infiltration were performed below. From that analysis, the Sanitary District does not face capacity issues related to flow. Instead of implementing additional monitoring techniques, it will be more cost effective for the Sanitary District to address defects as they are identified. Methods for identification include:

- Smoke testing
- Televising the mains
- Televising the laterals
- Home inspections for illicit connections

These methods do not need to be completed across the entire community simultaneously but can be conducted on smaller sections over several years.

2.5.1.1 Baseflow Determination

As noted above, water usage by user class (Residential, Commercial, Industrial, and Institutional) cannot be determined using data from the PSC because the Town of La Pointe does not have a centralized public water utility.

In absence of water usage data, historical influent data was reviewed for a period of average dry weather (ADW) flow. This was the highest 7 to 14 day average per day flow without precipitation and during high seasonal groundwater. ADW flow includes domestic wastewater and infiltration. June 2022 through December 2022 and May 2023 through September 2023 represented periods of above historical average lake level for Lake Superior. The groundwater in the areas around the collection system located near the shore of Lake Superior and wetlands that are hydraulically connected to the Lake are expected to reflect the high surface water levels. A period of ADW flow was identified for the off season and peak visitor season.

The ADW flow for the off season was 0.042 MGD (October 2022) and for peak visitor season was 0.084 MGD (August 2023). Using the populations identified above, gallons per person per day values of 98 and 80, respectively, were identified.

Groundwater infiltration (GWI) is then calculated. The EPA method to calculate GWI is to average the low nighttime flows (midnight to 6am) per day for the same ADW flow period, minus significant industrial or commercial flows. The Sanitary District utilizes a totalizer to determine daily influent flow so partial day data for the ADW flow period was not available. In absence of this data, low periods of ADW flow during low groundwater levels, reflective of low Lake Superior levels, were identified. Lake Superior was below historical average levels in March of 2022 (off season) and May of 2022 (peak visitor season). The low groundwater ADW flow was 0.027 MGD (March 2022) and the peak visitor season was 0.054 MGD (May 2022).

The difference between average dry weather flow and groundwater infiltration represents baseflow or sewage only flows without infiltration impacts. The baseflow for off season was calculated to be 0.015 MGD or 35 gallons per person per day. The baseflow for peak visitor season was calculated to be 0.030 MGD or 29 gallons per person per day.

2.5.2 EPA I/I Calculation

The EPA handbook defines excessive I/I as greater than 120 gallons per capita per day.

The EPA handbook also states that rehabilitation of sanitary sewer systems exhibiting less than 6,000 gallons of I/I flow per day per inch-miles of collection pipe is not cost effective. The Sanitary District has approximately 2.6 miles of 8-inch sanitary sewer and 1 mile of 10 inch sanitary sewer. Based on the Sanitary District's total number of inch-miles (30.8), 185,000 gpd of I/I would be considered not cost effective for the collection system. The highest maximum monthly flow in recent years occurred in April 2023. The total flow baseflow and I/I was 0.129 mgd. Comparing this value to the EPA's cost-effective value for I/I of 0.185 mgd shows that I/I is well below this limit.

The EPA handbook also states that infiltration is non-excessive if the 7–14-day average dry weather domestic wastewater flow does not exceed 120 gallons per capita per day (gpcd) during periods of high groundwater. The period of analysis (June 2022 - December 2022) was one of high groundwater for the region and the maximum 7-day flow occurred in October 2022, at 42,000 gpd. Based on a population of 428 people, the per capita flowrate is approximately 98 gpcd, which is below the 120 gpcd standard set by the EPA.

2.6 Sanitary District Lift Stations

2.6.1 Lift Station No. 1

Lift Station No. 1 is located at the end of O'Brien Court and serves the area between O'Brien Court and Voyager Lane and west of Whitefish Street. The station is composed of a 13-foot deep, 5-foot diameter precast manhole equipped with two vacuum-primed pumps. The pumps are located on a baseplate above the wet well. A vacuum pump is used to remove air from the suction line allowing effluent to be drawn up to the pump; once the pump is primed (filled with effluent) it can start operating. The wastewater from this lift station is pumped through almost 1000 ft of 4-inch force main to a manhole west of the intersection of Whitefish Street and Voyager Lane then flows by gravity to Lift Station No. 2. Figure 3 shows the location of the lift stations.

2.6.2 Lift Station No. 2

Lift station No. 2, located at the intersection of Main St E and Mandamin Rd, collects all the flow from the collection system and pumps to the WWTP. The station is composed of a wet well and dry well. The wet well is a 26.75-foot deep, 8-foot diameter precast structure. Two 8-inch suction pipes connect the wet well to the dry well. The drywell is an 8-foot diameter by 10.25-foot heigh chamber buried 18 feet deep. A manway provides access from the surface. The drywell houses two horizontal centrifugal pumps and control equipment. Each pump is designed for a flow of 313 gpm at 82 feet of head. The pumps are 20 hp units and are rated for a maximum speed of 1170 rpm. The discharge of the two pumps combines and leaves the drywell as one 8-inch forcemain. The forcemain to the WWTP is approximately 2 miles of 8-inch pipe.

The pump station was installed in 1974, and the original equipment is still in operation. Humidity in the drywell has led to corrosion of equipment and piping. Entering the drywell to maintain and fix equipment is a safety issue because the structure is a confined space. The station does not have a permanent standby generator nor telemetry. During loss of power a portable generator must be brought from the WWTP to the station which further compounds the challenges during an already challenging situation.

2.6.3 Pressure Sewer System

There is a pressure sewer system located west of Old Fort Road and north of South Shore Drive. There are seven grinder pump units with 1.1/4 and 2-inch pressure sewers. The pressure sewer system discharges to the southernmost manhole on Old Fort Road and then wastewater flows north to Lift Station No. 2.

2.7 Existing WWTP

After being pumped through a forcemain from Lift Station No. 2, wastewater enters the WWTP at the Headworks Building, where it passes through a magnetic flow meter and then through a rotary fine screen with 1/4-inch openings. Hauled wastewater from holding tanks, RV dump station, septic customers, and residential outhouses is dumped in the Hauled Waste Receiving Station and pumped into a common header with the influent from Lift Station No. 2, ahead of the magnetic flow meter. The screened wastewater flows from the Headworks Building to the first of two lagoons. The lagoons are equipped with fine bubble diffusers that convey air supplied by blowers in the Headworks Building. The lagoons are also equipped with baffle walls, media curtains and a floating insulated cover to enhance treatment. Effluent from the lagoons passes through an ultraviolet (UV) disinfection system before flowing by gravity to the effluent lift station. The effluent lift station pumps the treated effluent to the outfall on the north shore of the island into Lake Superior.

2.7.1 Influent Flow/Sampling

Influent flow is measured at the WWTP using a magnetic flow meter. There are no issues with the current flow meter.

Influent grab samples are hand collected from the screen discharge manhole just downstream of the fine screen in the Headworks Building. A conduit for an automatic sampler tube was installed in the Headworks Building. The conduit runs from the screen discharge manhole into the Blower Room. If a composite influent sample is required or desired in the future, an automatic sampler could be installed in the Blower Room and draw a sample from the screen discharge manhole.

2.7.2 Fine Screening

The screening equipment is located in a stainless steel tank in the Headworks Building. The fine screening equipment consists of a mechanically-cleaned drum-shaped screen with bars spaced at 1/4-inch along with an integral screening washer and compactor. The make and model of the equipment is Huber Rotamat Ro 1 600/6. The screen is installed in a tank at an angle of 35 degrees.

There are no issues reported with the fine screening system.

2.7.3 Hauled Waste Receiving Station

The Hauled Waste Receiving Tank is located west of the Headworks Building. The tank has a storage capacity of approximately 10,000 gallons and is equipped with 2 submersible pumps that are designed to convey the hauled waste into the fine screen at a flow of 200 gpm against a total dynamic head of 17 feet. The pumps are 3.4 hp units and are rated for a maximum speed of 178 rpm. The pumps are non-clog wastewater pumps for removable installation in a wet well. ABS, Inc. of Meriden, Connecticut manufactured the two ABS model AFP 1031 pumps.

The pumps operate automatically through the wet well level controller, cycling on and off as needed to handle hauled waste conditions. A submersible pressure transducer transmits a signal to the lift station control panel. Check valves in the valve vault prevent backflow through the pumps when they are not in service. These valves function automatically. There are plug valves on each pump that are normally kept open unless a pump is taken out of service.

There are no issues reported with the Hauled Waste Receiving Station.

2.7.4 Aerated Lagoons

The Madeline WWTP utilizes an aerated lagoon system to achieve secondary treatment. There are two lagoons, each divided into two cells by hanging curtain, for a total of four cells. The first cell is a partial mix cell with 16 diffusers that convey air from the blowers in the Headworks building. Cells 2 and 3 are partial mix cells with 8 diffusers each. Cell 2 also has two media curtains that provide additional attached growth to enhance nitrification while Cell 3 has 4 media curtains. Cell 4 is a quiescent zone that allows suspended solids to settle out before effluent is discharged.

The aerated lagoons at the Madeline WWTP were designed to provide a total hydraulic detention time of 24 days at average design flow of 0.163 mgd. This provides time for natural biological activities to reduce the amount of BOD_5 in the wastewater. The aerated partial mix and quiescent cells have an operating depth of 10 feet. At this depth, air must be introduced into the ponds to provide oxygen needed to keep the microorganisms that consume the BOD_5 alive. Air is provided by blowers and flows through fine-bubble diffusers.

Screened wastewater enters the first partial mix cell from the influent control structure through a 14-inch diameter ductile iron pipe (DIP). The wastewater is constantly mixed and aerated by two rows of 8 diffusers, or 16 air diffusers. The total volume of Cell 1 is approximately 820,000 gallons, which provides 5 days of hydraulic detention time at the average design flow of 163,000 gpd.

Flow from Cell 1 passes through a window in the curtain baffle between Cells 1 and 2. Cell 2 has two rows of 4 diffusers, or 8 air diffusers. The total volume of Cell 2 is approximately 820,000 gallons, which provides 5 days of hydraulic detention time at the average design flow of 163,000 gpd. Within Cell 2, there are two media curtains that provide surface area for attached growth treatment. The attached growth treatment assists in the nitrification process as nitrifying bacteria thrive in an attached growth system.

The wastewater leaves Cell 2 of Lagoon 1 via a 12-inch cast iron pipe through the berm that separates the lagoons and flows into Cell 3. The wastewater in Cell 3 is mixed and aerated by 8 diffusers as in Cell 2. The total volume of Cell 3 is approximately 1,340,000 gallons, which provides 8.2 days of hydraulic detention time at the average design flow of 163,000 gpd. Within Cell 3, there are four media curtains that provide surface area for attached growth treatment.

Cell 4, a quiescent zone at the west end of Lagoon 2, follows the aerated cells. The quiescent cell allows settleable solids in the effluent from the aerated cells to drop out of suspension. The total treatment volume of the stabilization pond is 970,000 gallons, which provides a hydraulic detention time of 6 days.

The aerated ponds are designed to operate with little process control by the operator aside from periodic measurement of the DO concentration at various locations in each cell. If the DO

concentration in a cell is consistently over 2.5 or under 1.0 throughout the cell and during various times during the day, the airflow to the pond can be adjusted.

The lagoons are covered with modular insulated floating cover systems. Lagoon 1, Cells 1 and 2, as well as Lagoon 2, Cell 3 are covered with insulated cover to reduce heat loss. Lagoon 2, Cell 4 is covered with a shading cover to eliminate UV light exposure. The covers are designed to accommodate snow, rain, and wind conditions for the full range of water levels. The shading cover over Cell 4 is too thin to accommodate safe operator access, and should be replaced with a cover of similar thickness to the other cells lagoon improvements are completed as part of the recommended alternative.

In 2009 the lagoon banks were regraded to 3:1 slope. Prior to that project, the banks had sloughed due to water surface action. The lagoon covers help to minimize wave action and reduce erosion and sloughing. The lagoon banks are vegetated from the top of bank to the water line, which proves to be a maintenance issue for operations staff to safely mow.

2.7.4.1 Lagoon Sludge

A sludge judge was used to measure sludge depth. At this time samples were only collected midway between the last set of aeration diffusers and the baffle between the 3rd and 4th cells of the secondary lagoon. The sludge was observed to be very thick with an almost clay like texture. Sample depths are presented in the Table 2 below and photos of the samples are included in Appendix D.

Table 2 – Sludge Sample

Sample Number	Depth (inches)
1*	16
2	16
3	14
4*	15.5
*samples taken in the same location	

Additional sampling is proposed to obtain a better understanding of sludge volume. While the volume of sludge in the lagoons is likely not sufficient to impact the treatment capacity of the WWTP, it would be cost effective and beneficial to removal sludge in conjunction with an upgrade project if work is required in the lagoons. If the WWTP is replaced altogether, sludge removal would be a necessary part of the lagoon decommissioning process.

2.7.4.2 Aeration Equipment

Three rotary lobe positive displacement blowers are utilized to provide air to the aeration and mixing system. The lagoons are designed to operate with one blower in the winter and two blowers in the summer. The third blower is provided for redundancy. Each blower is sized to deliver 190 SCFM of air at a discharge pressure of 6.1 psig.

The aeration and mixing system employs a main air header and valved lateral piping system to distribute air throughout the basin. The aeration system is generally designed to provide uniform

air distribution without adjustment to the isolation/throttling valves on the laterals. If needed, the valves can be adjusted for direct control of airflow distribution for process control with guidance from the manufacturer, EDI.

2.7.4.3 Phosphorus Removal

Phosphorus removal is limited to biological uptake for wastewater organism cell maintenance. No chemical addition facilities for phosphorus removal are currently provided. There is an existing Blower Building to the west of the lagoons that once housed chlorine gas for disinfection which could house ferric chloride, if required. Code compliant storage and feed facilities would be difficult to achieve with the existing space; it is recommended that a new building or addition be provided for this purpose.

2.7.4.4 Ammonia Treatment

In order to enhance nitrification in the aerated lagoons, a fixed film media system was provided during the last upgrade project. The system consisted of curtains in Cell #2 and Cell #3. Each curtain had ribbons of fabric hanging in the lagoon to provide a surface for biological growth. The placement of the curtains with respect to the aerators allowed biomass to accumulate while still being regulated by the shearing action of the aeration to avoid too much accumulation.

Nitrifying bacteria are typically slow-growing and can struggle with rapid changes in ammonia loading. These bacteria, which include ammonia-oxidizing bacteria (AOB) and nitrite-oxidizing bacteria (NOB), have relatively slow growth rates compared to other types of bacteria in wastewater treatment systems.

Nitrifying bacteria require specific environmental conditions to thrive, such as stable pH, adequate alkalinity, and sufficient dissolved oxygen levels. Sudden changes in ammonia levels can disrupt these conditions, making it difficult for nitrifiers to adapt quickly. This can lead to inefficiencies in the nitrification process, resulting in poor ammonia removal.

Over time the curtains have deteriorated and do not consistently provide nitrification necessary to meet the permitted ammonia concentrations.

The Village's WPDES permit includes a variable effluent ammonia limit that varies depending on the effluent pH at the time of discharge. In general, the lower the effluent pH, the higher the effluent ammonia limit (see Section 3.4 for additional details).

2.7.5 UV Disinfection

Following aeration and settling in the lagoons, effluent flows by gravity to the ultraviolet disinfection system for pathogen inactivation. The existing system is composed of a steel channel, five ballasts with bulbs, and control panel located below grade in a concrete vault. The Bailey, Fischer & Porter system was rebuilt in 2015 but is now obsolete. Replacement parts are not available from the OEM which will cause reliability issues as the system continues to age. Staff have indicated intermittent electrical issues with the current system.

The existing vault is served by a temporary sump pump. Future improvements should include a permanent sump pump system with redundant floats.

2.7.6 Effluent Lift Station

The effluent lift station is located east of the Headworks Building. The station is composed of a 21.5-foot deep, 6-foot diameter precast manhole equipped with two vacuum-primed pumps that are designed to convey the treated effluent to the outfall at a flow of 313 gpm against a total dynamic head of 44 feet. The pumps are 10 hp units and are rated for a maximum speed of 1760 rpm. The pumps are vacuum-primed wastewater pumps located on a baseplate above the wet well. A vacuum pump is used to remove air from the suction line allowing effluent to be drawn up to the pump; once the pump is primed (filled with effluent) it can start operating. The 8-inch force main runs north from the WWTP approximately 2,262 feet then transitions to gravity for the final 1,389 feet of 10-inch sewer which ends in a submerged outfall.

One pump is operated per month and the pump that is in service operates automatically through the station control panel, cycling on and off as needed to handle effluent flow. Floats transmit signal to the lift station control panel.

The penetration in the wet well wall for the force main was previously patched, but the patch has failed and now allows infiltration into the effluent wet well. The vacuum system for pump priming is prone to leaking which hinders proper operation. Power for the pump station is currently provided from a separate service than the main service for the WWTP.

2.7.7 Effluent Flow/Sampling

Effluent flow measurement has historically been calculated by recording pump runtime and multiplying by the pump capacity to calculate daily flow. This method can be problematic because the pump may not be operating at the design point due to differing head conditions or may be worn and not pumping at full capacity.

Due to these inaccuracies the Sanitary District purchased an ultrasonic flow meter for use with an existing Leopold-Lagco flume located between the UV disinfection system and the effluent lift station. The unit was installed at the end of August 2024. After two months of troubleshooting and calibration, data from November 2024 is believed to be accurate. The results indicate the effluent flow data derived from pump runtime could be 27 to 50 percent lower than what was is actually discharged when measured using the flume. Long term tracking would be required to determine if this trend is representative at various flow conditions

Final effluent samples are collected from the effluent lift station manually with a rope and bucket. If a composite effluent sample is required or desired in the future, an automatic sampler could be installed in the Blower Room and a conduit installed to the effluent lift station.

2.8 Existing WWTP Characteristics and Performance

According to the Sanitary District's 2023 CMAR report, the plant scored very well in all categories except for two. The effluent quality for phosphorus scored a "C", due to two monthly effluent permit exceedances. There are currently no provisions for biological or chemical phosphorus removal other than primary settling at the Madeline WWTP. The "Ponds" category, which addresses potential lagoon leakage, scored an "F" due to the difference between the influent and effluent flow rates. As mentioned above, there are issues with the accuracy of the effluent flow measurements that the Sanitary District feels provides inaccurate comparison of flow values. With this in mind, additional flow metering results tabulated from the new flume level sensor should be collected, and then the influent and effluent flows compared again to provide a more

accurate assessment of potential lagoon leakage. The Sanitary District received a "B" for "BOD/CBOD" which examines effluent quality and plant performance for BOD treatment due to one permit exceedance in July; the Sanitary District has been monitoring BOD5 and CBOD concurrently as part of a variance request over the last two years and results indicate that nitrogenous oxygen demand is resulting in biased high BOD5 results. All other categories including influent flow and loading, TSS, ammonia, biosolids quality and management, staffing, operator certification and education, financial management, collection systems received an "A" grading. The DNR gives the Madeline Sanitary District's WWTP a GPA score of 3.00 out of a possible 4. The Sanitary District's full 2023 CMAR report can be found in Appendix C.

Effluent DMR data from the period 2021 to 2023 was reviewed and is summarized below in Table 3. Graphical summaries on a monthly average basis for effluent TSS, BOD, and TP are presented in Figure 4, Figure 5, and Figure 36, respectively.

Table 3 – 2021-2023 WWTP Effluent Flow and Concentration Summary

Influent Summary	Units	2021	2022	2023
Flow				
Minimum Month	MGD	0.024	0.020	0.024
Average Annual	MGD	0.043	0.049	0.049
Maximum Month	MGD	0.113	0.083	0.119
Peak Day	MGD	0.117	0.129	0.414

Table 3 Continued – 2021-2023 WWTP Effluent Flow and Concentration Summary

Influent Summary	Units	2021	2022	2023
BOD (mg/L)				
Average Annual	mg/L	15.9	21.4	12.6
Maximum Month	mg/L	75.2	117	36.8
Peak Day	mg/L	151	147	60.0
TSS (mg/L)				
Average Annual	mg/L	4.6	5.5	5.4
Maximum Month	mg/L	10.0	13.8	10.0
Peak Day	mg/L	12.0	16.0	13.0
Phosphorus (mg/L)				
Average Annual	mg/L	2.5	2.9	2.8
Maximum Month	mg/L	4.6	5.0	6.1
Peak Day	mg/L	5.7	5.7	6.4
Ammonia (mg/L)				
Average Annual	mg/L	3.7	4.8	7.2
Maximum Month	mg/L	17.0	22.4	36.3
Peak Day	mg/L	19.6	25.0	39.8

3 Design Criteria

3.1 Design Year

To comply with typical facility planning periods, a 20-year design period is used in the alternatives analysis that follows. The design year for the purpose of this report is 2044. Intermediate projections using 5-year increments are also included.

3.2 Future Population

The Town of La Pointe and the Madeline Sanitary District is estimated to increase to its highest population in 2044, a 14 percent increase from the current population (1,066) to 1,197 people. As noted in Section 2.3 the populations presented herein are equivalent populations which combine the year-round residents with the seasonal population. Currently, the Madeline WWTP does not serve any major industrial businesses and does not have future industrial users planned. However, future projections at the WWTP will involve an additional 10 percent loading for unexpected growth or businesses. A summary of DOA future population increases applied to the 2020 Census data and seasonal equivalents with interpolated values in a 5-year increment to 2044 is shown in Table 4.

Table 4 – Population Projection Summary

Town of La Pointe	2020 Census	2025 Proj.	2030 Proj.	2035 Proj.	2040 Proj.	2044 Proj.	Peak Population
Population	428	458	480	502	502	511	511
Seasonal Only	-	2,048	2,148	2,247	2,247	2,286	2,286
Equivalent	-	1,072	1,124	1,176	1,176	1,197	1,197
% Difference	-	6.9%	4.8%	4.6%	0.0%	1.8%	14%

3.3 Future Wastewater Loading

A summary of future wastewater loadings calculated using the DOA's 14 percent future population growth with an additional 10 percent commercial growth is shown in Table 5.

Table 5 – WWTP Influent Design 2021-2023 Characteristics

Flow (MGD)	2021-2023	Projected Growth (14%)	10% Commercial Growth	Design Year Values
Annual Average	0.058	0.008	0.007	0.163 / 0.049[1,2]
Maximum Month	0.098	0.014	0.011	0.196[1]
Peak Day	0.381	0.053	0.043	0.515[1]
Peak Hour	-	-	-	1.030[1]
BOD (lb/d.)	**2021-2023**	**Projected Growth (14%)**	**10% Commercial Growth**	**Design Year Values**
Annual Average	52	7.2	5.9	244[1]
Maximum Month	161	22.6	18.4	394[1]

Table 5 Continued – WWTP Influent Design 2021-2023 Characteristics

TSS (lb/d.)	2021-2023	Projected Growth (14%)	10% Commercial Growth	Design Year Values
Annual Average	68	9.5	7.8	318[1]
Maximum Month	167	23.3	19.0	525[1]

[1]These values reflect the current rated capacity of the plant rather than the calculated projection to avoid artificially derating the plant.
[2]Avarage Summer Flow / Average Winter Flow

It should be noted that the calculated average flow (0.073 MGD) is less than the 0.163 MGD at which the plant is currently rated. For future design conditions, the current rated value is used. Similarly, the maximum month BOD projection would be 202 lb/d rather than the currently rated capacity of 394 lb/d, so the current rated value is used for the future project.

3.4 Effluent Requirements

The current, expired WPDES was effective from July 1, 2019 through June 30, 2024. The permit is included as Appendix A. A summary of the current WPDES effluent limitation requirements for the Madeline WWTP is provided in Tables 6 and 7.

Table 6 – Current WPDES Permit Limits

Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
BOD_5, Total	Monthly Avg	30 mg/L	Weekly	Grab	
BOD_5, Total	Weekly Avg	45 mg/L	Weekly	Grab	
Suspended Solids, Total	Monthly Avg	30 mg/L	Weekly	Grab	
Suspended Solids, Total	Weekly Avg	45 mg/L	Weekly	Grab	
Nitrogen, Ammonia Total	Daily Max - Variable	mg/L	Weekly	Grab	Variable Limits June through September, see following table
Nitrogen, Ammonia Total	Monthly Avg	39 mg/L	Weekly	Grab	Limit effective June Through September
Nitrogen, Ammonia Total	Weekly Avg	72 mg/L	Weekly	Grab	Limit effective June Through September
pH Field	Daily Max	9.0	Weekly	Grab	
pH Field	Daily Min	6.0	Weekly	Grab	
Phosphorus, Total	Monthly Avg	5.1	Weekly	Grab	
Fecal Coliform	Geometric Mean - Monthly	400#/100 mL	Weekly	Grab	Limit effective May Through October
Fecal Coliform	Geometric Mean - Wkly	656#/100 mL	Weekly	Grab	Limit effective May Through October

Table 7 – Variable Limits Table

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	72	7.0 < pH ≤ 7.1	44	8.0 < pH ≤ 8.1	9.4
6.1 < pH ≤ 6.2	71	7.1 < pH ≤ 7.2	40	8.1 < pH ≤ 8.2	7.7
6.2 < pH ≤ 6.3	69	7.2 < pH ≤ 7.3	35	8.2 < pH ≤ 8.3	6.4
6.3 < pH ≤ 6.4	68	7.3 < pH ≤ 7.4	31	8.3 < pH ≤ 8.4	5.3
6.4 < pH ≤ 6.5	65	7.4 < pH ≤ 7.5	27	8.4 < pH ≤ 8.5	4.3
6.5 < pH ≤ 6.6	63	7.5 < pH ≤ 7.6	23	8.5 < pH ≤ 8.6	3.5
6.6 < pH ≤ 6.7	60	7.6 < pH ≤ 7.7	19	8.6 < pH ≤ 8.7	3.0
6.7 < pH ≤ 6.8	56	7.7 < pH ≤ 7.8	16	8.7 < pH ≤ 8.8	2.5
6.8 < pH ≤ 6.9	52	7.8 < pH ≤ 7.9	14	8.8 < pH ≤ 8.9	2.1
6.9 < pH ≤ 7.0	48	7.9 < pH ≤ 8.0	11	8.9 < pH ≤ 9.0	1.8

SEH contacted WDNR about the need to submit an effluent limits request as part of this facility planning study per NR 110 Wis Adm. Code regulation. Because the future projected growth was less than the current rated design for the facility, WDNR indicated that an effluent request was not needed. No changes were noted from the limits summarized above.

The calculated effluent limitation for phosphorus is not known at this time. The limit will be determined when the Lake Superior nearshore or whole lake model is approved. It is the DNR's expectation that phosphorus optimization efforts shall continue until a calculated effluent limit can be developed.

4 Description of Wastewater Treatment Plant Alternatives

As detailed above, there are several issues with the existing WWTP that need to be addressed due to equipment age and condition, operator safety, and reliability concerns. The alternatives developed below are intended to address these issues and provide capacity to serve the projected growth over the next twenty years.

4.1 Alternative 1: No Construction

This option would keep the WWTP same as it is now. The WWTP was designed for an average summer flow of 0.163 MGD. Though, the WWTP currently has an average summer flow of 0.069 MGD and annual average flow of 0.058 MGD, well below design limits, some of the treatment plant equipment is 50 years old. Aged equipment is likely to be less efficient, more difficult to obtain parts for repair, and may be past its useful life expectancy already.

Should the Sanitary District choose to maintain the WWTP in its current state, staff will continue to face several ongoing issues including but not limited to:

- Lift Station No. 2 emergency reliability and routine access issues. Components of the station are 50 years old.
- Potential lagoon exfiltration (pending ongoing flow study).
- Inability to effectively meet ammonia limits.
- Inability to effectively meet phosphorus limits.
- Failure to reliably and adequately disinfect if replacement parts for UV Disinfection system cannot be sourced.
- Effluent Lift Station reliability issues. Components of the station are 50 years old.

Because of the list of age, condition, and reliability related issues, this alternative was not evaluated further.

4.2 Alternative 2: Sequencing Batch Reactor

This alternative would include the following:

- Replace the current aerated lagoon process with a Sequencing Batch Reactor (SBR) located to the north of the current plant.
- Lagoon sludge removal/disposal, abandonment of lagoons.
- Add a grit removal system to the treatment train prior the SBR.
- Construct an operations building to house pumps. Repurpose or replace existing blowers in Headworks Building, depending on compatibility.
- Replace ultraviolet disinfection system with a new ultraviolet disinfection system.
- Replace Lift Station No. 2 with a submersible lift station.
- Replace Effluent Lift Station with a submersible lift station.

4.2.1 Lift Station No. 2

The existing Lift Station No. 2 can-style lift station will be replaced with a typical modern style submersible lift station and valve vault. The top section of the existing wet well will be replaced along with a new access hatch for installing and retrieving the pumps. The lower section of the wet well will be rehabilitated to address defects identified during sewer cleaning and televising. Two submersible pumps and discharge piping will be installed in the existing wet well. A new valve vault will be provided to house isolation and check valves. Electrical and controls will be located in a new control panel. A diesel generator will be provided for backup power. The existing can station will be decommissioned after the new station is constructed and is operable.

4.2.2 Grit Removal

At the existing WWTP site following screening, flow would enter a vortex grit removal system, where grit would be segregated and classified for disposal at a landfill. Flow from grit removal would proceed to the SBR.

4.2.3 Sequencing Batch Reactor

Alternative 2 proposes that the Sanitary District replace the current aerated lagoon treatment process with an SBR. Instead of two lagoons for treatment, a SBR system would instead consist

of two smaller concrete basins. SBR basins typically come in sets of at least two, operating in parallel, which provides built in resiliency in the event either of the basins need to be taken down for maintenance. The SBR proposed in this alternative would be constructed at the current WWTP site, north of the existing lagoons.

SBRs operate with biological processes similar to the aerated lagoons currently in use at the plant. However, the activated sludge within a SBR is more concentrated allowing for faster treatment within a smaller footprint. SBRs typically operate in 4 stages, staggered between the multiple reactor basins. First, the SBR is filled with influent. Once it has reached capacity, the influent gate closes, and flow begins entering the other basin. The filled basin is then aerated, providing oxygen to the microbes present in the SBR. Once the microbes have been given enough time to sufficiently breakdown the organic matter and reduce the BOD in the tank to acceptable levels, the aerators are turned off. This allows the sludge in the basin to settle out.

SBR treatment should be able to biologically remove phosphorus to below 1 mg/L without chemical addition. It should also be able to meet the ammonia limits specified in the WPDES permit without chemical addition.

Once complete, the treated wastewater is decanted from the surface of the SBR and discharged to the next treatment process.

4.2.4 UV Disinfection

The existing ultraviolet disinfection system and structure would be replaced with a new system. The existing system is a channel system located in a below grade vault. Closed-vessel systems are also available with various benefits and downsides. Based on SEH's experience with UV systems at lagoons, a channel system was used for the purposes of this report.

4.2.5 Effluent Lift Station

The existing effluent lift station is a duplex vacuum-prime lift station. The vacuum-priming system is prone to leaks which renders the station inoperable. A typical modern style submersible lift station and valve vault would be constructed adjacent to the existing station. After the new station was constructed and brought online then the existing station would be removed.

Two submersible pumps and discharge piping will be installed in the new wet well. A new valve vault will be provided to house isolation and check valves. Electrical and controls will be located in a new control panel. The control panel will be fed from the MCC in the Blower Room of the Headworks Building.

A proposed site map for Alternative 2 can be found in Figure 7.

4.3 Alternative 3: Upgrades to Existing WWTP

This alternative would include the following:

- Construct an operations building to house chemical feed systems or an addition to the Headworks Building.
- Replace ultraviolet disinfection system with a new ultraviolet disinfection system.
- Replace Lift Station No. 2 with a submersible lift station.
- Sludge removal

- Lagoon improvements including new cover over Cell 4 and rip rap around lagoons.
- Replace Effluent Lift Station with a submersible lift station.

This alternative maintains the current lagoon treatment system with upgrades being made to influent pumping, disinfection, effluent pumping, and addition of chemical storage and dosing facilities. Sludge removal and lagoon improvements would also be included.

4.3.1 Lift Station No. 2

This alternative would propose the same changes as Section 4.2.1

4.3.2 Lagoon Improvements

Prior to proceeding with improvements to the lagoons, sludge would be removed to accommodate construction activities. Sludge removal last occurred in 2009 and at that time a larger quantity was removed than originally estimated; additional sludge judging is recommended to refine the final estimate.

Under this alternative, the cover on Cell 4 would be replaced with thicker material that matches the other cells so that it can support personnel and equipment for maintenance. Rip-rap with a geotextile barrier will replace the grassy inner slopes to improve maintainability and safety. It is recommended to perform additional sludge judging prior to any sludge removal. With the project in 2009, more sludge was removed than planned because the sludge and clay liner was intermingling.

4.3.3 Chemical Feed

Under this alternative, the Sanitary District would feed ferric chloride for phosphorus removal and sulfuric acid for pH adjustment to achieve effluent ammonia requirements. A new operations building (or building addition) would be constructed to house chemicals and related feed pumps. Chemical feed pumps would deliver a consistent dosage of ferric chloride to a new crossover manhole between the ponds. The crossover manhole would include an aeration diffuser to enhance mixing. Aeration would be achieved through a small diameter airline tapped from the air main. This could also be used to purge the lines of moisture/water, if needed.

The Sanitary District's WPDES permit includes a variable effluent ammonia limit that varies depending on the effluent pH at the time of discharge. In general, the lower the effluent pH, the higher the effluent ammonia limit (see Section 3.4 for additional details). This alternative would provide a means to reliably achieve compliance by lowering the effluent pH using sulfuric acid. Chemical feed pumps would deliver sulfuric acid to the mixing chamber downstream of the ultraviolet disinfection system that was previously used for disinfection.

An eyewash and safety shower would be provided in the chemical building for code compliance.

4.3.4 UV Disinfection

This alternative would propose the same changes as Section 4.2.4

4.3.5 Effluent Lift Station

This alternative would propose the same changes as Section 4.2.5

A proposed site map for Alternative 3 can be found in Figure 8.

4.4 Alternative 4: Upgrades to Existing WWTP and Ammonia Removal

This alternative would include the following:

- C Construct an operations building to house chemical feed systems or an addition to the Headworks Building.
- Replace ultraviolet disinfection system with a new ultraviolet disinfection system.
- Replace Lift Station No. 2 with a submersible lift station.
- Sludge removal
- Lagoon improvements including new cover over Cell 4 and rip rap around lagoons.
- Replace Effluent Lift Station with a submersible lift station
- The addition of a new polishing reactor to provide post-lagoon ammonia removal.

4.4.1 Lift Station No. 2

This alternative would propose the same changes as Section 4.2.1

4.4.2 Lagoon Improvements

This alternative would propose the same changes as Section 4.3.2

4.4.3 Chemical Feed

Under this alternative, the Sanitary District would add feed ferric chloride for phosphorus removal. A new operations building would be constructed to house ferric chloride and related feed pumps. Chemical feed pumps would deliver a consistent dosage of ferric chloride to a new crossover manhole between the ponds. The crossover manhole would include an aeration diffuser to enhance mixing. Aeration would be achieved through a small diameter airline tapped from the air main. This could also be used to purge the lines of moisture/water, if needed.

An eyewash and safety shower would be provided in the chemical building for code compliance.

4.4.4 UV Disinfection

This alternative would propose the same changes as Section 4.2.4

4.4.5 Effluent Lift Station

This alternative would propose the same changes as Section 4.2.5

4.4.6 Ammonia Polishing Reactor

The current fixed film system for enhanced nitrification in the lagoons is effective for reducing influent ammonia concentrations, but it is not capable of providing consistent near-complete ammonia removal. The fabric curtains located between lagoon cells provides some substate for nitrifiers to grow on. However, the nitrifying bacteria must compete with other bacteria for resources and independent oxygen control to the curtains is not possible.

This alternative would include addition of a dedicated post-lagoon polishing reactor to achieve <1 mg/L ammonia concentration in the effluent year-round. Polishing reactors contain larger quantities of media for nitrifying microbes to attach to and independent air headers for optimized

oxygen control. During colder temperatures, microbial activity slows, leading to potential washout in the lagoon effluent. However, storing more nitrifying bacteria on increased media surface area during warmer conditions the bacteria can be retained year-round. Additionally, nitrifying bacteria require more oxygen to convert ammonia to nitrate and nitrite than heterotrophic bacteria require to convert BOD to biomass. Providing ammonia treatment in a dedicated reactor allows for improved control and efficiency.

This reactor would be a separate tank located to the north of the existing lagoons; effluent would be diverted through the reactor from the north lagoon prior to entering the disinfection process.

A proposed site map for Alternative 4 can be found in Figure 9.

5 Evaluation of WWTP Alternatives

5.1 General

The following sections outline advantages and disadvantages for each of the alternatives. A cost effectiveness analysis was completed and is presented below. The parallel cost percentage was determined and is presented. Non-monetary factors including primary and secondary environmental impacts as well as reliability of treatment were considered and summarized.

5.2 Alternative 2

The advantages of Alternative 2 are:

- Modernizes treatment process with SBR, improving efficiency and treatment capacity.
- Enhanced ammonia and phosphorus removal without chemical addition.
- New UV disinfection system improves reliability.
- Replaces outdated lift stations with modern submersible ones.
- Adds grit removal system for better pre-treatment.

The disadvantages of Alternative 2 are:

- Significant capital investment required.
- Requires sludge removal and lagoon abandonment.
- The construction and operational transition period must be managed carefully to avoid disrupting ongoing operations.
- A mechanical plant may be challenged to perform consistently over the wide seasonal variability in loading.

5.3 Alternative 3

The advantages of Alternative 3 are:

- Maintains current lagoon system with necessary upgrades.
- New chemical feed systems for reliable phosphorus and ammonia control.
- New UV disinfection system improves reliability.
- Replaces outdated lift stations with modern submersible ones.
- Less disruptive than a complete overhaul.

The disadvantages of Alternative 3 are:

- Reliance on chemical addition for phosphorus and ammonia control.
- Upgrades may not achieve the same level of treatment efficiency as a new SBR system.

5.4 Alternative 4

The advantages of Alternative 4 are:

- Maintains current lagoon system with necessary upgrades.
- Enhanced ammonia removal, achieving <1 mg/L year-round.
- Reliable phosphorus removal through chemical addition.
- New UV disinfection system improves reliability.
- Replaces outdated lift stations with modern submersible ones.

The disadvantages of Alternative 4 are:

- Significant capital investment required.
- Reliance on chemical addition for phosphorus control.
- The construction and operational transition period must be managed carefully to avoid disrupting ongoing operations.

5.5 Cost Effective Analysis

A cost effectiveness analysis was performed to determine which wastewater treatment alternative will minimize total resource cost for the design life of the facilities and remain compatible with water quality goals. In a cost effectiveness analysis using the present worth analysis method, future costs are reduced to their present worth cost and summarized for each alternative. Future expenditures are converted to a present worth cost at the beginning of the planning period. The planning period is a time span for which alternative wastewater collection and treatment facilities are evaluated for cost effectiveness. Typically, a 20-year planning period is selected which corresponds to the design life of most process equipment. The total capital investment includes:

1. Initial capital construction costs plus engineering, legal, and administrative costs.
2. The capital costs necessary for major equipment replacement during the planning period. All future costs are discounted to the present using a single payment present worth factor computed at 2.5 percent, the present federally mandated discount rate. This yields the amount of money that must be theoretically invested at 2.5 percent when the project is initially constructed so that the capital required for equipment replacement would be available when such expenditures are required.

The salvage value at the end of the planning period, which represents a credit, must also be considered in the present worth costs. Structures and equipment with a service life extending beyond the 20-year planning period are considered to have a salvage value. Straight line depreciation methods are used to determine the salvage value for these components. The single payment present worth factor computed at 2.5 percent is also applied to the total salvage value. The resulting present worth is subtracted from the present worth cost for each alternative.

The values of operation and maintenance costs that occur during the planning period are discounted to a present worth. The value of operation and maintenance costs that occur during the planning period is obtained by multiplying the estimated average operation and maintenance expenses during the 20-year planning period by a series present worth factor computed at 2.5 percent. This yields the amount of money that must be theoretically invested at 2.5 percent when the project is initially constructed so that the annual operation and maintenance expenses can be paid each year for the 20-year facilities design life.

Inflation of costs during the planning period was not considered in the analysis as specified in the Environmental Protection Agency (EPA) guidelines. Therefore, all costs provided are based on December 2024 costs; this includes future replacement costs and salvage values. The assumption is that all prices involved will tend to change by approximately the same percentage; thus, the results and conclusions drawing from the present worth cost analysis will not be affected by changes in the general level of prices. Detailed cost opinions for each alternative are found in Appendix E.

Table 8 – 20-Year Present Worth Summary of Alternatives

Alternative	Initial Capital Cost	Present Worth of Annual Cost	Present Worth of 20-Year Salvage Value	20-Year Net Present Worth
Alternative 2	$10,490,000	$2,799,000	$(1,139,000)	$12,150,000
Alternative 3	$3,219,000	$825,000	$(38,000)	$4,006,000
Alternative 4	$4,411,000	$1,672,000	$(38,000)	$6,045,000

5.6 Parallel Cost Percentage

The parallel cost percentage refers to the proportion of project costs that correspond to and are eligible for below-market-rate financing relative to the total project cost eligible for CWF financing. To apply for a CWFP loan, the Sanitary District must submit a parallel cost estimate to the WDNR. This identifies the portion of the project eligible for a low-interest loan.

The parallel cost percentage is determined by calculating a reduced capacity condition that removes reserve capacity provided for:

- Projected flows beyond 10 years from the project completion date.
- Industrial users with equivalent flows greater that 25,000 gpd.
- State/federal facilities if the flow exceeds 5 percent of the total flow to the WWTP.

Peak population occurs in 2044, however the absolute difference in population between 2044 and 2034, 10 years from the projected project completion, and current is so minimally different that the facility to serve either would effectively be the same. Additionally, there are no industrial, state or federal users meeting the criteria above. The reduced capacity condition is the same as the design capacity. As a result, the parallel cost percentage is 100 percent.

5.7 Non-Monetary Comparison

5.7.1 Primary Environmental Impacts

Each alternative, with the exclusion of Alternative 1, will be able to achieve the goals for providing adequate wastewater treatment for current permit limits once the new facilities are completed, which will maintain the current quality of Lake Superior.

Each alternative, with the exception of Alternative 1, has construction occurring on the current Sanitary District-owned property, therefore, minimal impact is expected.

Construction impacts will include noise in the local area of the project, as well as air-emissions from construction equipment, but are expected to be similar to other construction projects. The entire construction area is previously disturbed, and currently in use as a WWTP, so there will be no negative impacts on flora, fauna, agricultural land or cultural, historic or archaeological features.

According to FEMA's National Flood Hazard Map, floodplains are present near Lift Station No. 2. The flood maps show that the LS is located within the waterway. However, these maps are out of date with regards to the current topography. The 100-yr high water elevation for this area is 605. Record drawings indicate the top of casting for the lift station to be 630.5. During design a survey will confirm the elevation. At the WWTP, there are no floodplains present. The National Flood Hazard Map can be seen in Figure 10.

Figure 11 shows the wetland/wetland indicator soils mapping for the wastewater treatment plant site. It should be noted that there are no mapped wetlands within the site. Wetland indicator soils nor mapped wetlands are present at the Lift Station No. 2 site adjacent to the marina. However, mapped wetlands are present adjacent to both sites. The proposed disturbance is within the site boundaries; therefore, wetland impacts are not anticipated. As part of the design, the Sanitary District will submit the project as part of the Wetland Identification Program to ensure DNR concurrence.

An Endangered Resources Preliminary Assessment was performed for the proposed project, which indicated that the project is covered by the Broad Incidental Take Permit/Authorization for No/Low Impact Activities. The follow up action required to be implemented is to follow USFWS National Bald Eagle Management Guidelines. The findings of the assessment and review are included as Appendix F.

An Archaeological Survey was conducted at the airport near the WWTP with no indication of archaeological materials located. There were no archeological or historical reports within or adjacent to Lift Station No 2. See Appendix G for the results.

6 Recommended Alternative and Implementation Plan

Based on the monetary and non-monetary evaluations presented in Section 5, it is recommended the Sanitary District select Alternative 3. Alternative 3 will extend the WWTP's design life and provide reliable treatment over the next twenty years at the lowest cost to the Sanitary District.

SEH recommends implementing this alternative as a single project as opposed to a phased series of projects based on the condition and age limitations of a number of the existing unit

treatment processes. The estimated project cost is $3,219,000 including contingencies, engineering, administration, and legal fees which is detailed in Appendix E. These costs are estimated for market conditions as of December 2024, and do not account for inflation beyond that date.

6.1 Implementation Schedule

The anticipated implementation schedule is outlined below:

- Conduct Public Hearing — January 2025
- Submit Facility Plan to WDNR — February 2025
- Begin Design — February 2025
- Congressional Appropriation Request — February 2025
- WDNR Approval of Facility Plan — May 2025
- Submit Drawings and Specifications to WDNR — September 2025
- WDNR Approval of Drawings and Specifications — December 2025
- Award of Construction Contract — March 2026
- Start Construction — May 2026
- End Construction/Startup — August 2027

6.2 Project Cost and Funding

The Sanitary District is pursuing financial assistance from the WDNR Clean Water Fund Loan Program (CWF). CWF provides subsidized interest rate loans and principal forgiveness (essentially grant dollars) to public entities seeking to fund wastewater infrastructure projects. The Bipartisan Infrastructure Law funds have increased the level of principal forgiveness in this program for SFY 2023-2027. The current estimate is that the district would be eligible for 30-35% principle forgiveness. Additionally, the Sanitary District can request a Congressional Appropriation for additional funding support.

6.3 Estimated User Rate Impact

The Sanitary District currently has a fee structure to account for the varied means by which it receives wastewater. The current fee structure is as follows:

- Sewer User Fee: $34 per month per unit
- Holding Tank Dumping Fee: $125 per year
- Septic Tank Dumping Fee: $150 per 1000 gal
- Pit Toilet Dumping Fee: $250 per 1000 gal

Assuming the proposed project is funded by the CWF and financed over 20 years, the current interest rate would be 55 percent of the market rate of 4.0 percent, or 2.2 percent. Current levels of principal forgiveness through the CWF indicate that the Sanitary District could receive up to 30-35% percent principal forgiveness. Based on the proposed estimated capital cost of $3,219,000, and assuming 30 percent principal forgiveness up to the loan forgiveness cap of $2,100,000, the Sanitary District loan amount would be $2,253,300. The annual debt service for this loan would be approximately $140,478.

Additional operation and maintenance costs associated with the project are associated with chemical usage. These would include chemical deliveries and pump maintenance.

CWF requires the Sanitary District to have in place and pay into an equipment replacement fund. To fully replace all equipment at the WWTP when equipment is at the end of its design life, the Sanitary District would need to contribute $34,650 annually to the fund. CWF does not require the Sanitary District to plan for all equipment and deposits of less than $34,650 would be accepted and encouraged. It is suggested that the Sanitary District work with their accounting team to determine an appropriate amount for the equipment replacement fund once CWF loan funds are awarded.

While the details of user charge changes will need to be calculated with the final bid price, for the purposes of this exercise, it is assumed that the debt service payment will be added to the fixed charge. To evenly allocate the proposed debt, a cost per 1000 gals of $6.64/1000 gal was determined based on the annual average flow from 2021-2023. For Sewer Users, the average flow is 4300 gal/month. This equates to an increase in fees of $28.53 per month or $342.40 per year. For Holding Tank Users, the average flow is 7480 gal/year. This equates to an increase in fees of $49.63 per year. This does not account for any additional funds for an equipment replacement fund.

With the assumptions outlined above, the total annual impact on an average residential user will be a total annual cost of $750.40 for a 'typical' residential user. Based on the Town of La Pointe's Comprehensive Plan Amendment 2024, Median Household Income (MHI) of $64,063, this represents 1.17 percent of MHI. EPA considers sewer costs at or above 2 percent of the MHI to be a hardship. Most communities have between 1--2 percent of their MHI.

7 Public Participation

7.1 Public Education

The goal for public outreach in the context of the Madeline Sanitary District (MSD) project is to engage and educate residents about the necessary updates to the Wastewater Treatment Plant (WWTP) and sanitary system, and their positive impact on the natural environment. This will be achieved through community outreach and a public hearing regarding the Facility Plan. The outreach aims to inform residents about the importance of having an up-to-date WWTP, how it protects the local environment, and steps they can take through proper wastewater system use to contribute positively. Public educational material included in Appendix H. Public outreach material includes:

- Public Outreach for WWTP & Sanitary Sewer Improvements
- Protect Our Environment: Avoid Harmful Substances Down the Drain
- Impact of Ammonia and Phosphorus on the Environment from Wastewater Treatment Plants

7.2 Public Hearing

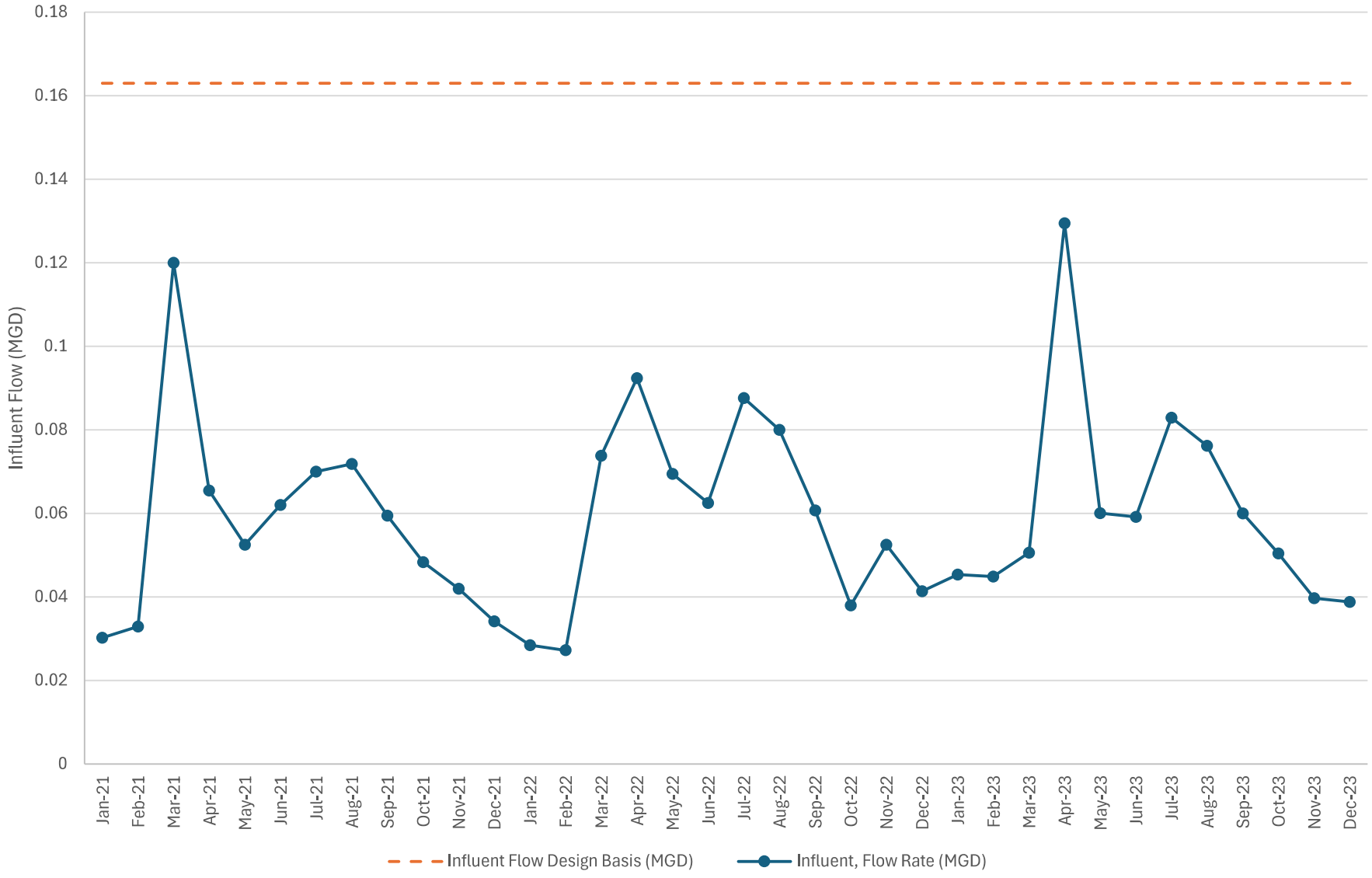
A public hearing for the recommended alternative was held on January 15, 2025 in compliance with NR 110.09 requirements. Minutes of that meeting will be included as Appendix I.

srb

Figures

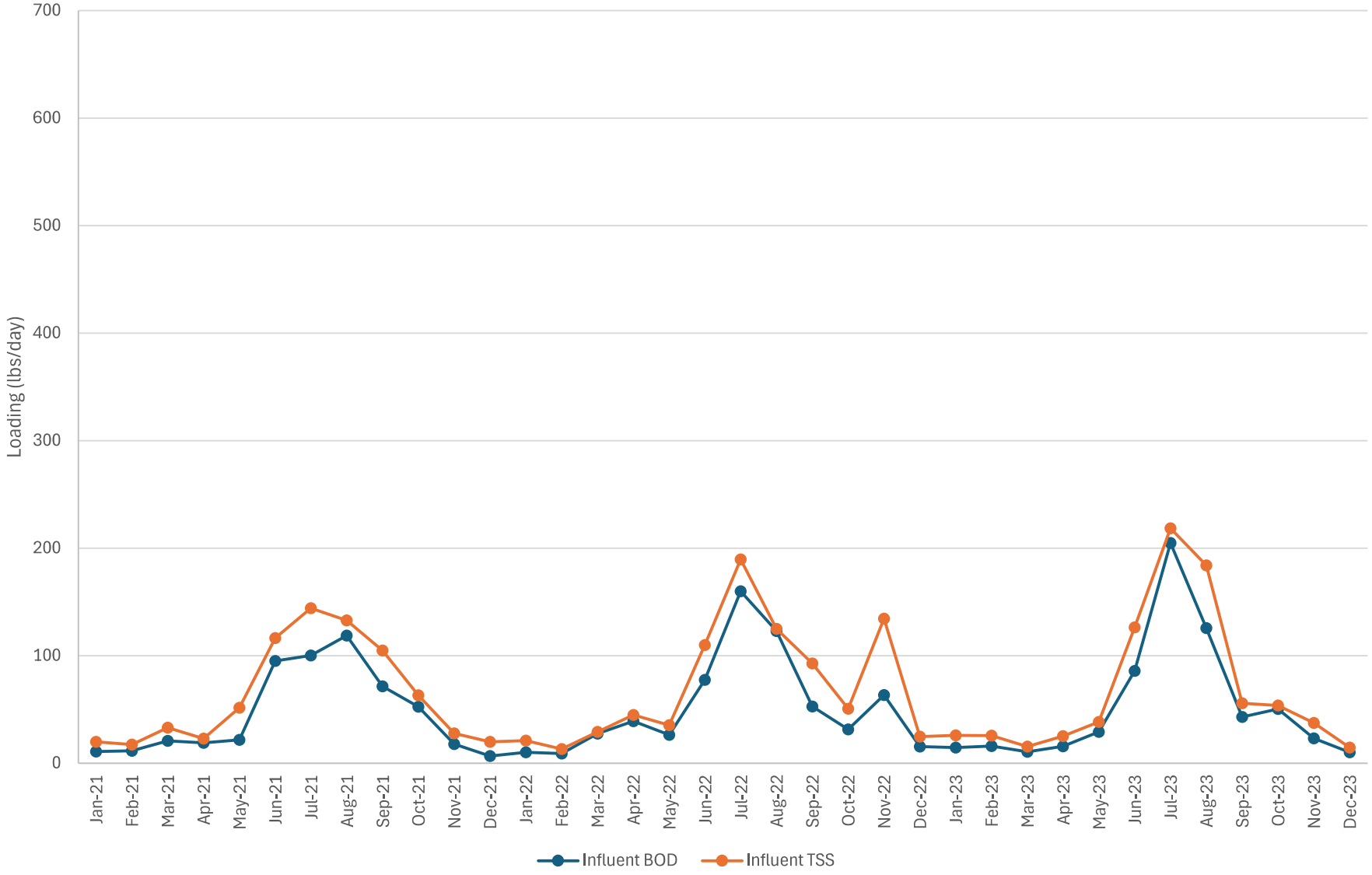
DRAFT

Figure 1: Madeline WWTP
Average Monthly Influent Flow
January 2021 - December 2023



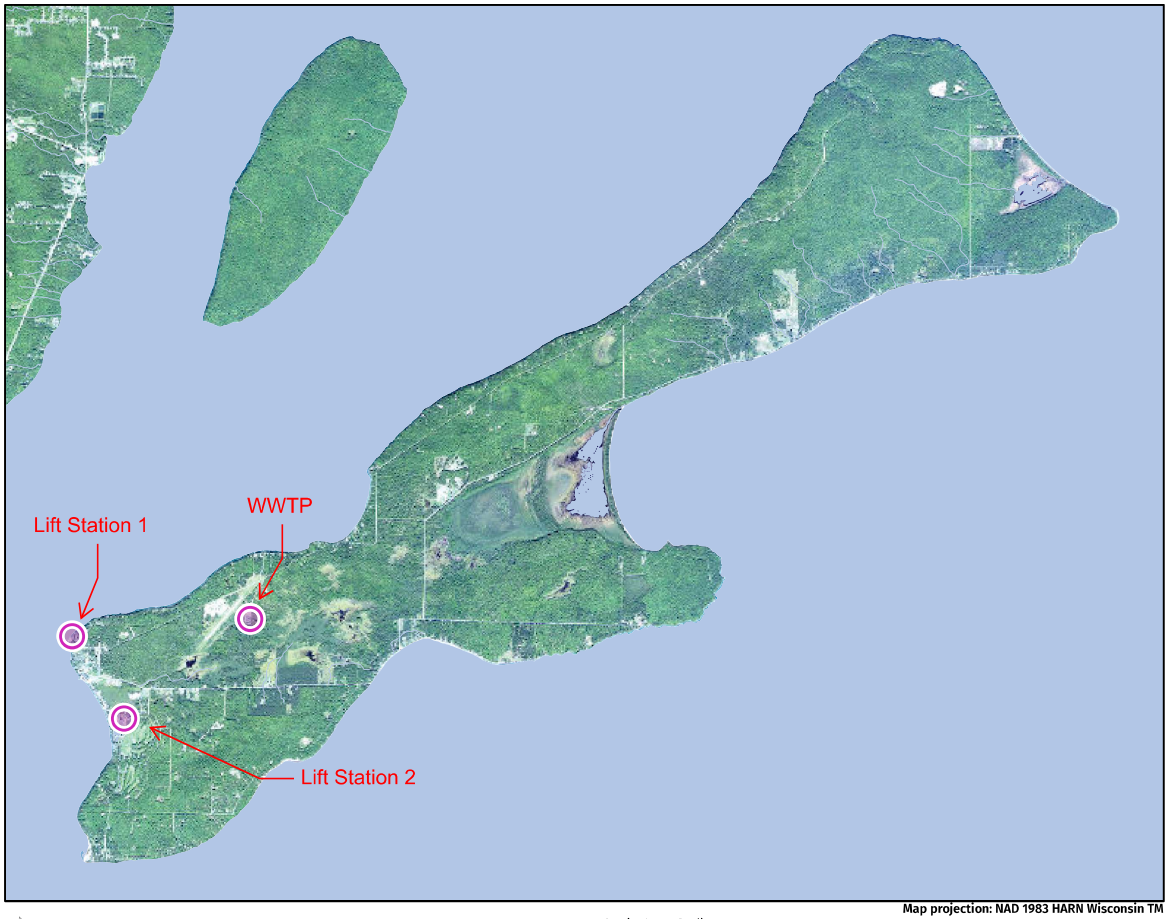
DRAFT

Figure 2: Madeline WWTP
Average Monthly Influent TSS and BOD
January 2021 - December 2023



WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Madeline Island Sanitary Sewer District
WWTP & Lift Station Location



Legend: (some map layers may not be displayed)

- 24K Lakes and Open Water
- 24K Streams and Rivers

2015 Leaf On

- Red: Band_1
- Green: Band_2
- Blue: Band_3
- City or Village
- State Boundaries
- County Boundaries

Major Roads

- Interstate Highway
- State Highway
- US Highway

County and Local Roads

- County HWY
- Local Road

Notes:
Facility Plan - WWTP & LS Upgrades

Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 6,000 12,000 Feet
0 1,000 2,000 Meters

Service Layer Credits:
2015 Leaf On: , EN Basic Basemap WTM Ext:

Date Printed: 12/17/2024 11:12 AM

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Figure 4: Madeline WWTP
Average Monthly Effluent TSS
January 2021 - December 2023

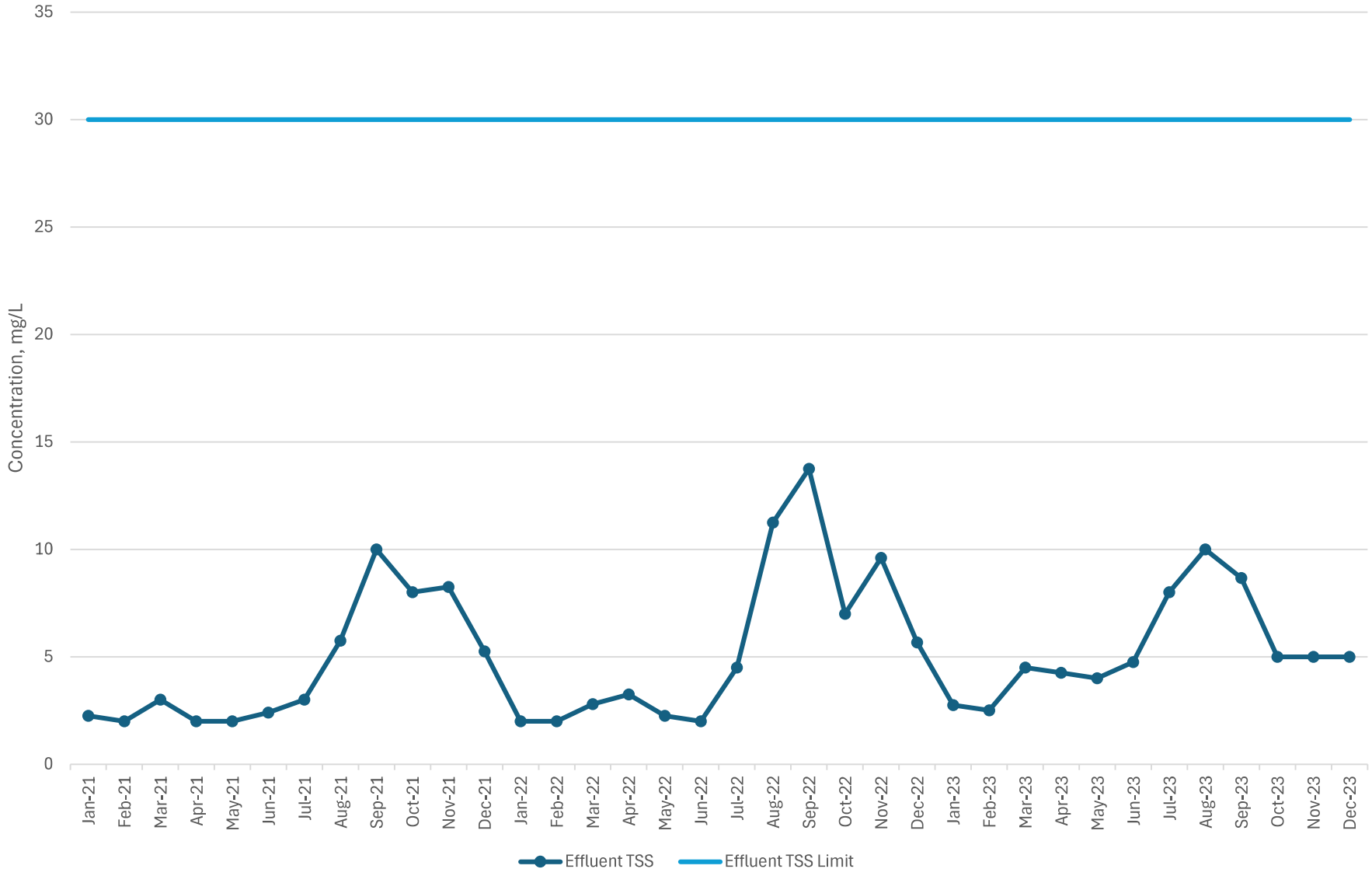

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Figure 5: Madeline WWTP
Average Monthly Effluent BOD
January 2021 - December 2023

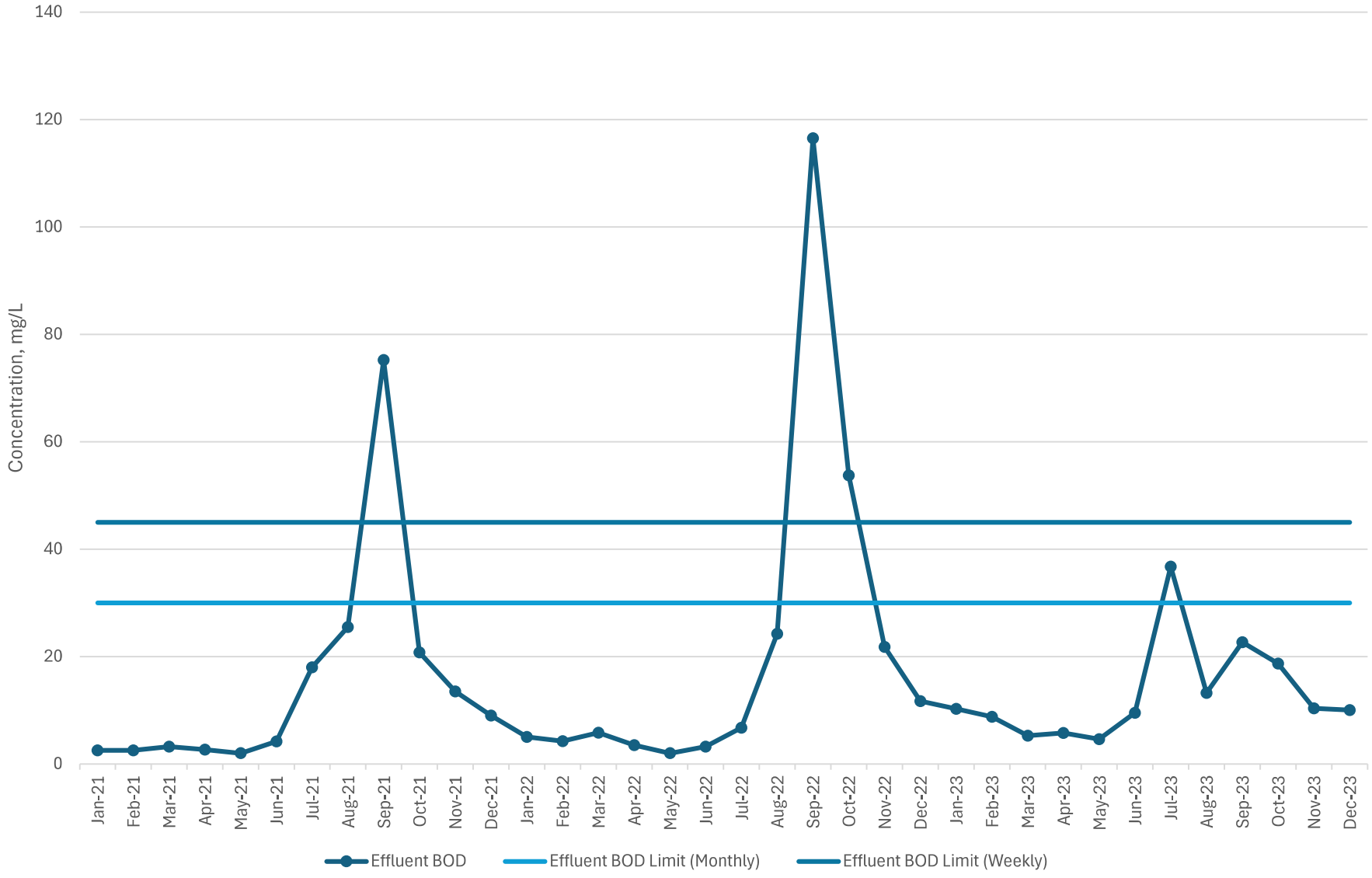
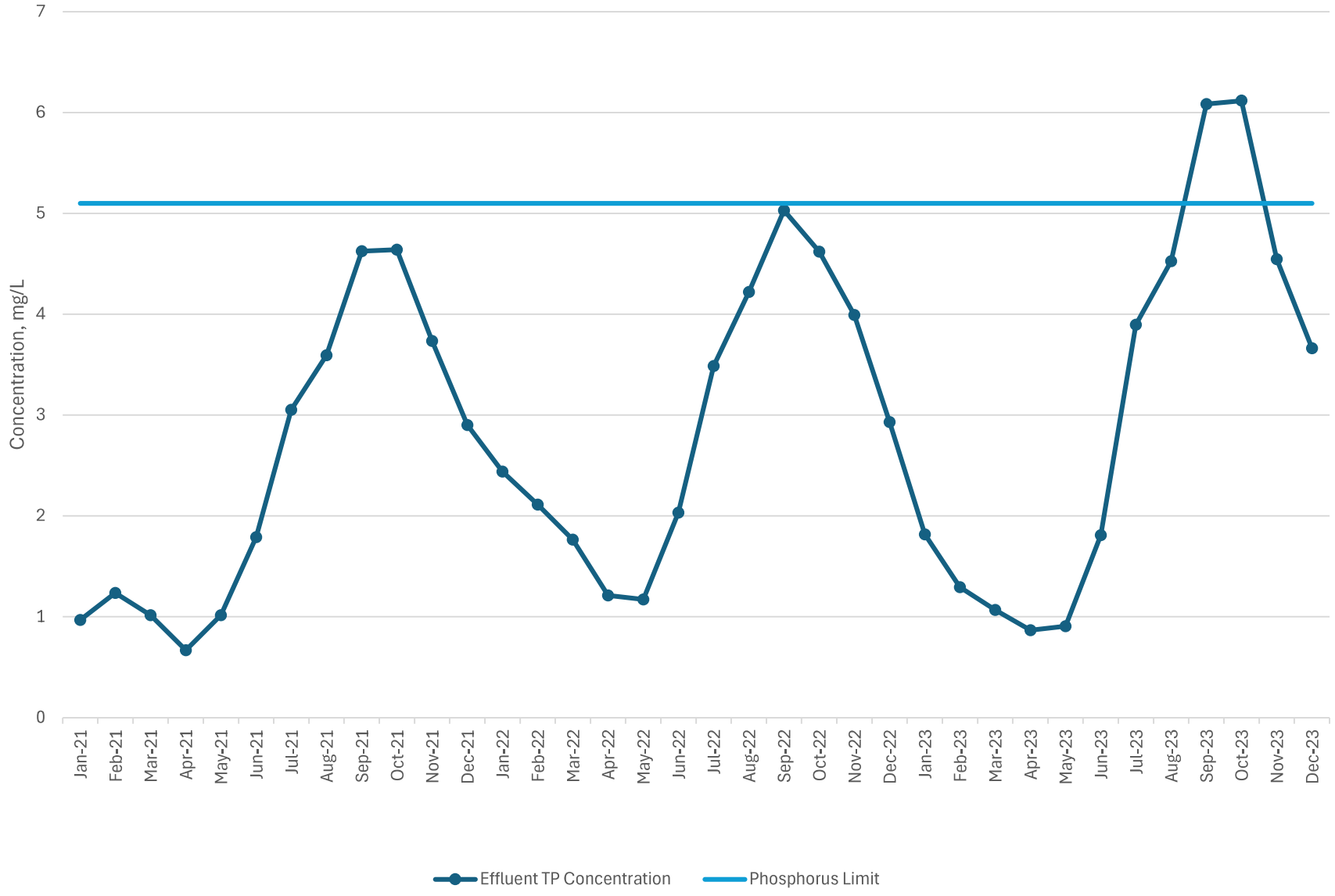
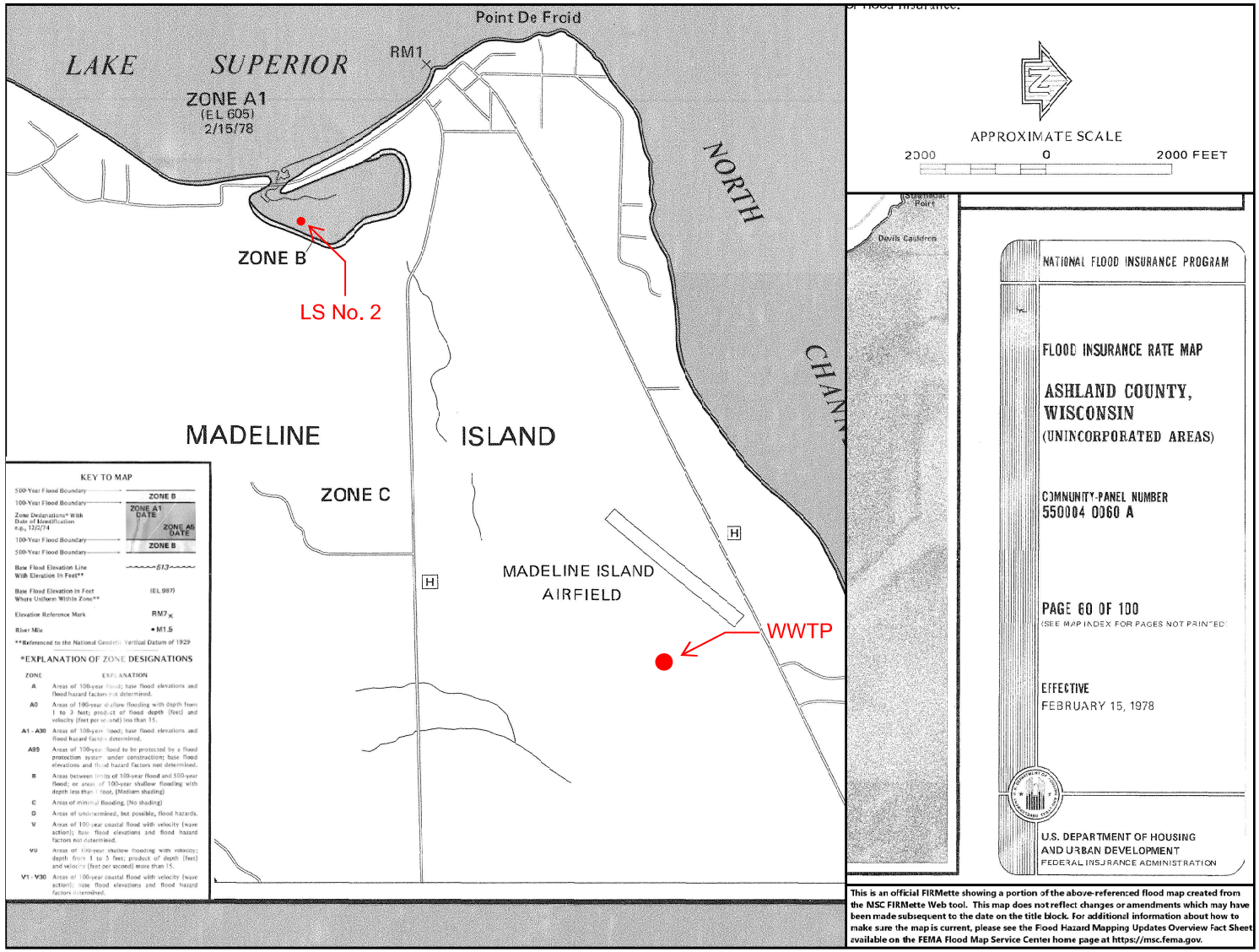


Figure 6: Madeline WWTP
Average Monthly Effluent Total Phosphorus
January 2021 - December 2023




Point De Froid
LAKE SUPERIOR
RM1
ZONE A1
(EL 605)
2/15/78
NORTH CHANNEL
ZONE B
LS No. 2
MADELINE ISLAND
ZONE C
MADELINE ISLAND AIRFIELD
WWTP
H
H
KEY TO MAP
500-Year Flood Boundary
ZONE B
100-Year Flood Boundary
ZONE A1 DATE
Zone Designations* With Date of Identification e.g., 12/2/74
ZONE A6 DATE
100-Year Flood Boundary
ZONE B
500-Year Flood Boundary
Base Flood Elevation Line With Elevation In Feet**
513
Base Flood Elevation in Feet Where Uniform Within Zone**
(EL 987)
Elevation Reference Mark
RM7
River Mile
M1.5
**Referenced to the National Geodetic Vertical Datum of 1929
*EXPLANATION OF ZONE DESIGNATIONS
ZONE
EXPLANATION
A
Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0
Areas of 100-year shallow flooding with depth from 1 to 3 feet; product of flood depth (feet) and velocity (feet per second) less than 15.
A1 - A30
Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99
Areas of 100-year flood to be protected by a flood protection system under construction; base flood elevations and flood hazard factors not determined.
B
Areas between limits of 100-year flood and 500-year flood; or areas of 100-year shallow flooding with depth less than 1 foot. (Medium shading)
C
Areas of minimal flooding. (No shading)
D
Areas of undetermined, but possible, flood hazards.
V
Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V0
Areas of 100-year shallow flooding with velocity; depth from 1 to 3 feet; product of depth (feet) and velocity (feet per second) more than 15.
V1 - V30
Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.
APPROXIMATE SCALE
2000
0
2000 FEET
Devils Cauldron
NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP
ASHLAND COUNTY, WISCONSIN
(UNINCORPORATED AREAS)
COMMUNITY-PANEL NUMBER
550004 0060 A
PAGE 60 OF 100
(SEE MAP INDEX FOR PAGES NOT PRINTED)
EFFECTIVE
FEBRUARY 15, 1978
U.S. DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION
This is an official FIRMette showing a portion of the above-referenced flood map created from the NSC FIRMette Web tool. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For additional information about how to make sure the map is current, please see the Flood Hazard Mapping Updates Overview Fact Sheet available on the FEMA Flood Map Service Center home page at https://msc.fema.gov.

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Wetland Map
Madeline Sanitary District

Legend: (some map layers may not be displayed)

Wetland Class Points
- Wetland too small to delineate
- Wetland Class Areas
- Wetland Indicators
- Latest Leaf Off Imagery
- Latest Leaf On Imagery
- City or Village
- State Boundaries
- County Boundaries

Major Roads
- Interstate Highway
- State Highway
- US Highway

County and Local Roads
- County HWY
- Local Road

Notes:
Facility Plan- WWTP & LS Upgrades

Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 160 320 Feet
0 40 80 Meters

Service Layer Credits:
Wisconsin Wetland Inventory NWI (cached): , Wetland Indicators & Soils: Surface Water Data Viewer Team, EN Basic Basemap WTM Ext: , 2022 Leaf On: , 2020 Leaf Off: , Wisconsin Wetland Inventory NWI (Dynamic): Calvin Lawrence, Dennis Weise, Nina Rihn

Date Printed: 12/10/2024 12:15 PM

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

Wetland Map
Madeline Sanitary District

Legend: (some map layers may not be displayed)

- Wetland Class Areas
- Wetland Indicators
- Latest Leaf Off Imagery
- Latest Leaf On Imagery
- City or Village
- State Boundaries
- County Boundaries

Major Roads
- Interstate Highway
- State Highway
- US Highway

County and Local Roads
- County HWY
- Local Road
- Railroads
- Tribal Lands

Notes:
Facility Plan- WWTP & LS Upgrades

Map projection: NAD 1983 HARN Wisconsin TM

N

Map: 0 50 100 Feet
0 10 20 Meters

Service Layer Credits:
Wisconsin Wetland Inventory NWI (cached): , Wetland Indicators & Soils: Surface Water Data Viewer Team, EN Basic Basemap WTM Ext: , 2022 Leaf On: , 2020 Leaf Off: , Wisconsin Wetland Inventory NWI (Dynamic): Calvin Lawrence, Dennis Weise, Nina Rihn

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Appendix A

WPDES 0030759 Permit

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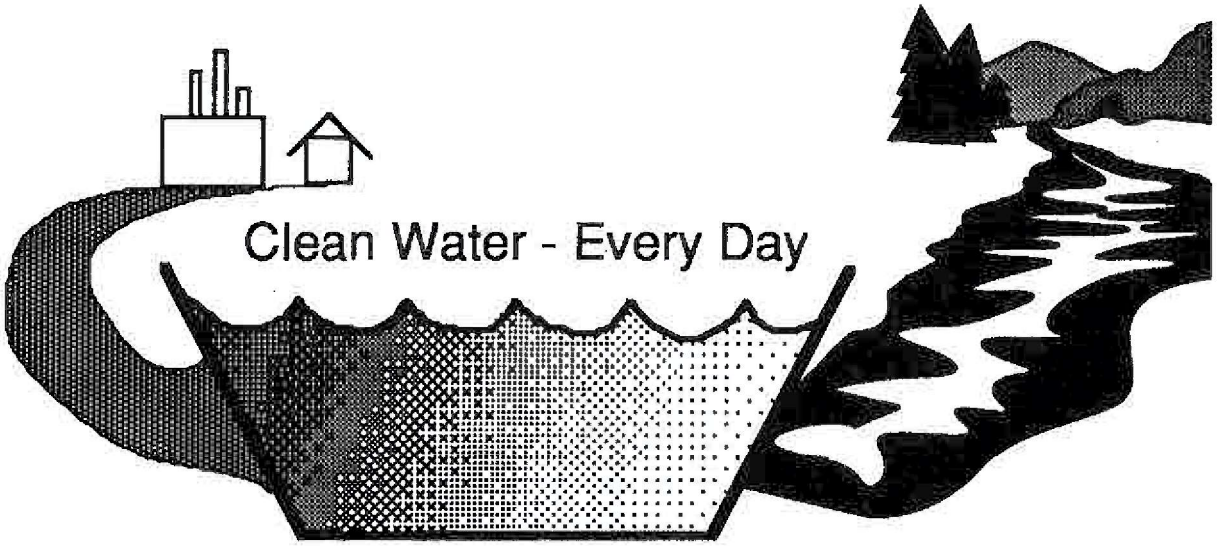
The WPDES Clean Water Permit for the Madeline Sanitary District Wastewater Treatment Plant



Our Shared Responsibility

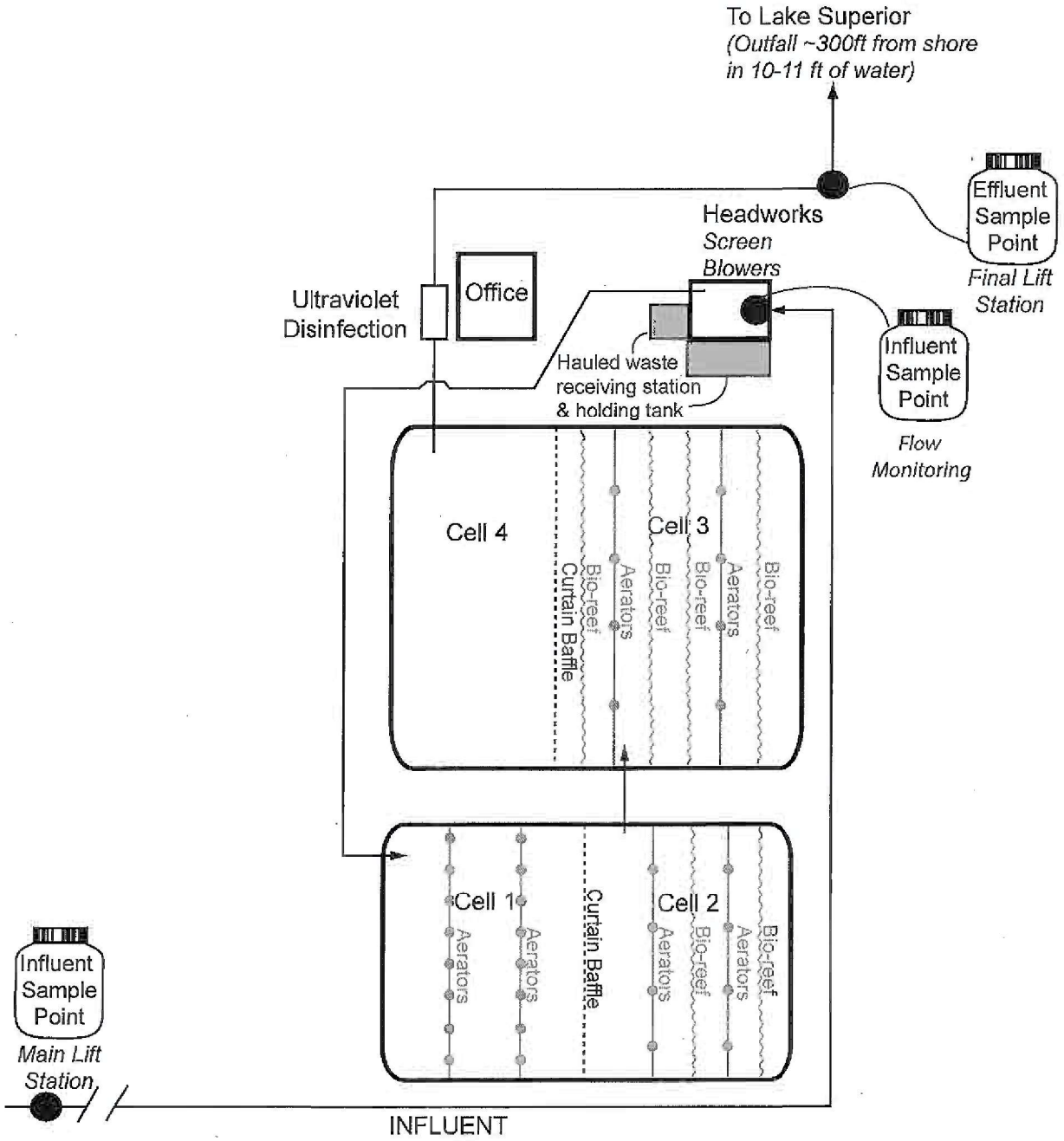
WISCONSIN DEPARTMENT OF NATURAL RESOURCES

DRAFT

WPDES # WI-0030759

Madeline Sanitary District
Wastewater Treatment Plant

The Madeline Sanitary District wastewater treatment facility consists of two covered aerated ponds. Submerged curtain-type fixed film media systems (Bio-reefs) have been installed to increase treatment quality. Ultraviolet disinfection is provided from May through September, annually. Effluent is discharged to Lake Superior. The diagram below shows the treatment units and sampling locations.



● represents sample locations

NOT TO SCALE

Flow: 0.1519 MGD
Construction year: 2010

WISCONSIN
DEPT. OF NATURAL RESOURCES

WPDES PERMIT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

PERMIT TO DISCHARGE UNDER THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM

MADELINE SANITARY DISTRICT

is permitted, under the authority of Chapter 283, Wisconsin Statutes, to discharge from a facility located at

949 SNOW PLACE LANE, LA POINTE, WISCONSIN

to

LAKE SUPERIOR IN ASHLAND COUNTY WITHIN THE LAKE SUPERIOR WATERSHED

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in this permit.

The permittee shall not discharge after the date of expiration. If the permittee wishes to continue to discharge after this expiration date an application shall be filed for reissuance of this permit, according to Chapter NR 200, Wis. Adm. Code, at least 180 days prior to the expiration date given below.

State of Wisconsin Department of Natural Resources
For the Secretary

By _____
Michelle Balk
Wastewater Field Supervisor - NOR

June 4, 2019
Date Permit Signed/Issued

PERMIT TERM: EFFECTIVE DATE - July 01, 2019 **EXPIRATION DATE - June 30, 2024**

TABLE OF CONTENTS

1 Influent Requirements

1.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
701	Representative influent samples shall be collected from the pumps at the main lift station except for flow which shall be monitored prior to the screening unit.

1.2 Monitoring Requirements

The permittee shall comply with the following monitoring requirements.

1.2.1 Sampling Point 701 - INFLUENT TO PLANT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Total Daily	
BOD_5, Total		mg/L	Weekly	Grab	
Suspended Solids, Total		mg/L	Weekly	Grab	

2 Surface Water Requirements

2.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
001	Representative samples shall be collected from the wet well or the final lift station, except for fecal coliform and E. coli which shall be collected immediately after the Ultraviolet disinfection system. The permittee is authorized to discharge to Lake Superior within the Lake Superior drainage basin.

2.2 Monitoring Requirements and Effluent Limitations

The permittee shall comply with the following monitoring requirements and limitations.

2.2.1 Sampling Point (Outfall) 001 - EFFLUENT

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Total Daily	
BOD_5, Total	Monthly Avg	30 mg/L	Weekly	Grab	
BOD_5, Total	Weekly Avg	45 mg/L	Weekly	Grab	
Suspended Solids, Total	Monthly Avg	30 mg/L	Weekly	Grab	
Suspended Solids, Total	Weekly Avg	45 mg/L	Weekly	Grab	
Nitrogen, Ammonia (NH_3-N) Total	Daily Max - Variable	mg/L	Weekly	Grab	Variable limits are in effect June 1st through September 30th. See the "Ammonia Limitation" subsection.
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	39 mg/L	Weekly	Grab	Limitation is effective June 1st through September 30th.
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	72 mg/L	Weekly	Grab	Limitation is effective June 1st through September 30th.
Nitrogen, Ammonia Variable Limit		mg/L	Weekly	Grab	Variable limits are in effect June 1st through September 30th. See the "Ammonia Limitation" subsection.
pH Field	Daily Max	9.0 su	Weekly	Grab	
pH Field	Daily Min	6.0 su	Weekly	Grab	
Phosphorus, Total	Monthly Avg	5.1 mg/L	Weekly	Grab	See the "Phosphorus Limitation" subsection for more information.

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Fecal Coliform	Geometric Mean - Monthly	400 #/100 ml	Weekly	Grab	Monitoring and limit are effective May 1st through October 31st.
Fecal Coliform	Geometric Mean - Wkly	656 #/100 ml	Weekly	Grab	Monitoring and limit are effective May 1st through October 31st.
E. coli		#/100 ml	Weekly	Grab	Monitoring is effective May 1st through October 31st.
Chronic WET		TUc	Once	Grab	One test is required during 2022.
Acute WET		TU_a	Once	Grab	One test is required during 2022.

2.2.1.1 Annual Average Design Flow

The annual average design flow of the permittee's wastewater treatment facility is 0.152 MGD.

2.2.1.2 Ammonia Limitation

Daily maximum effluent ammonia limits are required for the period of June through September. Sample results for pH shall be used to calculate the variable limit (see the Maximum Effluent Ammonia Concentration Limits table at the end of this section). Ammonia (NH3-N) sampling shall occur on a day when pH levels are monitored. Report the applicable variable limit from the limits table and the ammonia discharge concentration on the electronic Discharge Monitoring Report (eDMR) in the Ammonia Variable Limit column and the Total Ammonia column respectively.

Daily Maximum Limits – Cold Water

Effluent pH (s.u.)	NH_3-N Limit (mg/L)	Effluent pH (s.u.)	NH_3-N Limit (mg/L)	Effluent pH (s.u.)	NH_3-N Limit (mg/L)
$6.0 < pH \leq 6.1$	72	$7.0 < pH \leq 7.1$	44	$8.0 < pH \leq 8.1$	9.4
$6.1 < pH \leq 6.2$	71	$7.1 < pH \leq 7.2$	40	$8.1 < pH \leq 8.2$	7.7
$6.2 < pH \leq 6.3$	69	$7.2 < pH \leq 7.3$	35	$8.2 < pH \leq 8.3$	6.4
$6.3 < pH \leq 6.4$	68	$7.3 < pH \leq 7.4$	31	$8.3 < pH \leq 8.4$	5.3
$6.4 < pH \leq 6.5$	65	$7.4 < pH \leq 7.5$	27	$8.4 < pH \leq 8.5$	4.3
$6.5 < pH \leq 6.6$	63	$7.5 < pH \leq 7.6$	23	$8.5 < pH \leq 8.6$	3.5
$6.6 < pH \leq 6.7$	60	$7.6 < pH \leq 7.7$	19	$8.6 < pH \leq 8.7$	3.0
$6.7 < pH \leq 6.8$	56	$7.7 < pH \leq 7.8$	16	$8.7 < pH \leq 8.8$	2.5
$6.8 < pH \leq 6.9$	52	$7.8 < pH \leq 7.9$	14	$8.8 < pH \leq 8.9$	2.1
$6.9 < pH \leq 7.0$	48	$7.9 < pH \leq 8.0$	11	$8.9 < pH \leq 9.0$	1.8

2.2.1.3 Phosphorus Limitation

Final Phosphorus Effluent Limitation: The calculated effluent limitation for phosphorus is not known at this time. This limit will be determined when the Lake Superior nearshore or whole lake model is approved. This final effluent limitation may be finalized during this permit term, if so the permit may be modified or reissued. It is the

Department's expectation that phosphorus optimization efforts shall continue until a calculated effluent limit can be developed. See the Schedules section of this permit for more information on continued phosphorus optimization.

Interim Phosphorus Limitation: The interim effluent limitation for phosphorus (5.1 mg/L) is effective upon the first day of the permit term.

2.2.1.4 Whole Effluent Toxicity (WET) Testing

Primary Control Water: Lake Superior

Instream Waste Concentration (IWC): 9%

Acute Mixing Zone Concentration: None

Dilution series: At least five effluent concentrations and dual controls must be included in each test.

- **Acute:** 100, 50, 25, 12.5, 6.25% and any additional selected by the permittee.
- **Chronic:** 100, 30, 10, 3, 1% and any additional selected by the permittee.

WET Testing Frequency: One Acute and **Chronic** test shall be conducted during the 2022 calendar year.

Testing: WET testing shall be performed during normal operating conditions. Permittees are not allowed to turn off or otherwise modify treatment systems, production processes, or change other operating or treatment conditions during WET tests.

Reporting: The permittee shall report test results on the Discharge Monitoring Report form, and also complete the "Whole Effluent Toxicity Test Report Form" (Section 6, "*State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, 2nd Edition*"), for each test. The original, complete, signed version of the Whole Effluent Toxicity Test Report Form shall be sent to the Biomonitoring Coordinator, Bureau of Water Quality, 101 S. Webster St., P.O. Box 7921, Madison, WI 53707-7921, within 45 days of test completion. The Discharge Monitoring Report (DMR) form shall be submitted electronically by the required deadline.

Determination of Positive Results: An acute toxicity test shall be considered positive if the Toxic Unit - Acute (TU_a) is greater than 1.0 for either species. The TU_a shall be calculated as follows: $TU_a = 100 \div LC_{50}$. A chronic toxicity test shall be considered positive if the Toxic Unit - Chronic (TU_c) is greater than 11 for either species. The TU_c shall be calculated as follows: $TU_c = 100 \div IC_{25}$.

Additional Testing Requirements: Within 90 days of a test which showed positive results, the permittee shall submit the results of at least 2 retests to the Biomonitoring Coordinator on "Whole Effluent Toxicity Test Report Forms". The 90 day reporting period shall begin the day after the test which showed a positive result. The retests shall be completed using the same species and test methods specified for the original test (see the Standard Requirements section herein).

3 Land Application Requirements

3.1 Sampling Point(s)

The discharge(s) shall be limited to land application of the waste type(s) designated for the listed sampling point(s) on Department approved land spreading sites or by hauling to another facility.

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
002	Representative samples shall be collected from the ponds if sludge is removed during the permit term. Removal of sludge is not anticipated.

4 Schedules

4.1 Phosphorus

No later than 30 days following each date, the permittee shall notify the Department in writing of its observance or non-observance with the action. If a submittal is part of the action, then a timely submittal fulfills the written notification requirement.

Required Action	Due Date
Progress Report: Submit an update on the progress of any phosphorus optimization, including any implementation schedules identified in the previous progress reports.	04/01/2020
Progress Report: Submit an update on the progress of any phosphorus optimization, including any implementation schedules identified in the previous progress reports.	04/01/2021
Progress Report: Submit an update on the progress of any phosphorus optimization, including any implementation schedules identified in the previous progress reports.	04/01/2022
Progress Report: Submit an update on the progress of any phosphorus optimization, including any implementation schedules identified in the previous progress reports.	04/01/2023
Updated Draft Report: Submit an update to the draft Comprehensive Facility Plan, include any new findings and conclusions from the progress reports. The updated draft plan shall be used to provide an outline of all the items necessary for completion of a Final Comprehensive Facility Plan. It shall address the identified technology-based level for phosphorus removal of the existing plant and potential use of Adaptive Management Plan options/alternatives, including Water Quality Trading for achieving compliance with a final WQBEL for phosphorus. It is recognized submittal of a final comprehensive facility plan will not be required until such time the WQBEL limit for phosphorus has been determined by the Department for subsequent permit re-issuance or modification.	04/01/2024

5 Standard Requirements

NR 205, Wisconsin Administrative Code: The conditions in ss. NR 205.07(1) and NR 205.07(2), Wis. Adm. Code, are included by reference in this permit. The permittee shall comply with all of these requirements. Some of these requirements are outlined in the Standard Requirements section of this permit. Requirements not specifically outlined in the Standard Requirement section of this permit can be found in ss. NR 205.07(1) and NR 205.07(2).

5.1 Reporting and Monitoring Requirements

5.1.1 Monitoring Results

Monitoring results obtained during the previous month shall be summarized and reported on a Department Wastewater Discharge Monitoring Report. The report may require reporting of any or all of the information specified below under 'Recording of Results'. This report is to be returned to the Department no later than the date indicated on the form. A copy of the Wastewater Discharge Monitoring Report Form or an electronic file of the report shall be retained by the permittee.

Monitoring results shall be reported on an electronic discharge monitoring report (eDMR). The eDMR shall be certified electronically by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

If the permittee monitors any pollutant more frequently than required by this permit, the results of such monitoring shall be included on the Wastewater Discharge Monitoring Report.

The permittee shall comply with all limits for each parameter regardless of monitoring frequency. For example, monthly, weekly, and/or daily limits shall be met even with monthly monitoring. The permittee may monitor more frequently than required for any parameter.

5.1.2 Sampling and Testing Procedures

Sampling and laboratory testing procedures shall be performed in accordance with Chapters NR 218 and NR 219, Wis. Adm. Code and shall be performed by a laboratory certified or registered in accordance with the requirements of ch. NR 149, Wis. Adm. Code. Groundwater sample collection and analysis shall be performed in accordance with ch. NR 140, Wis. Adm. Code. The analytical methodologies used shall enable the laboratory to quantitate all substances for which monitoring is required at levels below the effluent limitation. If the required level cannot be met by any of the methods available in NR 219, Wis. Adm. Code, then the method with the lowest limit of detection shall be selected. Additional test procedures may be specified in this permit.

5.1.3 Recording of Results

The permittee shall maintain records which provide the following information for each effluent measurement or sample taken:

- the date, exact place, method and time of sampling or measurements;
- the individual who performed the sampling or measurements;
- the date the analysis was performed;
- the individual who performed the analysis;
- the analytical techniques or methods used; and
- the results of the analysis.

5.1.4 Reporting of Monitoring Results

The permittee shall use the following conventions when reporting effluent monitoring results:

- Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 0.1 mg/L, report the pollutant concentration as < 0.1 mg/L.

- Pollutant concentrations equal to or greater than the limit of detection, but less than the limit of quantitation, shall be reported and the limit of quantitation shall be specified.

- For purposes of calculating NR 101 fees, the 2 mg/l lower reporting limits for BOD_5 and Total Suspended Solids shall be considered to be limits of quantitation

- For the purposes of reporting a calculated result, average or a mass discharge value, the permittee may substitute a 0 (zero) for any pollutant concentration that is less than the limit of detection. However, if the effluent limitation is less than the limit of detection, the department may substitute a value other than zero for results less than the limit of detection, after considering the number of monitoring results that are greater than the limit of detection and if warranted when applying appropriate statistical techniques.

5.1.5 Compliance Maintenance Annual Reports

Compliance Maintenance Annual Reports (CMAR) shall be completed using information obtained over each calendar year regarding the wastewater conveyance and treatment system. The CMAR shall be submitted and certified by the permittee in accordance with ch. NR 208, Wis. Adm. Code, by June 30, each year on an electronic report form provided by the Department.

In the case of a publicly owned treatment works, a resolution shall be passed by the governing body and submitted as part of the CMAR, verifying its review of the report and providing responses as required. Private owners of wastewater treatment works are not required to pass a resolution; but they must provide an Owner Statement and responses as required, as part of the CMAR submittal.

The CMAR shall be certified electronically by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The certification verifies that the electronic report is true, accurate and complete.

5.1.6 Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings or electronic data records for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit for a period of at least 3 years from the date of the sample, measurement, report or application. All pertinent sludge information, including permit application information and other documents specified in this permit or s. NR 204.06(9), Wis. Adm. Code shall be retained for a minimum of 5 years.

5.1.7 Other Information

Where the permittee becomes aware that it failed to submit any relevant facts in a permit application or submitted incorrect information in a permit application or in any report to the Department, it shall promptly submit such facts or correct information to the Department.

5.1.8 Reporting Requirements – Alterations or Additions

The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is only required when:

- The alteration or addition to the permitted facility may meet one of the criteria for determining whether a facility is a new source.
- The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification requirement applies to pollutants which are not subject to effluent limitations in the existing permit.
- The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use of disposal sites not reported during the permit application process nor reported pursuant to an approved land application plan. Additional sites may not be used for the land application of sludge until department approval is received.

5.2 System Operating Requirements

5.2.1 Noncompliance Reporting

Sanitary sewer overflows and sewage treatment facility overflows shall be reported according to the 'Sanitary Sewer Overflows and Sewage Treatment Facility Overflows' section of this permit.

The permittee shall report the following types of noncompliance by a telephone call to the Department's regional office within 24 hours after becoming aware of the noncompliance:

- any noncompliance which may endanger health or the environment;
- any violation of an effluent limitation resulting from a bypass;
- any violation of an effluent limitation resulting from an upset; and
- any violation of a maximum discharge limitation for any of the pollutants listed by the Department in the permit, either for effluent or sludge.

A written report describing the noncompliance shall also be submitted to the Department's regional office within 5 days after the permittee becomes aware of the noncompliance. On a case-by-case basis, the Department may waive the requirement for submittal of a written report within 5 days and instruct the permittee to submit the written report with the next regularly scheduled monitoring report. In either case, the written report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; the steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and if the noncompliance has not been corrected, the length of time it is expected to continue.

A scheduled bypass approved by the Department under the 'Scheduled Bypass' section of this permit shall not be subject to the reporting required under this section.

NOTE: Section 292.11(2)(a), Wisconsin Statutes, requires any person who possesses or controls a hazardous substance or who causes the discharge of a hazardous substance to notify the Department of Natural Resources **immediately** of any discharge not authorized by the permit. **The discharge of a hazardous substance that is not authorized by this permit or that violates this permit may be a hazardous substance spill. To report a hazardous substance spill, call DNR's 24-hour HOTLINE at 1-800-943-0003.**

5.2.2 Flow Meters

Flow meters shall be calibrated annually, as per s. NR 218.06, Wis. Adm. Code.

5.2.3 Raw Grit and Screenings

All raw grit and screenings shall be disposed of at a properly licensed solid waste facility or picked up by a licensed waste hauler. If the facility or hauler are located in Wisconsin, then they shall be licensed under chs. NR 500-555, Wis. Adm. Code.

5.2.4 Sludge Management

All sludge management activities shall be conducted in compliance with ch. NR 204 "Domestic Sewage Sludge Management", Wis. Adm. Code.

5.2.5 Prohibited Wastes

Under no circumstances may the introduction of wastes prohibited by s. NR 211.10, Wis. Adm. Code, be allowed into the waste treatment system. Prohibited wastes include those:

- which create a fire or explosion hazard in the treatment work;
- which will cause corrosive structural damage to the treatment work;
- solid or viscous substances in amounts which cause obstructions to the flow in sewers or interference with the proper operation of the treatment work;
- wastewaters at a flow rate or pollutant loading which are excessive over relatively short time periods so as to cause a loss of treatment efficiency; and
- changes in discharge volume or composition from contributing industries which overload the treatment works or cause a loss of treatment efficiency.

5.2.6 Bypass

This condition applies only to bypassing at a sewage treatment facility that is not a scheduled bypass, approved blending as a specific condition of this permit, a sewage treatment facility overflow or a controlled diversion as provided in the sections titled 'Scheduled Bypass', 'Blending' (if approved), 'SSO's and Sewage Treatment Facility Overflows' and 'Controlled Diversions' of this permit. Any other bypass at the sewage treatment facility is prohibited and the Department may take enforcement action against a permittee for such occurrences under s. 283.89, Wis. Stats. The Department may approve a bypass if the permittee demonstrates all the following conditions apply:

- The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities or adequate back-up equipment, retention of untreated wastes, reduction of inflow and infiltration, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance. When evaluating feasibility of alternatives, the department may consider factors such as technical achievability, costs and affordability of implementation and risks to public health, the environment and, where the permittee is a municipality, the welfare of the community served; and
- The bypass was reported in accordance with the Noncompliance Reporting section of this permit.

5.2.7 Scheduled Bypass

Whenever the permittee anticipates the need to bypass for purposes of efficient operations and maintenance and the permittee may not meet the conditions for controlled diversions in the 'Controlled Diversions' section of this permit, the permittee shall obtain prior written approval from the Department for the scheduled bypass. A permittee's written

request for Department approval of a scheduled bypass shall demonstrate that the conditions for bypassing specified in the above section titled 'Bypass' are met and include the proposed date and reason for the bypass, estimated volume and duration of the bypass, alternatives to bypassing and measures to mitigate environmental harm caused by the bypass. The department may require the permittee to provide public notification for a scheduled bypass if it is determined there is significant public interest in the proposed action and may recommend mitigation measures to minimize the impact of such bypass.

5.2.8 Controlled Diversions

Controlled diversions are allowed only when necessary for essential maintenance to assure efficient operation. Sewage treatment facilities that have multiple treatment units to treat variable or seasonal loading conditions may shut down redundant treatment units when necessary for efficient operation. The following requirements shall be met during controlled diversions:

- Effluent from the sewage treatment facility shall meet the effluent limitations established in the permit. Wastewater that is diverted around a treatment unit or treatment process during a controlled diversion shall be recombined with wastewater that is not diverted prior to the effluent sampling location and prior to effluent discharge;
- A controlled diversion does not include blending as defined in s. NR 210.03(2e), Wis. Adm. Code, and as may only be approved under s. NR 210.12. A controlled diversion may not occur during periods of excessive flow or other abnormal wastewater characteristics;
- A controlled diversion may not result in a wastewater treatment facility overflow; and
- All instances of controlled diversions shall be documented in sewage treatment facility records and such records shall be available to the department on request.

5.2.9 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training as required in ch. NR 114, Wis. Adm. Code, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

5.2.10 Operator Certification

The wastewater treatment facility shall be under the direct supervision of a state certified operator. In accordance with s. NR 114.53, Wis. Adm. Code, every WPDES permitted treatment plant shall have a designated operator-in-charge holding a current and valid certificate. The designated operator-in-charge shall be certified at the level and in all subclasses of the treatment plant, except laboratory. Treatment plant owners shall notify the department of any changes in the operator-in-charge within 30 days. Note that s. NR 114.52(22), Wis. Adm. Code, lists types of facilities that are excluded from operator certification requirements (i.e. private sewage systems, pretreatment facilities discharging to public sewers, industrial wastewater treatment that consists solely of land disposal, agricultural digesters and concentrated aquatic production facilities with no biological treatment).

5.3 Sewage Collection Systems

5.3.1 Sanitary Sewage Overflows and Sewage Treatment Facility Overflows

5.3.1.1 Overflows Prohibited

Any overflow or discharge of wastewater from the sewage collection system or at the sewage treatment facility, other than from permitted outfalls, is prohibited. The permittee shall provide information on whether any of the following conditions existed when an overflow occurred:

- The sanitary sewer overflow or sewage treatment facility overflow was unavoidable to prevent loss of life, personal injury or severe property damage;
- There were no feasible alternatives to the sanitary sewer overflow or sewage treatment facility overflow such as the use of auxiliary treatment facilities or adequate back-up equipment, retention of untreated wastes, reduction of inflow and infiltration, or preventative maintenance activities;
- The sanitary sewer overflow or the sewage treatment facility overflow was caused by unusual or severe weather related conditions such as large or successive precipitation events, snowmelt, saturated soil conditions, or severe weather occurring in the area served by the sewage collection system or sewage treatment facility; and
- The sanitary sewer overflow or the sewage treatment facility overflow was unintentional, temporary, and caused by an accident or other factors beyond the reasonable control of the permittee.

5.3.1.2 Permittee Response to Overflows

Whenever a sanitary sewer overflow or sewage treatment facility overflow occurs, the permittee shall take all feasible steps to control or limit the volume of untreated or partially treated wastewater discharged, and terminate the discharge as soon as practicable. Remedial actions, including those in NR 210.21 (3), Wis. Adm. Code, shall be implemented consistent with an emergency response plan developed under the CMOM program.

5.3.1.3 Permittee Reporting

Permittees shall report all sanitary sewer overflows and sewage treatment overflows as follows:

- The permittee shall notify the department by telephone, fax or email as soon as practicable, but no later than 24 hours from the time the permittee becomes aware of the overflow;
- The permittee shall, no later than five days from the time the permittee becomes aware of the overflow, provide to the department the information identified in this paragraph using department form number 3400-184. If an overflow lasts for more than five days, an initial report shall be submitted within 5 days as required in this paragraph and an updated report submitted following cessation of the overflow. At a minimum, the following information shall be included in the report:

  ◦The date and location of the overflow;
  ◦The surface water to which the discharge occurred, if any;
  ◦The duration of the overflow and an estimate of the volume of the overflow;
  ◦A description of the sewer system or treatment facility component from which the discharge occurred such as manhole, lift station, constructed overflow pipe, or crack or other opening in a pipe;
  ◦The estimated date and time when the overflow began and stopped or will be stopped;
  ◦The cause or suspected cause of the overflow including, if appropriate, precipitation, runoff conditions, areas of flooding, soil moisture and other relevant information;
  ◦Steps taken or planned to reduce, eliminate and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
  ◦A description of the actual or potential for human exposure and contact with the wastewater from the overflow;
  ◦Steps taken or planned to mitigate the impacts of the overflow and a schedule of major milestones for those steps;
  ◦To the extent known at the time of reporting, the number and location of building backups caused by excessive flow or other hydraulic constraints in the sewage collection system that occurred

concurrently with the sanitary sewer overflow and that were within the same area of the sewage collection system as the sanitary sewer overflow; and
◦The reason the overflow occurred or explanation of other contributing circumstances that resulted in the overflow event. This includes any information available including whether the overflow was unavoidable to prevent loss of life, personal injury, or severe property damage and whether there were feasible alternatives to the overflow.

NOTE: A copy of form 3400-184 for reporting sanitary sewer overflows and sewage treatment facility overflows may be obtained from the department or accessed on the department's web site at http://dnr.wi.gov/topic/wastewater/SSOreport.html. As indicated on the form, additional information may be submitted to supplement the information required by the form.

- The permittee shall identify each specific location and each day on which a sanitary sewer overflow or sewage treatment facility overflow occurs as a discrete sanitary sewer overflow or sewage treatment facility overflow occurrence. An occurrence may be more than one day if the circumstances causing the sanitary sewer overflow or sewage treatment facility overflow results in a discharge duration of greater than 24 hours. If there is a stop and restart of the overflow at the same location within 24 hours and the overflow is caused by the same circumstance, it may be reported as one occurrence. Sanitary sewer overflow occurrences at a specific location that are separated by more than 24 hours shall be reported as separate occurrences; and
- A permittee that is required to submit wastewater discharge monitoring reports under NR 205.07 (1) (r) shall also report all sanitary sewer overflows and sewage treatment facility overflows on that report.

5.3.1.4 Public Notification

The permittee shall notify the public of any sanitary sewer and sewage treatment facility overflows consistent with its emergency response plan required under the CMOM (Capacity, Management, Operation and Maintenance) section of this permit and s. NR 210.23 (4) (f), Wis. Adm. Code. Such public notification shall occur promptly following any overflow event using the most effective and efficient communications available in the community. At minimum, a daily newspaper of general circulation in the county(s) and municipality whose waters may be affected by the overflow shall be notified by written or electronic communication.

5.3.2 Capacity, Management, Operation and Maintenance (CMOM) Program

- The permittee shall have written documentation of the Capacity, Management, Operation and Maintenance (CMOM) program components in accordance with s. NR 210.23(4), Wis. Adm. Code. Such documentation shall be available for Department review upon request. The Department may request that the permittee provide this documentation or prepare a summary of the permittee's CMOM program at the time of application for reissuance of the WPDES permit.
- The permittee shall implement a CMOM program in accordance with s. NR 210.23, Wis. Adm. Code.
- The permittee shall at least annually conduct a self-audit of activities conducted under the permittee's CMOM program to ensure CMOM components are being implemented as necessary to meet the general standards of s. NR 210.23(3), Wis. Adm. Code.

5.3.3 Sewer Cleaning Debris and Materials

All debris and material removed from cleaning sanitary sewers shall be managed to prevent nuisances, run-off, ground infiltration or prohibited discharges.

- Debris and solid waste shall be dewatered, dried and then disposed of at a licensed solid waste facility.
- Liquid waste from the cleaning and dewatering operations shall be collected and disposed of at a permitted wastewater treatment facility.

- Combination waste including liquid waste along with debris and solid waste may be disposed of at a licensed solid waste facility or wastewater treatment facility willing to accept the waste.

5.4 Surface Water Requirements

5.4.1 Permittee-Determined Limit of Quantitation Incorporated into this Permit

For pollutants with water quality-based effluent limits below the Limit of Quantitation (LOQ) in this permit, the LOQ calculated by the permittee and reported on the Discharge Monitoring Reports (DMRs) is incorporated by reference into this permit. The LOQ shall be reported on the DMRs, shall be the lowest quantifiable level practicable, and shall be no greater than the minimum level (ML) specified in or approved under 40 CFR Part 136 for the pollutant at the time this permit was issued, unless this permit specifies a higher LOQ.

5.4.2 Appropriate Formulas for Effluent Calculations

The permittee shall use the following formulas for calculating effluent results to determine compliance with average concentration limits and mass limits and total load limits:

Weekly/Monthly/Six-Month/Annual Average Concentration = the sum of all daily results for that week/month/six-month/year, divided by the number of results during that time period. [Note: When a six-month average effluent limit is specified for Total Phosphorus the applicable periods are May through October and November through April.]

Weekly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the week.

Monthly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the month.

Six-Month Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the six-month period. [Note: When a six-month average effluent limit is specified for Total Phosphorus the applicable periods are May through October and November through April.]

Annual Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the entire year.

Total Monthly Discharge: = monthly average concentration (mg/L) x total flow for the month (MG/month) x 8.34.

Total Annual Discharge: = sum of total monthly discharges for the calendar year.

12-Month Rolling Sum of Total Monthly Discharge: = the sum of the most recent 12 consecutive months of Total Monthly Discharges.

5.4.3 Visible Foam or Floating Solids

There shall be no discharge of floating solids or visible foam in other than trace amounts.

5.4.4 Surface Water Uses and Criteria

In accordance with NR 102.04, Wis. Adm. Code, surface water uses and criteria are established to govern water management decisions. Practices attributable to municipal, industrial, commercial, domestic, agricultural, land development or other activities shall be controlled so that all surface waters including the mixing zone meet the following conditions at all times and under all flow and water level conditions:

a) Substances that will cause objectionable deposits on the shore or in the bed of a body of water, shall not be present in such amounts as to interfere with public rights in waters of the state.

b) Floating or submerged debris, oil, scum or other material shall not be present in such amounts as to interfere with public rights in waters of the state.

c) Materials producing color, odor, taste or unsightliness shall not be present in such amounts as to interfere with public rights in waters of the state.

d) Substances in concentrations or in combinations which are toxic or harmful to humans shall not be present in amounts found to be of public health significance, nor shall substances be present in amounts which are acutely harmful to animal, *plant or aquatic* life.

5.4.5 Percent Removal

During any 30 consecutive days, the average effluent concentrations of BOD_5 and of total suspended solids shall not exceed 15% of the average influent concentrations, respectively. This requirement does not apply to removal of total suspended solids if the permittee operates a lagoon system and has received a variance for suspended solids granted under NR 210.07(2), Wis. Adm. Code.

5.4.6 Fecal Coliforms

The weekly and monthly limit(s) for fecal coliforms shall be expressed as a geometric mean.

5.4.7 Seasonal Disinfection

Disinfection shall be provided from May 1 through September 30 of each year. Monitoring requirements and the limitation for fecal coliforms apply only during the period in which disinfection is required. Whenever chlorine is used for disinfection or other uses, the limitations and monitoring requirements for residual chlorine shall apply. A dechlorination process shall be in operation whenever chlorine is used.

5.4.8 Whole Effluent Toxicity (WET) Monitoring Requirements

In order to determine the potential impact of the discharge on aquatic organisms, static-renewal toxicity tests shall be performed on the effluent in accordance with the procedures specified in the *"State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, 2nd Edition" (PUB-WT-797,* November 2004) as required by NR 219.04, Table A, Wis. Adm. Code). All of the WET tests required in this permit, including any required retests, shall be conducted on the *Ceriodaphnia dubia* and fathead minnow species. Receiving water samples shall not be collected from any point in contact with the permittee's mixing zone and every attempt shall be made to avoid contact with any other discharge's mixing zone.

5.4.9 Whole Effluent Toxicity (WET) Identification and Reduction

Within 60 days of a retest which showed positive results, the permittee shall submit a written report to the Biomonitoring Coordinator, Bureau of Water Quality, 101 S. Webster St., PO Box 7921, Madison, WI 53707-7921, which details the following:

- A description of actions the permittee has taken or will take to remove toxicity and to prevent the recurrence of toxicity;

- A description of toxicity reduction evaluation (TRE) investigations that have been or will be done to identify potential sources of toxicity, including some or all of the following actions:

  (a) Evaluate the performance of the treatment system to identify deficiencies contributing to effluent toxicity (e.g., operational problems, chemical additives, incomplete treatment)

  (b) Identify the compound(s) causing toxicity

(c) Trace the compound(s) causing toxicity to their sources (e.g., industrial, commercial, domestic)

(d) Evaluate, select, and implement methods or technologies to control effluent toxicity (e.g., in-plant or pretreatment controls, source reduction or removal)

- Where corrective actions including a TRE have not been completed, an expeditious schedule under which corrective actions will be implemented;

- If no actions have been taken, the reason for not taking action.

The permittee may also request approval from the Department to postpone additional retests in order to investigate the source(s) of toxicity. Postponed retests must be completed after toxicity is believed to have been removed.

5.5 Land Application Requirements

5.5.1 Sludge Management Program Standards And Requirements Based Upon Federally Promulgated Regulations

In the event that new federal sludge standards or regulations are promulgated, the permittee shall comply with the new sludge requirements by the dates established in the regulations, if required by federal law, even if the permit has not yet been modified to incorporate the new federal regulations.

5.5.2 General Sludge Management Information

The General Sludge Management Form 3400-48 shall be completed and submitted prior to any significant sludge management changes.

5.5.3 Sludge Samples

All sludge samples shall be collected at a point and in a manner which will yield sample results which are representative of the sludge being tested, and collected at the time which is appropriate for the specific test.

5.5.4 Land Application Characteristic Report

Each report shall consist of a Characteristic Form 3400-49 and Lab Report. The Characteristic Report Form 3400-49 shall be submitted electronically by January 31 following each year of analysis.

Following submittal of the electronic Characteristic Report Form 3400-49, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report is true, accurate and complete. The Lab Report must be sent directly to the facility's DNR sludge representative or basin engineer unless approval for not submitting the lab reports has been given.

The permittee shall use the following convention when reporting sludge monitoring results: Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 1.0 mg/kg, report the pollutant concentration as < 1.0 mg/kg .

All results shall be reported on a dry weight basis.

5.5.5 Calculation of Water Extractable Phosphorus

When sludge analysis for Water Extractable Phosphorus is required by this permit, the permittee shall use the following formula to calculate and report Water Extractable Phosphorus:
Water Extractable Phosphorus (% of Total P) =
[Water Extractable Phosphorus (mg/kg, dry wt) ÷ Total Phosphorus (mg/kg, dry wt)] x 100

5.5.6 Monitoring and Calculating PCB Concentrations in Sludge

When sludge analysis for "PCB, Total Dry Wt" is required by this permit, the PCB concentration in the sludge shall be determined as follows.

Either congener-specific analysis or Aroclor analysis shall be used to determine the PCB concentration. The permittee may determine whether Aroclor or congener specific analysis is performed. Analyses shall be performed in accordance with the following provisions and Table EM in s. NR 219.04, Wis. Adm. Code.

- EPA Method 1668 may be used to test for all PCB congeners. If this method is employed, all PCB congeners shall be delineated. Non-detects shall be treated as zero. The values that are between the limit of detection and the limit of quantitation shall be used when calculating the total value of all congeners. All results shall be added together and the total PCB concentration by dry weight reported. **Note:** It is recognized that a number of the congeners will co-elute with others, so there will not be 209 results to sum.
- EPA Method 8082A shall be used for PCB-Aroclor analysis and may be used for congener specific analysis as well. If congener specific analysis is performed using Method 8082A, the list of congeners tested shall include at least congener numbers 5, 18, 31, 44, 52, 66, 87, 101, 110, 138, 141, 151, 153, 170, 180, 183, 187, and 206 plus any other additional congeners which might be reasonably expected to occur in the particular sample. For either type of analysis, the sample shall be extracted using the Soxhlet extraction (EPA Method 3540C) (or the Soxhlet Dean-Stark modification) or the pressurized fluid extraction (EPA Method 3545A). If Aroclor analysis is performed using Method 8082A, clean up steps of the extract shall be performed as necessary to remove interference and to achieve as close to a limit of detection of 0.11 mg/kg as possible. Reporting protocol, consistent with s. NR 106.07(6)(e), should be as follows: If all Aroclors are less than the LOD, then the Total PCB Dry Wt result should be reported as less than the highest LOD. If a single Aroclor is detected then that is what should be reported for the Total PCB result. If multiple Aroclors are detected, they should be summed and reported as Total PCBs. If congener specific analysis is done using Method 8082A, clean up steps of the extract shall be performed as necessary to remove interference and to achieve as close to a limit of detection of 0.003 mg/kg as possible for each congener. If the aforementioned limits of detection cannot be achieved after using the appropriate clean up techniques, a reporting limit that is achievable for the Aroclors or each congener for the sample shall be determined. This reporting limit shall be reported and qualified indicating the presence of an interference. The lab conducting the analysis shall perform as many of the following methods as necessary to remove interference:

3620C – Florisil	3611B - Alumina
3640A - Gel Permeation	3660B - Sulfur Clean Up (using copper shot instead of powder)
3630C - Silica Gel	3665A - Sulfuric Acid Clean Up

5.5.7 Annual Land Application Report

Land Application Report Form 3400-55 shall be submitted electronically by January 31, each year whether or not non-exceptional quality sludge is land applied. Non-exceptional quality sludge is defined in s. NR 204.07(4), Wis. Adm. Code. Following submittal of the electronic Annual Land Application Report Form 3400-55, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

5.5.8 Other Methods of Disposal or Distribution Report

The permittee shall submit electronically the Other Methods of Disposal or Distribution Report Form 3400-52 by January 31, each year whether or not sludge is hauled, landfilled, incinerated, or exceptional quality sludge is distributed or land applied. Following submittal of the electronic Report Form 3400-52, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

5.5.9 Approval to Land Apply

Bulk non-exceptional quality sludge as defined in s. NR 204.07(4), Wis. Adm. Code, may not be applied to land without a written approval letter or Form 3400-122 from the Department unless the Permittee has obtained permission from the Department to self approve sites in accordance with s. NR 204.06 (6), Wis. Adm. Code. Analysis of sludge characteristics is required prior to land application. Application on frozen or snow covered ground is restricted to the extent specified in s. NR 204.07(3) (l), Wis. Adm. Code.

5.5.10 Soil Analysis Requirements

Each site requested for approval for land application must have the soil tested prior to use. Each approved site used for land application must subsequently be soil tested such that there is at least one valid soil test in the four years prior to land application. All soil sampling and submittal of information to the testing laboratory shall be done in accordance with UW Extension Bulletin A-2100. The testing shall be done by the UW Soils Lab in Madison or Marshfield, WI or at a lab approved by UW. The test results including the crop recommendations shall be submitted to the DNR contact listed for this permit, as they are available. Application rates shall be determined based on the crop nitrogen recommendations and with consideration for other sources of nitrogen applied to the site.

5.5.11 Land Application Site Evaluation

For non-exceptional quality sludge, as defined in s. NR 204.07(4), Wis. Adm. Code, a Land Application Site Request Form 3400-053 shall be submitted to the Department for the proposed land application site. The Department will evaluate the proposed site for acceptability and will either approve or deny use of the proposed site. The permittee may obtain permission to approve their own sites in accordance with s. NR 204.06(6), Wis. Adm. Code.

6 Summary of Reports Due

FOR INFORMATIONAL PURPOSES ONLY

Description	Date	Page
Phosphorus -Progress Report	April 1, 2020	6
Phosphorus -Progress Report	April 1, 2021	6
Phosphorus -Progress Report	April 1, 2022	6
Phosphorus -Progress Report	April 1, 2023	6
Phosphorus -Updated Draft Report	April 1, 2024	6
Compliance Maintenance Annual Reports (CMAR)	by June 30, each year	8
General Sludge Management Form 3400-48	prior to any significant sludge management changes	16
Characteristic Form 3400-49 and Lab Report	by January 31 following each year of analysis	16
Land Application Report Form 3400-55	by January 31, each year whether or not non-exceptional quality sludge is land applied	17
Other Methods of Disposal or Distribution Report Form 3400-52	by January 31, each year whether or not sludge is hauled, landfilled, incinerated, or exceptional quality sludge is distributed or land applied	18
Wastewater Discharge Monitoring Report	no later than the date indicated on the form	7

Report forms shall be submitted electronically in accordance with the reporting requirements herein. Any facility plans or plans and specifications for municipal, industrial, industrial pretreatment and non industrial wastewater systems shall be submitted to the Bureau of Water Quality, P.O. Box 7921, Madison, WI 53707-7921. All other submittals required by this permit shall be submitted to:
Northern Region - Spooner, 810 W. Maple Street, Spooner, WI 54801-1255

Appendix B

Cleaning and Televising Defects

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Start Manhole	End Manhole	Type	Distance (ft)	Severity
428	407	Infiltration in MH	320.3	Average
404	403	Sag in Line	136.9	Moderate
402	401	Sag in Line	170.8-193.2	Heavy
124	123	Bad Pipe	9.6	None
103	104	Gasket Loose	49.3	Light
4	5	Gasket Loose for Lateral	81.9	None
3	2	Infiltration in MH	137.5	Moderate
2	1	Patch/Repair	17.2	None
2	1	Patch/Repair	106.4	None
2	1	Patch/Repair	168.3	None
6	7	Sag in Line	23.3	Moderate
6	7	Dimples in Pipe	176.3	Average
6	7	Sag in Line	253	Average
6	LS1	Cracks w/Infiltration	179.8	Heavy
6	LS1	Cracks w/Infiltration	183.3	Heavy
117	116	Sag in Line	14	Average
115	114	Gasket Loose	92.5	Light
117	118	Infiltration in MH	106.4	Heavy
118	119	Sag in Line	31.1-59.5	Severe
120	121	Infiltration in MH	248.3	Average
400	LS2	Sag in Line	13	Average
400	LS2	Cracks w/Infiltration	17.7	Average
400	LS2	Infiltration in Lift Station	18.9	None
202	201	Sag in Line	240.8	Moderate
202	201	Sag in Line	304-325.6	Severe
201	200	Sag in Line	2.7-34.9	Severe
201	200	Sag in Line	57.2	Heavy
206	300	Sag in Line	116	Average
301	302	Roots in MH	106.7	None
303	302	Debris in Line	282.1	None
327	326	Roots	25.7	Light
327	326	Cracks	27	Moderate
327	236	Cracks	37.6	Average
317	318	Sag in Line	97.5	Heavy
318	319	Gasket Loose w/Infiltration	287.2	Light

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Appendix C

CMAR Final 2023

Compliance Maintenance Annual Report

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Madeline Sanitary District

Last Updated: 6/28/2024 Reporting For: **2023**

Influent Flow and Loading

1. Monthly Average Flows and BOD Loadings

1.1 Verify the following monthly flows and BOD loadings to your facility.

Influent No. 701	Influent Monthly Average Flow, MGD	x	Influent Monthly Average BOD Concentration mg/L	x	8.34	=	Influent Monthly Average BOD Loading, lbs/day
January	0.0454	x	44	x	8.34	=	17
February	0.0449	x	30	x	8.34	=	11
March	0.0506	x	15	x	8.34	=	6
April	0.1294	x	9	x	8.34	=	10
May	0.0601	x	60	x	8.34	=	30
June	0.0591	x	169	x	8.34	=	83
July	0.0829	x	302	x	8.34	=	208
August	0.0762	x	191	x	8.34	=	121
September	0.0600	x	68	x	8.34	=	34
October	0.0504	x	126	x	8.34	=	53
November	0.0397	x	67	x	8.34	=	22
December	0.0388	x	19	x	8.34	=	6

2. Maximum Monthly Design Flow and Design BOD Loading

2.1 Verify the design flow and loading for your facility.

Design	Design Factor	x	%	=	% of Design
Max Month Design Flow, MGD	.152	x	90	=	0.1368
		x	100	=	.152
Design BOD, lbs/day	258	x	90	=	232.2
		x	100	=	258

2.2 Verify the number of times the flow and BOD exceeded 90% or 100% of design, points earned, and score:

	Months of Influent	Number of times flow was greater than 90% of	Number of times flow was greater than 100% of	Number of times BOD was greater than 90% of design	Number of times BOD was greater than 100% of design
January	1	0	0	0	0
February	1	0	0	0	0
March	1	0	0	0	0
April	1	0	0	0	0
May	1	0	0	0	0
June	1	0	0	0	0
July	1	0	0	0	0
August	1	0	0	0	0
September	1	0	0	0	0
October	1	0	0	0	0
November	1	0	0	0	0
December	1	0	0	0	0
Points per each		2	1	3	2
Exceedances		0	0	0	0
Points		0	0	0	0
Total Number of Points					**0**

0

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Last Updated: 6/28/2024 Reporting For: **2023**

3. Flow Meter

3.1 Was the influent flow meter calibrated in the last year?

● Yes Enter last calibration date (MM/DD/YYYY): 2024-06-13

○ No

If No, please explain:

4. Sewer Use Ordinance

4.1 Did your community have a sewer use ordinance that limited or prohibited the discharge of excessive conventional pollutants ((C)BOD, SS, or pH) or toxic substances to the sewer from industries, commercial users, hauled waste, or residences?

● Yes

○ No

If No, please explain:

4.2 Was it necessary to enforce the ordinance?

○ Yes

● No

If Yes, please explain:

While there were not any formal enforcement actions, restrictions were placed on quantities of high strength waste from known sources.

5. Septage Receiving

5.1 Did you have requests to receive septage at your facility?

Septic Tanks	Holding Tanks	Grease Traps
● Yes	● Yes	○ Yes
○ No	○ No	● No

5.2 Did you receive septage at your facility? If yes, indicate volume in gallons.

Septic Tanks

● Yes 14,400 gallons

○ No

Holding Tanks

● Yes 3,432,810 gallons

○ No

Grease Traps

○ Yes gallons

● No

5.2.1 If yes to any of the above, please explain if plant performance is affected when receiving any of these wastes.

In addition to the above we also received a confirmed amount of 2,505 gal of portable restroom waste, 15,850 gal of RV waste from the RV disposal station, 1200 gal of RV waste from private sources and 500 gal of pit toilet/outhouse waste. We have procedures in place to minimize the impact of these loads but the high nutrient content continue to create compliance issues.

6. Pretreatment

6.1 Did your facility experience operational problems, permit violations, biosolids quality concerns, or hazardous situations in the sewer system or treatment plant that were attributable to commercial or industrial discharges in the last year?

○ Yes

● No

If yes, describe the situation and your community's response.

I selected no but high strength hauled waste from an RV disposal site is a likely contributor to our elevated nutrient concentrations and permit violations.

6.2 Did your facility accept hauled industrial wastes, landfill leachate, etc.?

- ○ Yes
- ● No

If yes, describe the types of wastes received and any procedures or other restrictions that were in place to protect the facility from the discharge of hauled industrial wastes.

Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	**A**

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Madeline Sanitary District

Last Updated: 6/28/2024 Reporting For: **2023**

Effluent Quality and Plant Performance (BOD/CBOD)

1. Effluent (C)BOD Results

1.1 Verify the following monthly average effluent values, exceedances, and points for BOD or CBOD

Outfall No. 001	Monthly Average Limit (mg/L)	90% of Permit Limit > 10 (mg/L)	Effluent Monthly Average (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance	90% Permit Limit Exceedance
January	30	27	10	1	0	0
February	30	27	9	1	0	0
March	30	27	5	1	0	0
April	30	27	6	1	0	0
May	30	27	4	1	0	0
June	30	27	10	1	0	0
July	30	27	37	1	1	1
August	30	27	13	1	0	0
September	30	27	23	1	0	0
October	30	27	19	1	0	0
November	30	27	10	1	0	0
December	30	27	10	1	0	0
* Equals limit if limit is <= 10						
Months of discharge/yr				12		
Points per each exceedance with 12 months of discharge					7	3
Exceedances					1	1
Points					7	3
Total number of points						**10**

10

NOTE: For systems that discharge intermittently to state waters, the points per monthly exceedance for this section shall be based upon a multiplication factor of 12 months divided by the number of months of discharge. Example: For a wastewater facility discharging only 6 months of the year, the multiplication factor is 12/6 = 2.0

1.2 If any violations occurred, what action was taken to regain compliance?

During the time of this violation we were also sampling for CBOD as part of a variance request in our next permit, these numbers were much better and averaged <3 mg/L for 4 samples collected in July and August. Additionally we withheld discharge from the lagoons in an effort to increase detention time and turned on a second blower for added aeration and mixing.

2. Flow Meter Calibration

2.1 Was the effluent flow meter calibrated in the last year?

● Yes Enter last calibration date (MM/DD/YYYY)

2024-06-13

○ No

If No, please explain:

3. Treatment Problems

3.1 What problems, if any, were experienced over the last year that threatened treatment?

We continue to struggle with high strength hauled waste.

4. Other Monitoring and Limits

4.1 At any time in the past year was there an exceedance of a permit limit for any other pollutants such as chlorides, pH, residual chlorine, fecal coliform, or metals?

- ○ Yes
- ● No

If Yes, please explain:

4.2 At any time in the past year was there a failure of an effluent acute or chronic whole effluent toxicity (WET) test?

- ○ Yes
- ● No

If Yes, please explain:

4.3 If the biomonitoring (WET) test did not pass, were steps taken to identify and/or reduce source(s) of toxicity?

- ○ Yes
- ○ No
- ● N/A

Please explain unless not applicable:

Total Points Generated	10
Score (100 - Total Points Generated)	90
Section Grade	**B**

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Madeline Sanitary District

Last Updated: 6/28/2024

Reporting For: **2023**

Effluent Quality and Plant Performance (Total Suspended Solids)

1. Effluent Total Suspended Solids Results

1.1 Verify the following monthly average effluent values, exceedances, and points for TSS:

Outfall No. 001	Monthly Average Limit (mg/L)	90% of Permit Limit >10 (mg/L)	Effluent Monthly Average (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance	90% Permit Limit Exceedance
January	30	27	3	1	0	0
February	30	27	2	1	0	0
March	30	27	5	1	0	0
April	30	27	4	1	0	0
May	30	27	4	1	0	0
June	30	27	5	1	0	0
July	30	27	8	1	0	0
August	30	27	10	1	0	0
September	30	27	9	1	0	0
October	30	27	5	1	0	0
November	30	27	5	1	0	0
December	30	27	5	1	0	0
* Equals limit if limit is <= 10						
Months of Discharge/yr				12		
Points per each exceedance with 12 months of discharge:					**7**	**3**
Exceedances					0	0
Points					0	0
Total Number of Points						**0**

0

NOTE: For systems that discharge intermittently to state waters, the points per monthly exceedance for this section shall be based upon a multiplication factor of 12 months divided by the number of months of discharge.

Example: For a wastewater facility discharging only 6 months of the year, the multiplication factor is 12/6 = 2.0

1.2 If any violations occurred, what action was taken to regain compliance?

Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	**A**

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Madeline Sanitary District

Last Updated: 6/28/2024

Reporting For: **2023**

Effluent Quality and Plant Performance (Ammonia - NH3)

1. Effluent Ammonia Results

1.1 Verify the following monthly and weekly average effluent values, exceedances and points for ammonia

Outfall No. 001	Monthly Average NH3 Limit (mg/L)	Weekly Average NH3 Limit (mg/L)	Effluent Monthly Average NH3 (mg/L)	Monthly Permit Limit Exceedance	Effluent Weekly Average for Week 1	Effluent Weekly Average for Week 2	Effluent Weekly Average for Week 3	Effluent Weekly Average for Week 4	Weekly Permit Limit Exceedance
January									0
February									0
March									0
April									0
May									0
June	39	72	.025	0	0	.1	0	0	0
July	39	72	10.925	0	2	8.6	14.5	18.6	0
August	39	72	26.94	0	25.1	27.8	28.6	22.9	0
September	39	72	36.3	0	36.8	39.8	32.3		0
October									0
November									0
December									0

Points per each exceedance of Monthly average:	10
Exceedances, Monthly:	0
Points:	0
Points per each exceedance of weekly average (when there is no monthly average):	2.5
Exceedances, Weekly:	0
Points:	0
Total Number of Points	**0**

0

NOTE: Limit exceedances are considered for monthly OR weekly averages but not both. When a monthly average limit exists it will be used to determine exceedances and generate points. This will be true even if a weekly limit also exists. When a weekly average limit exists and a monthly limit does not exist, the weekly limit will be used to determine exceedances and generate points.

1.2 If any violations occurred, what action was taken to regain compliance?

Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	**A**

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Madeline Sanitary District

Last Updated: 6/28/2024

Reporting For: **2023**

Effluent Quality and Plant Performance (Phosphorus)

1. Effluent Phosphorus Results

1.1 Verify the following monthly average effluent values, exceedances, and points for Phosphorus

Outfall No. 001	Monthly Average phosphorus Limit (mg/L)	Effluent Monthly Average phosphorus (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance
January	5.1	1.817	1	0
February	5.1	1.295	1	0
March	5.1	1.068	1	0
April	5.1	0.868	1	0
May	5.1	0.908	1	0
June	5.1	1.810	1	0
July	5.1	3.895	1	0
August	5.1	4.525	1	0
September	5.1	6.083	1	1
October	5.1	6.117	1	1
November	5.1	4.547	1	0
December	5.1	3.663	1	0
Months of Discharge/yr			12	
Points per each exceedance with 12 months of discharge:				**10**
Exceedances				2
Total Number of Points				**20**

20

NOTE: For systems that discharge intermittently to waters of the state, the points per monthly exceedance for this section shall be based upon a multiplication factor of 12 months divided by the number of months of discharge.
Example: For a wastewater facility discharging only 6 months of the year, the multiplication factor is 12/6 = 2.0

1.2 If any violations occurred, what action was taken to regain compliance?

Effluent control valve was closed in order to increase detention time, additional blower was turned on to promote better mixing and increase DO.

Total Points Generated	20
Score (100 - Total Points Generated)	80
Section Grade	**C**

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Madeline Sanitary District

Last Updated: 6/28/2024 Reporting For: **2023**

Ponds And Lagoon Leakage

1. Pond Lining

1.1 What material was used to line your ponds?

Natural clay

2. Flow Measurements

2.1 Did you measure influent flow to your wastewater ponds or lagoons?

- ● Yes (0 points)☐☐
- ○ No (40 points) (Go to question 6)☐☐

2.1.1 Method of influent flow measurement:

Magnetic flow meter

2.2 Did you measure effluent flow discharged from your wastewater system either to the land disposal system or to the receiving stream?

0

- ● Yes (0 points) ☐☐
- ○ No (40 points) (Go to question 6)☐☐
- ○ No Discharge (0 points)

2.2.1 Method of effluent flow measurement:

Pump run time

3. Total Flow Volumes

3.1 Total monthly influent and effluent flow volumes from the pond/lagoon system during the last calendar year.

Total Monthly Influent Volume		Total Monthly Effluent Volume
1.406	JANUARY	.984
1.256	FEBRUARY	1.017
1.568	MARCH	1.116
3.883	APRIL	3.572
1.862	MAY	1.297
1.774	JUNE	1.178
2.57	JULY	1.381
2.362	AUGUST	1.506
1.799	SEPTEMBER	.961
1.563	OCTOBER	.925
1.191	NOVEMBER	1.191
1.202	DECEMBER	.489
22.4360	**YEARLY TOTAL**	**15.6170**

3.2 From the Yearly Total influent and effluent volumes above, total effluent is divided by total influent and converted to a percent of volume loss.

Total effluent, MG => 15.6170

---------- ---------- = 0.696 <= effl / infl ratio

Total influent, MG => 22.4360

Conversion to a percent of volume loss:

(1-effl/infl ratio) * 100 = 30.4 % of influent lost and not discharged with effluent

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4. Surface Area

4.1 What was the total wastewater surface area of the ponds/lagoons at operating level (do not include seepage cells)?

1.86 Acres

5. Leakage Rate Estimation

5.1 Total influent volume (in MG) minus total effluent volume (in MG) plus or minus the change in pond/lagoon storage (in MG) is the net wastewater loss. The net loss divided by 0.000365 equals the estimated leakage amount in gpd.

Total Annual Influent (MG)	22.4360	
Total Annual Effluent (MG)	15.6170	
Estimated Net Loss (MG)	6.8190	
Estimated Leakage Amount (gpd)		18682

If you have a *Department approved* method for determining a change in storage volume, enter the storage change last year in MG below.

○ Storage Increase: Enter amount in MG ->

○ Storage Decrease: Enter amount in MG ->

5.2 CMAR Estimated Leakage Rate in gallons per acre per day (gpad): The CMAR Estimated Leakage Rate in gpad is the leakage amount in gpd (from part 5.1) divided by the total pond surface area (from question 4).

Leakage Amount (gpd)		Acres		CMAR Estimated Leakage Rate
18682	divided by	1.86	=	10044

6. On Site Leakage Testing

6.1 Did you conduct and on-site, field water balance/leakage test on your ponds or lagoons that was approved by the Department and is still valid?

○ Yes Year

● No

If yes, what was the field Test Calculated Leakage Rate for your ponds/lagoons?

gpad

NOTE: if 6.1 is answered Yes, the value entered above in gpad will be used in 7.1 to compute points generated.

6.2 Leakage Rate Comments:

While I continue to believe that there are environmental and other factors at play, it is becoming apparent that this warrants further attention. As part of our proposed Facility plan we will be conducting a flow analysis and investigating lagoon liner integrity.

7. Estimated Leakage Rate and Points

7.1 The CMAR Estimated Leakage Rate (from 5) is used to determine the points generated in the table below.

If an approved field test was conducted and the results are still valid and accepted by the Department, the Field Calculated Leakage rate (from 5.2) is used to determine the points earned from the table below

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gpad	points
0 - 1,000	0
1,001 - 2,000	10
2,001 - 4,000	20
4,001 - 7,000	30
> 7,000	40

Based on the leakage rate in gpad, the points earned are:

40

Total Points Generated	40
Score (100 - Total Points Generated)	60
Section Grade	**F**

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Reporting For: **2023**

Biosolids Quality and Management

1. Biosolids Use/Disposal

1.1 How did you use or dispose of your biosolids? (Check all that apply)

- ☐ Land applied under your permit
- ☐ Publicly Distributed Exceptional Quality Biosolids
- ☐ Hauled to another permitted facility
- ☐ Landfilled
- ☐ Incinerated
- ☒ Other

NOTE: If you did not remove biosolids from your system, please describe your system type such as lagoons, reed beds, recirculating sand filters, etc.

1.1.1 If you checked Other, please describe:

lagoon system

6. Biosolids Storage

6.1 How many days of actual, current biosolids storage capacity did your wastewater treatment facility have either on-site or off-site?

- ○ >= 180 days (0 Points)
- ○ 150 - 179 days (10 Points)
- ○ 120 - 149 days (20 Points)
- ○ 90 - 119 days (30 Points)
- ○ < 90 days (40 Points)
- ● N/A (0 Points)

0

6.2 If you checked N/A above, explain why.

lagoon system

7. Issues

7.1 Describe any outstanding biosolids issues with treatment, use or overall management:

I believe that sludge build up, particularly in our secondary lagoon is a contributing factor for effluent quality violations for phosphorus, NH3-N and BOD.

Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	**A**

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Last Updated: 6/28/2024

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Staffing and Preventative Maintenance (All Treatment Plants)

1. Plant Staffing

1.1 Was your wastewater treatment plant adequately staffed last year?

- ● Yes
- ○ No

If No, please explain:

Could use more help/staff for:

1.2 Did your wastewater staff have adequate time to properly operate and maintain the plant and fulfill all wastewater management tasks including recordkeeping?

- ● Yes
- ○ No

If No, please explain:

2. Preventative Maintenance

2.1 Did your plant have a documented AND implemented plan for preventative maintenance on major equipment items?

- ● Yes (Continue with question 2) ☐☐
- ○ No (40 points)☐☐

If No, please explain, then go to question 3:

2.2 Did this preventative maintenance program depict frequency of intervals, types of lubrication, and other tasks necessary for each piece of equipment?

- ● Yes
- ○ No (10 points)

2.3 Were these preventative maintenance tasks, as well as major equipment repairs, recorded and filed so future maintenance problems can be assessed properly?

- ● Yes
  - ○ Paper file system
  - ○ Computer system
  - ● Both paper and computer system
- ○ No (10 points)

0

3. O&M Manual

3.1 Does your plant have a detailed O&M and Manufacturer Equipment Manuals that can be used as a reference when needed?

- ● Yes
- ○ No

4. Overall Maintenance /Repairs

4.1 Rate the overall maintenance of your wastewater plant.

- ○ Excellent
- ○ Very good
- ● Good
- ○ Fair
- ○ Poor

Describe your rating:

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While our routine maintenance schedule is very good there are areas that could be improved upon, especially those tasks requiring more than one person.

Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	**A**

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Madeline Sanitary District

Last Updated: 6/28/2024

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Operator Certification and Education

1. Operator-In-Charge

1.1 Did you have a designated operator-in-charge during the report year?

- ● Yes (0 points)
- ○ No (20 points)

Name: ZACHARIAH J MONTAGNE

Certification No: 34795

0

2. Certification Requirements

2.1 In accordance with Chapter NR 114.56 and 114.57, Wisconsin Administrative Code, what level and subclass(es) were required for the operator-in-charge (OIC) to operate the wastewater treatment plant and what level and subclass(es) were held by the operator-in-charge?

Sub Class	SubClass Description	WWTP	OIC		
		Basic	OIT	Basic	Advanced
A1	Suspended Growth Processes				
A2	Attached Growth Processes				
A3	Recirculating Media Filters				
A4	Ponds, Lagoons and Natural	X		X	
A5	Anaerobic Treatment Of Liquid				
B	Solids Separation				
C	Biological Solids/Sludges				
P	Total Phosphorus				
N	Total Nitrogen				
D	Disinfection	X		X	
L	Laboratory				
U	Unique Treatment Systems				
SS	Sanitary Sewage Collection	X	NA	NA	NA

2.2 Was the operator-in-charge certified at the appropriate level and subclass(es) to operate this plant? (Note: Certification in subclass SS is required 5 years after permit reissuance.)

- ● Yes (0 points)
- ○ No (20 points)

2.3 For wastewater treatment facilities with a registered or certified laboratory, is at least one operator that works in the laboratory certified at the basic level in the laboratory (L) subclass?

- ○ Yes
- ○ No
- ● N/A – Wastewater treatment facility does not have a registered or certified laboratory

2.4 For wastewater treatment facilities that own and operate a sanitary sewage collection system, has at least one operator been designated the OIC for sanitary sewage collection system and certified at the basic level in the sanitary sewage collection system (SS) subclass?

- ○ Yes
- ● No
- ○ N/A – Owner of the Wastewater treatment facility does not own and operate a sanitary sewage collection system

0

3. Succession Planning

3.1 In the event of the loss of your designated operator-in-charge, did you have a contingency plan to ensure the continued proper operation and maintenance of the plant that includes one or more of the following options (check all that apply)?

- ☐ One or more additional certified operators on staff

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☒ An arrangement with another certified operator ☐ An arrangement with another community with a certified operator ☐ An operator on staff who has an operator-in-training certificate for your plant and is expected to be certified within one year ☒ A consultant to serve as your certified operator ☐ None of the above (20 points) If "None of the above" is selected, please explain:	**0**
4. Continuing Education Credits 4.1 If you had a designated operator-in-charge, was the operator-in-charge earning Continuing Education Credits at the following rates? OIT and Basic Certification: ● Averaging 6 or more CECs per year. ○ Averaging less than 6 CECs per year. Advanced Certification: ○ Averaging 8 or more CECs per year. ○ Averaging less than 8 CECs per year.	

Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	**A**

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Reporting For: **2023**

Financial Management

1. Provider of Financial Information

Name: Nancy Romundstad

Telephone: 715-747-6923 (XXX) XXX-XXXX

E-Mail Address (optional): madsan@cheqnet.net

2. Treatment Works Operating Revenues

2.1 Are User Charges or other revenues sufficient to cover O&M expenses for your wastewater treatment plant AND/OR collection system ?

- ● Yes (0 points) ☐☐
- ○ No (40 points)

If No, please explain:

2.2 When was the User Charge System or other revenue source(s) last reviewed and/or revised?

Year: 2023

- ● 0-2 years ago (0 points) ☐☐
- ○ 3 or more years ago (20 points)☐☐
- ○ N/A (private facility)

2.3 Did you have a special account (e.g., CWFP required segregated Replacement Fund, etc.) or financial resources available for repairing or replacing equipment for your wastewater treatment plant and/or collection system?

- ● Yes (0 points)
- ○ No (40 points)

0

REPLACEMENT FUNDS [PUBLIC MUNICIPAL FACILITIES SHALL COMPLETE QUESTION 3]

3. Equipment Replacement Funds

3.1 When was the Equipment Replacement Fund last reviewed and/or revised?

Year: 2023

- ● 1-2 years ago (0 points)☐☐
- ○ 3 or more years ago (20 points)☐☐
- ○ N/A

If N/A, please explain:

3.2 Equipment Replacement Fund Activity

3.2.1 Ending Balance Reported on Last Year's CMAR		$ 184,878.25
3.2.2 Adjustments - if necessary (e.g. earned interest, audit correction, withdrawal of excess funds, increase making up previous shortfall, etc.)	+	$ 2,991.08
3.2.3 Adjusted January 1st Beginning Balance		$ 187,869.33
3.2.4 Additions to Fund (e.g. portion of User Fee, earned interest, etc.)	+	$ 12,000.00

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3.2.5 Subtractions from Fund (e.g., equipment replacement, major repairs - use description box 3.2.6.1 below*) - $ 0.00

3.2.6 Ending Balance as of December 31st for CMAR Reporting Year $ 199,869.33

All Sources: This ending balance should include all Equipment Replacement Funds whether held in a bank account(s), certificate(s) of deposit, etc.

3.2.6.1 Indicate adjustments, equipment purchases, and/or major repairs from 3.2.5 above.

3.3 What amount should be in your Replacement Fund? $ 50,000.00

0

Please note: If you had a CWFP loan, this amount was originally based on the Financial Assistance Agreement (FAA) and should be regularly updated as needed. Further calculation instructions and an example can be found by clicking the SectionInstructions link under Info header in the left-side menu.

3.3.1 Is the December 31 Ending Balance in your Replacement Fund above, (#3.2.6) equal to, or greater than the amount that should be in it (#3.3)?

- ● Yes
- ○ No

If No, please explain.

4. Future Planning

4.1 During the next ten years, will you be involved in formal planning for upgrading, rehabilitating, or new construction of your treatment facility or collection system?

- ● Yes - If Yes, please provide major project information, if not already listed below.☐☐
- ○ No

Project #	Project Description	Estimated Cost	Approximate Construction Year
1	Facility Plan, which includes cleaning and televising 25,000 feet of sewer mains, flow and lagoon liner integrity study, existing equipment evaluation and potential upgrade needs.	$150,000	2024

5. Financial Management General Comments

ENERGY EFFICIENCY AND USE

6. Collection System

6.1 Energy Usage

6.1.1 Enter the monthly energy usage from the different energy sources:

COLLECTION SYSTEM PUMPAGE: Total Power Consumed

Number of Municipally Owned Pump/Lift Stations: 4

	Electricity Consumed (kWh)	Natural Gas Consumed (therms)
January	2,720	
February	3,093	
March	3,033	
April	3,992	
May	2,226	
June	2,547	
July	2,396	
August	1,974	
September	1,619	
October	1,415	
November	2,174	
December	2,595	
Total	**29,784**	**0**
Average	**2,482**	**0**

6.1.2 Comments:

6.2 Energy Related Processes and Equipment

6.2.1 Indicate equipment and practices utilized at your pump/lift stations (Check all that apply):

- ☒ Comminution or Screening
- ☐ Extended Shaft Pumps
- ☒ Flow Metering and Recording
- ☐ Pneumatic Pumping
- ☐ SCADA System
- ☐ Self-Priming Pumps
- ☒ Submersible Pumps
- ☐ Variable Speed Drives
- ☐ Other:

6.2.2 Comments:

6.3 Has an Energy Study been performed for your pump/lift stations?

- ○ No
- ● Yes

Year: 2018

By Whom: MSA Proffessional Services

Describe and Comment: We were fortunate to get funding for this from Focus on Energy as part of one of their programs

6.4 Future Energy Related Equipment

6.4.1 What energy efficient equipment or practices do you have planned for the future for your pump/lift stations?

To be determined based on the outcome of the Facility Plan

7. Treatment Facility

7.1 Energy Usage

7.1.1 Enter the monthly energy usage from the different energy sources:

TREATMENT PLANT: Total Power Consumed/Month

	Electricity Consumed (kWh)	Total Influent Flow (MG)	Electricity Consumed/ Flow (kWh/MG)	Total Influent BOD (1000 lbs)	Electricity Consumed/ Total Influent BOD (kWh/1000lbs)	Natural Gas Consumed (therms)
January	12,570	1.41	8,915	0.53	23,717	
February	12,749	1.26	10,118	0.31	41,126	
March	11,187	1.57	7,125	0.19	58,879	
April	8,778	3.88	2,262	0.30	29,260	
May	7,069	1.86	3,801	0.93	7,601	
June	7,361	1.77	4,159	2.49	2,956	
July	7,032	2.57	2,736	6.45	1,090	
August	7,605	2.36	3,222	3.75	2,028	
September	6,743	1.80	3,746	1.02	6,611	
October	7,656	1.56	4,908	1.64	4,668	
November	11,550	1.19	9,706	0.66	17,500	
December	12,784	1.20	10,653	0.19	67,284	
Total	**113,084**	**22.43**		**18.46**		**0**
Average	**9,424**	**1.87**	**5,946**	**1.54**	**21,893**	**0**

7.1.2 Comments:

7.2 Energy Related Processes and Equipment

7.2.1 Indicate equipment and practices utilized at your treatment facility (Check all that apply):

- ☐ Aerobic Digestion
- ☐ Anaerobic Digestion
- ☐ Biological Phosphorus Removal
- ☐ Coarse Bubble Diffusers
- ☐ Dissolved O2 Monitoring and Aeration Control
- ☒ Effluent Pumping
- ☒ Fine Bubble Diffusers
- ☒ Influent Pumping
- ☐ Mechanical Sludge Processing
- ☐ Nitrification
- ☐ SCADA System
- ☒ UV Disinfection
- ☐ Variable Speed Drives
- ☐ Other:

7.2.2 Comments:

7.3 Future Energy Related Equipment

7.3.1 What energy efficient equipment or practices do you have planned for the future for your treatment facility?

To be determined based on the outcome of the Facility Plan

8. Biogas Generation

8.1 Do you generate/produce biogas at your facility?

- ● No
- ○ Yes

If Yes, how is the biogas used (Check all that apply):

- ☐ Flared Off
- ☐ Building Heat
- ☐ Process Heat
- ☐ Generate Electricity
- ☐ Other:

9. Energy Efficiency Study

9.1 Has an Energy Study been performed for your treatment facility?

- ○ No
- ● Yes

☒ Entire facility

Year: 2018

By Whom: MSA Professional Services

Describe and Comment:

We were fortunate to get funding for this from Focus on Energy as part of one of their programs

☐ Part of the facility

Year:

By Whom:

Describe and Comment:

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Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	**A**

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Sanitary Sewer Collection Systems

1. Capacity, Management, Operation, and Maintenance (CMOM) Program

1.1 Do you have a CMOM program that is being implemented?

- ● Yes
- ○ No

If No, explain:

1.2 Do you have a CMOM program that contains all the applicable components and items according to Wisc. Adm Code NR 210.23 (4)?

- ● Yes
- ○ No (30 points)
- ○ N/A

If No or N/A, explain:

1.3 Does your CMOM program contain the following components and items? (check the components and items that apply)

☒ Goals [NR 210.23 (4)(a)]

Describe the major goals you had for your collection system last year:

Sewer and wet well cleaning and televising, grease trap informational letter, budget, weed and varmint control, private lateral inspections, smoke testing

Did you accomplish them?

- ● Yes
- ○ No

If No, explain:

☒ Organization [NR 210.23 (4) (b)]☐☐

Does this chapter of your CMOM include:

- ☒ Organizational structure and positions (eg. organizational chart and position descriptions)
- ☒ Internal and external lines of communication responsibilities
- ☒ Person(s) responsible for reporting overflow events to the department and the public

☒ Legal Authority [NR 210.23 (4) (c)]

What is the legally binding document that regulates the use of your sewer system?

Ordinances of the Madeline Sanitary District03

If you have a Sewer Use Ordinance or other similar document, when was it last reviewed and revised? (MM/DD/YYYY) 2020-02-26

Does your sewer use ordinance or other legally binding document address the following:

- ☒ Private property inflow and infiltration
- ☒ New sewer and building sewer design, construction, installation, testing and inspection
- ☐ Rehabilitated sewer and lift station installation, testing and inspection
- ☐ Sewage flows satellite system and large private users are monitored and controlled, as necessary
- ☒ Fat, oil and grease control
- ☒ Enforcement procedures for sewer use non-compliance

☒ Operation and Maintenance [NR 210.23 (4) (d)]

Does your operation and maintenance program and equipment include the following:

- ☒ Equipment and replacement part inventories
- ☒ Up-to-date sewer system map

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☐ A management system (computer database and/or file system) for collection system information for O&M activities, investigation and rehabilitation
☒ A description of routine operation and maintenance activities (see question 2 below)
☐ Capacity assessment program
☐ Basement back assessment and correction
☒ Regular O&M training

☒ Design and Performance Provisions [NR 210.23 (4) (e)]☐☐

What standards and procedures are established for the design, construction, and inspection of the sewer collection system, including building sewers and interceptor sewers on private property?

☒ State Plumbing Code, DNR NR 110 Standards and/or local Municipal Code Requirements
☒ Construction, Inspection, and Testing
☒ Others:

professional engineers

☒ Overflow Emergency Response Plan [NR 210.23 (4) (f)]☐☐

Does your emergency response capability include:

☒ Responsible personnel communication procedures
☐ Response order, timing and clean-up
☒ Public notification protocols
☒ Training
☐ Emergency operation protocols and implementation procedures

☒ Annual Self-Auditing of your CMOM Program [NR 210.23 (5)]☐☐

☐ Special Studies Last Year (check only those that apply):

☐ Infiltration/Inflow (I/I) Analysis
☐ Sewer System Evaluation Survey (SSES)
☐ Sewer Evaluation and Capacity Managment Plan (SECAP)
☐ Lift Station Evaluation Report
☐ Others:

0

2. Operation and Maintenance

2.1 Did your sanitary sewer collection system maintenance program include the following maintenance activities? Complete all that apply and indicate the amount maintained.

Cleaning	70	% of system/year
Root removal	0	% of system/year
Flow monitoring	0	% of system/year
Smoke testing	.1	% of system/year
Sewer line televising	70	% of system/year
Manhole inspections	75	% of system/year
Lift station O&M	365	# per L.S./year
Manhole rehabilitation	0	% of manholes rehabbed
Mainline rehabilitation	0	% of sewer lines rehabbed
Private sewer inspections	.1	% of system/year

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Private sewer I/I removal	.1	% of private services
River or water crossings	30	% of pipe crossings evaluated or maintained

Please include additional comments about your sanitary sewer collection system below:

We are fortunate that the majority of our collection system is new enough to be made of PVC. We also just completed a significant sewer cleaning and televising project and while there were a few defects noted our system is in good shape overall.

3. Performance Indicators

3.1 Provide the following collection system and flow information for the past year.

29.25	Total actual amount of precipitation last year in inches
30.95	Annual average precipitation (for your location)
4.3	Miles of sanitary sewer
4	Number of lift stations
0	Number of lift station failures
0	Number of sewer pipe failures
0	Number of basement backup occurrences
0	Number of complaints
	Average daily flow in MGD (if available)
	Peak monthly flow in MGD (if available)
	Peak hourly flow in MGD (if available)

3.2 Performance ratios for the past year:

0.00	Lift station failures (failures/year)
0.00	Sewer pipe failures (pipe failures/sewer mile/yr)
0.00	Sanitary sewer overflows (number/sewer mile/yr)
0.00	Basement backups (number/sewer mile)
0.00	Complaints (number/sewer mile)
	Peaking factor ratio (Peak Monthly:Annual Daily Avg)
	Peaking factor ratio (Peak Hourly:Annual Daily Avg)

4. Overflows

LIST OF SANITARY SEWER (SSO) AND TREATMENT FACILITY (TFO) OVERFLOWS REPORTED **

	Date	Location	Cause	Estimated Volume
None reported				

** If there were any SSOs or TFOs that are not listed above, please contact the DNR and stop work on this section until corrected.

5. Infiltration / Inflow (I/I)

5.1 Was infiltration/inflow (I/I) significant in your community last year?

- ● Yes
- ○ No

If Yes, please describe:

The winter of 22-23 brought us record snowfall, this in combination with a late thaw and spring rains caused significant I&I.

5.2 Has infiltration/inflow and resultant high flows affected performance or created problems in your collection system, lift stations, or treatment plant at any time in the past year?

○ Yes

● No

If Yes, please describe:

5.3 Explain any infiltration/inflow (I/I) changes this year from previous years:

The winter of 22-23 brought us record snowfall, this in combination with a late thaw and spring rains caused significant I&I.

5.4 What is being done to address infiltration/inflow in your collection system?

We just completed a substantial sewer cleaning and televising project and plan to follow up with smoke testing and private lateral televising in areas of concern.

Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	**A**

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Grading Summary

WPDES No: 0030759

SECTIONS	LETTER GRADE	GRADE POINTS	WEIGHTING FACTORS	SECTION POINTS
Influent	A	4	3	12
BOD/CBOD	B	3	10	30
TSS	A	4	5	20
Ammonia	A	4	5	20
Phosphorus	C	2	3	6
Ponds	F	0	7	0
Biosolids	A	4	5	20
Staffing/PM	A	4	1	4
OpCert	A	4	1	4
Financial	A	4	1	4
Collection	A	4	3	12
TOTALS			**44**	**132**
GRADE POINT AVERAGE (GPA) = 3.00				

Notes:
A = Voluntary Range (Response Optional)
B = Voluntary Range (Response Optional)
C = Recommendation Range (Response Required)
D = Action Range (Response Required)
F = Action Range (Response Required)

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Resolution or Owner's Statement

Name of Governing Body or Owner: Madeline Sanitary District

Date of Resolution or Action Taken: 2024-06-19

Resolution Number: 2024-01

Date of Submittal:

ACTIONS SET FORTH BY THE GOVERNING BODY OR OWNER RELATING TO SPECIFIC CMAR SECTIONS (Optional for grade A or B. Required for grade C, D, or F):

Influent Flow and Loadings: Grade = A

Effluent Quality: BOD: Grade = B

Effluent Quality: TSS: Grade = A

Effluent Quality: Ammonia: Grade = A

Effluent Quality: Phosphorus: Grade = C

We will be taking steps to address this as part of our Facility Plan

Ponds: Grade = F

We will be taking steps to address this as part of our Facility Plan

Biosolids Quality and Management: Grade = A

Staffing: Grade = A

Operator Certification: Grade = A

Financial Management: Grade = A

Collection Systems: Grade = A

(Regardless of grade, response required for Collection Systems if SSOs were reported)

ACTIONS SET FORTH BY THE GOVERNING BODY OR OWNER RELATING TO THE OVERALL GRADE POINT AVERAGE AND ANY GENERAL COMMENTS

(Optional for G.P.A. greater than or equal to 3.00, required for G.P.A. less than 3.00)

G.P.A. = 3.00

Appendix D

Sludge Photos

Photo 1 Sludge Sample 1

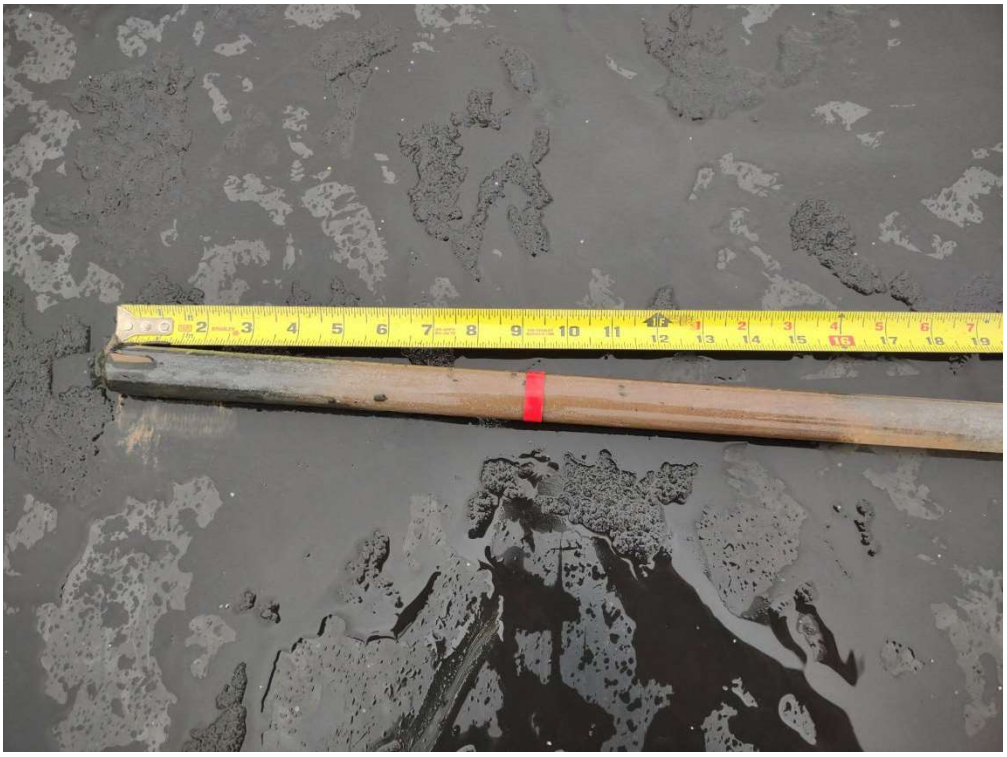

Photo 2 Sludge Sample 2

Photo 3 Sludge Sample 3

Photo 4 Sludge Sample 4

Appendix E

Detailed Cost Opinions for Each Alternative

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Project Name:	Madeline Sanitary District Facility Plan	12/18/2024
Project Location:	Madeline WWTP	
Project Number	MASAN 179787	

December 2024 Dollars	**Alternative 2**	**Alternative 3**	**Alternative 4**
Design Engineering Services	**$ 682,000**	**$ 209,000**	**$ 287,000**
PROCESS	$ 2,226,172	$ 1,025,294	$ 1,521,380
STRUCTURAL	$ 1,837,880	$ 61,600	$ 61,600
CIVIL	$ 734,848	$ 239,274	$ 392,187
ARCHITECTURAL	$ 280,000	$ 78,400	$ 78,400
MECHANICAL	$ 445,234	$ 205,059	$ 304,276
PROCESS PIPING	$ 779,160	$ 153,794	$ 228,207
ELECTRICAL	$ 1,113,086	$ 512,647	$ 532,483
GENERAL CONDITIONS	$ 964,129	$ 295,889	$ 405,409
CONTRACTOR OH&P (15%)	$ 1,089,466	$ 334,354	$ 458,112
Construction Subtotal	**$ 7,416,380**	**$ 2,276,068**	**$ 3,118,533**
Construction Contingency	$ 1,112,457	$ 341,410	$ 467,780
Probable Construction Cost	**$ 8,529,000**	**$ 2,617,000**	**$ 3,586,000**
Construction Engineering, Admin, Legal	**$ 1,279,000**	**$ 393,000**	**$ 538,000**
Replacement Cost, $/yr	**$ 58,600**	**$ 34,650**	**$ 45,700**
Chemical Cost, $/yr	**$ -**	**$ 18,000**	**$ 17,000**
Sludge Disposal, $/yr	**$ 58,844.90**		
Electrical consumption, kW/hrs per day	1,001	4	718
Utility electricity unit, $/kWhr	$ 0.17	$ 0.17	$ 0.17
Electrical Cost, $/day	$ 170.14	$ 0.76	$ 122.08
Electrical Cost, $/yr	**$ 62,100**	**$ 278**	**$ 44,559**
Equipment Life	20	years	
Interest	2.50%	percent	
Engineering Economy Weight (P/A)	15.589		
Budget Summary December 2024 Dollars			
Initial Capital Cost	**$ 10,490,000**	**$ 3,219,000**	**$ 4,411,000**
Present Worth Maintenance Cost	$ 1,831,000	$ 821,000	$ 977,000
Present Worth Electrical Cost	$ 968,000	$ 4,000	$ 695,000
Salvage Value	$ (1,139,000)	$ (38,000)	$ (38,000)
Net Present Worth	**$ 12,150,000**	**$ 4,006,000**	**$ 6,045,000**

PROJECT NAME: Madeline Sanitary District Facility Plan **Date:** 12/17/24
SEH Project No. MASAN 179787 **Time:** 15:59

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Cost Estimate for Alternative 2: Sequencing Batch Reactor (SBR)

Notes:
Please use the weight factor table located to the right of the cost estimate table
[1] Weight factor accounts for City Cost Index Correction, Installation, Location, and/or Contractor Overhead/Profit
[2] If possible, identify taxes separately.

Item No.	Item	Division	Quantity	Units	Unit Cost	Installed or Equipment	Weight Factor[1]	Tax[2]	Adjusted Unit Cost	Total Cost
	PROCESS									
1	Lift Station Demolition		2	LS	$ 15,000	Equipment	1.00		$ 15,000	$ 30,000
2	UV System Demolition		1	LS	$ 8,000	Equipment	1.00		$ 8,000	$ 8,000
3	Sludge removal and lagoon abandonment		1	LS	$ 300,000	Installed	1.00		$ 300,000	$ 300,000
4	Submersible Pumps and Accessories (4 pumps)		1	LS	$ 154,000	Equipment	1.46		$ 224,840	$ 224,840
5	Grit Removal Equipment		1	LS	$ 277,000	Equipment	1.46		$ 405,251	$ 405,251
6	SBR Equipment (includes Inf Valves, Mixers, Decanters, Blowers, Diffusers, WAS pumps, Controls)		1	LS	$ 400,000	Equipment	1.46		$ 585,200	$ 585,200
7	UV Disinfection		1	LS	$ 238,000	Equipment	1.46		$ 348,194	$ 348,194
8	Automatic Composite Samplers		2	EA	$ 8,600	Equipment	1.10		$ 9,460	$ 18,920
9	Positive Displacement Blowers		3	EA	$ 53,000	Equipment	1.46		$ 77,539	$ 232,617
10	Digester Diffuser Grid		1	LS	$ 50,000	Equipment	1.46		$ 73,150	$ 73,150
	STRUCTURAL									
11	Concrete Walls and Slabs - SBR		500	CY	$ 1,600	Installed	1.00		$ 1,600	$ 800,000
12	Structural Excavation / Backfill SBR		2700	CY	$ 100	Installed	1.00		$ 100	$ 270,000
13	Concrete Walls and Slabs - GRIT		8	CY	$ 1,600	Installed	1.00		$ 1,600	$ 12,800
14	Structural Excavation / Backfill GRIT		10	CY	$ 100	Installed	1.00		$ 100	$ 1,000
15	Concrete for Below Grade Portion - Operations Building & UV		100	CY	$ 1,600	Installed	1.00		$ 1,600	$ 160,000
16	Structural Excavation / Backfill - Operations Building & UV		200	CY	$ 100	Installed	1.00		$ 100	$ 20,000
17	Stairway		1	EA	$ 9,400	Installed	1.00		$ 9,400	$ 9,400
18	Handrails		60	LF	$ 78	Installed	1.00		$ 78	$ 4,680
19	Aerobic Digester Concrete		350	CY	$ 1,600	Installed	1.00		$ 1,600	$ 560,000
	CIVIL									
20	Civil Site Work (15% of Process and Structural)		1	LS	$ 609,608	Installed	1.00		$ 609,608	$ 609,608
21	New water line		440	LF	$ 60	Installed	1.00		$ 60	$ 26,400
22	8" PVC Sanitary Sewer		200	LF	$ 85	Installed	1.00		$ 85	$ 17,000
23	8" Force Main		30	LF	$ 120	Installed	1.00		$ 120	$ 3,600
24	8" Air Piping		300	LF	$ 170	Installed	1.00		$ 170	$ 51,000
25	8' deep manhole (4' dia.)		3	EA	$ 8,300	Installed	1.00		$ 8,300	$ 24,900
26	Excess MH Depth		6	VF	$ 390	Installed	1.00		$ 390	$ 2,340
	ARCHITECTURAL									
27	Operations Building for Pump, UV $280/ sq.ft		1000	SF	$ 280	Installed	1.00		$ 280	$ 280,000
	MECHANICAL									
28	20% of Process Equipment Cost		1	LS	$ 445,234	Installed	1.00		$ 445,234	$ 445,234
	PROCESS PIPING									
29	35% of Process Equipment Cost		1	LS	$ 779,160	Installed	1.00		$ 779,160	$ 779,160
	ELECTRICAL									
30	50% of Process Equipment Cost		1	LS	$ 1,113,086	Installed	1.00		$ 1,113,086	$ 1,113,086
						Cost Estimate for Alternative 2: Sequencing Batch Reactor (SBR)			**Subtotal**	**$ 7,416,380**

Item No.	Item	Quantity Running	Power	Units	Quantity	Units	Unit Cost	KW-HR per Day	Daily Cost	Annual Cost
	Positive Displacement Blowers (3)	3	40	HP	89.48	kW	$0.170	715.9	$121.70	$ 44,420
	SBR Mixers (2)	2	5	HP	7.46	kW	$0.170	179.0	$30.42	$ 11,105
	SBR Sub. Pumps (2)	2	2.4	HP	3.58	kW	$0.170	7.2	$1.22	$ 444
	Grit Dry-Pump	1	10	HP	7.46	kW	$0.170	7.5	$1.27	$ 463
	Influent Pumps	1	20	HP	14.91	kW	$0.170	89.5	$15.21	$ 5,552
	WAS Pumps	1	5	HP	3.73	kW	$0.170	1.9	$0.32	$ 116
								1000.8		**$ 62,100**

Annual Equipment Replacement Funding		Quantity	Unit	Unit Cost	Extended Cost
Grit Removal Equipment		1	LS	$ 277,000	$ 277,000
Submersible Pumps and Accessories (4 pumps)		1	LS	$ 154,000	$ 154,000
SBR Equipment (includes Inf Valves, Mixers, Decanters, Blowers, Diffusers, WAS pumps, Controls)		1	LS	$ 400,000	$ 400,000
UV Disinfection Bulbs		1	LS	$ 238,000	$ 238,000
Positive Displacement Blowers		1	EA	$ 53,000	$ 53,000
Digester Diffuser Grid		1	LS	$ 50,000	$ 50,000
Total Annual Equipment Replacement Funding (for 20-year life)					**$ 58,600**

		Quantity	Unit	Unit Cost	Annual Cost
Sludge Disposal Cost		98075	lb	0.60	**$ 58,845**

PROJECT NAME: Madeline Sanitary District Facility Plan
SEH Project No. MASAN 179787

Date: 12/18/24
Time: 05:09

DRAFT

Cost Opinion for Alternative 3: Lift Station Improvements, UV Upgrades, Chemical Addition

Notes:

Please use the weight factor table located to the right of the cost estimate table

(1) Weight factor accounts for City Cost Index Correction, Installation, Location, and/or Contractor Overhead/Profit

(2) If possible, identify taxes separately.

Item No.	Item	Division	Quantity	Units	Unit Cost	Installed or Equipment	Weight Factor(1)	Tax(2)	Adjusted Unit Cost	Total Cost
	PROCESS									
1	Lift Station Demolition		2	LS	$ 15,000	Installed	1.00		$ 15,000	$ 30,000
2	UV System Demolition		1	LS	$ 8,000	Installed	1.00		$ 8,000	$ 8,000
3	Submersible Pumps and Accessories (4 pumps)		1	LS	$ 154,000	Equipment	1.46		$ 224,840	$ 224,840
4	UV Disinfection		1	LS	$ 238,000	Equipment	1.46		$ 348,194	$ 348,194
5	Lagoon Covers		14	EA	$ 2,000	Installed	1.00		$ 2,000	$ 28,000
6	Chemical Feed System (Ferric/Sulfuric Acid)		2	EA	$ 10,000	Equipment	1.46		$ 14,630	$ 29,260
7	Sludge Removal		1	LS	$ 281,000	Equipment	1.00		$ 281,000	$ 281,000
8	Lagoon berm riprap and geotextile fabric		1	LS	$ 76,000	Installed	1.00		$ 76,000	$ 76,000
	STRUCTURAL									
9	Chemical Building Foundation		36	CY	$ 1,600	Installed	1.00		$ 1,600	$ 57,600
10	Structural Excavation / Backfill - Chemical Building		40	CY	$ 100	Installed	1.00		$ 100	$ 4,000
	CIVIL									
11	Civil Site Work (15% of Process and Structural)		1	LS	$ 163,034	Installed	1.00		$ 163,034	$ 163,034
12	New water line		440	LF	$ 60	Installed	1.00		$ 60	$ 26,400
13	4" PVC Sanitary Sewer		100	LF	$ 75	Installed	1.00		$ 75	$ 7,500
14	8" Force Main		30	LF	$ 120	Installed	1.00		$ 120	$ 3,600
15	6" Chemical Tubing Conduit		100	LF	$ 75	Installed	1.00		$ 75	$ 7,500
16	8' deep manhole (4' dia.)		1	EA	$ 8,300	Installed	1.00		$ 8,300	$ 8,300
17	8' deep manhole (6' dia.)		2	EA	$ 10,300	Installed	1.00		$ 10,300	$ 20,600
18	Excess MH Depth		6	VF	$ 390	Installed	1.00		$ 390	$ 2,340
	ARCHITECTURAL									
19	Chemical Building incl Electrical $280/ sq.ft		280	SF	$ 280	Installed	1.00		$ 280	$ 78,400
	MECHANICAL									
20	20% of Process Equipment Cost		1	LS	$ 205,059	Installed	1.00		$ 205,059	$ 205,059
	PROCESS PIPING									
21	15% of Process Equipment Cost		1	LS	$ 153,794	Installed	1.00		$ 153,794	$ 153,794
	ELECTRICAL									
22	50% of Process Equipment Cost		1	LS	$ 512,647	Installed	1.00		$ 512,647	$ 512,647
						Cost Opinion for Alternative 3: Lift Station Improvements, UV Upgrades, Chemical Addition			**Subtotal**	**$ 2,276,068**

Item No.	Item	Quantity Running	Power	Units	Quantity	Units	Unit Cost	KW-HR per Day	Daily Cost	Annual Cost
	Chemical Pumps (2)	2	0.13	HP	0.19	kW	$0.170	4.5	$0.76	$ 278
				HP	0.00	kW	$0.170	0.0	$0.00	$ -
				HP	0.00	kW	$0.170	0.0	$0.00	$ -
								4.5		**$ 278**

Annual Equipment Replacement Funding		Quantity	Unit	Unit Cost	Extended Cost
Submersible Pumps and Accessories (4 pumps)		1	LS	$ 154,000	$ 154,000
UV Disinfection		1	LS	$ 238,000	$ 238,000
Chemical Feed System (Ferric/Sulfuric Acid)		2	LS	$ 10,000	$ 20,000
Sludge Removal		1	LS	$ 281,000	$ 281,000
Total Annual Equipment Replacement Funding (for 20-year life)					**$ 34,650**

Chemical Cost (Ferric/Sulfuric Acid)		1	LS	$ 18,000	$ 18,000

PROJECT NAME: Madeline Sanitary District Facility Plan
SEH Project No. MASAN 179787

Date: 12/18/24
Time: 05:09

DRAFT

Cost Estimate for Alternative 4: Upgrades to Existing WWTP and Ammonia Removal

Notes:

Please use the weight factor table located to the right of the cost estimate table

(1) Weight factor accounts for City Cost Index Correction, Installation, Location, and/or Contractor Overhead/Profit

(2) If possible, identify taxes separately.

Item No.	Item	Division	Quantity	Units	Unit Cost	Installed or Equipment	Weight Factor(1)	Tax(2)	Adjusted Unit Cost	Total Cost
	PROCESS									
1	Lift Station Demolition		2	LS	$ 15,000	Installed	1.00		$ 15,000	$ 30,000
2	UV System Demolition		1	LS	$ 8,000	Installed	1.00		$ 8,000	$ 8,000
3	Submersible Pumps and Accessories (4 pumps)		1	LS	$ 154,000	Equipment	1.46		$ 224,840	$ 224,840
4	UV Disinfection		1	LS	$ 238,000	Equipment	1.46		$ 348,194	$ 348,194
5	Post-lagoon ammonia reactor		1	LS	$ 332,000	Equipment	1.46		$ 485,716	$ 485,716
6	Chemical Feed System (Ferric)		1	LS	$ 10,000	Equipment	1.46		$ 14,630	$ 14,630
7	Sludge Removal		1	LS	$ 281,000	Equipment	1.00		$ 281,000	$ 281,000
8	Lagoon berm riprap and geotextile fabric		1	LS	$ 76,000	Installed	1.00		$ 76,000	$ 76,000
8	Blower		1	EA	$ 53,000	Equipment	1.00		$ 53,000	$ 53,000
	STRUCTURAL									
9	Chemical Building Foundation		36	CY	$ 1,600	Installed	1.00		$ 1,600	$ 57,600
10	Structural Excavation / Backfill - Chemical Building		40	CY	$ 100	Installed	1.00		$ 100	$ 4,000
	CIVIL									
11	Civil Site Work (15% of Process and Structural)		1	LS	$ 237,447	Installed	1.00		$ 237,447	$ 237,447
12	New water line		440	LF	$ 60	Installed	1.00		$ 60	$ 26,400
13	4" PVC Sanitary Sewer		100	LF	$ 75	Installed	1.00		$ 75	$ 7,500
14	8" PVC Sanitary Sewer		150	LF	$ 85	Installed	1.00		$ 85	$ 12,750
15	8" Force Main		30	LF	$ 75	Installed	1.00		$ 75	$ 2,250
16	6" Chemical Tubing Conduit		100	LF	$ 70	Installed	1.00		$ 70	$ 7,000
17	8" Air Piping		300	LF	$ 170	Installed	1.00		$ 170	$ 51,000
18	8' deep manhole (4' dia.)		3	EA	$ 8,300	Installed	1.00		$ 8,300	$ 24,900
19	8' deep manhole (6' dia.)		2	EA	$ 10,300	Installed	1.00		$ 10,300	$ 20,600
20	Excess MH Depth		6	VF	$ 390	Installed	1.00		$ 390	$ 2,340
	ARCHITECTURAL									
21	Chemical Building incl Electrical $280/ sq.ft		280	SF	$ 280	Installed	1.00		$ 280	$ 78,400
	MECHANICAL									
22	20% of Process Equipment Cost		1	LS	$ 304,276	Installed	1.00		$ 304,276	$ 304,276
	PROCESS PIPING									
23	15% of Process Equipment Cost		1	LS	$ 228,207	Installed	1.00		$ 228,207	$ 228,207
	ELECTRICAL									
24	35% of Process Equipment Cost		1	LS	$ 532,483	Installed	1.00		$ 532,483	$ 532,483
								Cost Estimate for Alternative 4: Upgrades to Existing WWTP and Ammonia Removal	**Subtotal**	**$ 3,118,533**

Item No.	Item	Quantity Running	Power	Units	Quantity	Units	Unit Cost	KW-HR per Day	Daily Cost	Annual Cost
	Positive Displacement Blowers (3)	1	40	HP	29.83	kW	$0.170	715.9	$121.70	$ 44,420
	Chemical Pumps	1	0.13	HP	0.09	kW	$0.170	2.2	$0.38	$ 139
				HP	0.00	kW	$0.170	0.0	$0.00	$ -
								718.1		**$ 44,559**

Annual Equipment Replacement Funding		Quantity	Unit	Unit Cost	Extended Cost
UV Disinfection		1	LS	$ 238,000	$ 238,000
Post-lagoon ammonia reactor		1	LS	$ 332,000	$ 332,000
Chemical Feed System (Ferric)		1	LS	$ 10,000	$ 10,000
Sludge Removal		1	LS	$ 281,000	$ 281,000
Blower		1	EA	$ 53,000	$ 53,000
Total Annual Equipment Replacement Funding (for 20-year life)					**$ 45,700**

Chemical Costs (Ferric)		1	LS	$ 17,000	$ 17,000

Appendix F

Endangered Resources Preliminary Assessment

WISCONSIN
DEPT. OF NATURAL RESOURCES

Endangered Resources Preliminary Assessment

Created on **12/5/2024**. This report is good for one year after the created date.

DNR staff will be reviewing the ER Preliminary Assessments to verify the results provided by the Public Portal. ER Preliminary Assessments are only valid if the project habitat and waterway-related questions are answered accurately based on current site conditions. If an assessment is deemed invalid, a full ER review may be required even if the assessment indicated otherwise.

Results

A search was conducted of the NHI Portal within a 1-mile buffer (for terrestrial and wetland species) and a 2-mile buffer (for aquatic species) of the project area. Based on these search results, below are your follow-up actions.

This project is covered by the Broad Incidental Take Permit/Authorization for No/Low Impact Activities (No/Low BITP/A) (https://dnr.wi.gov/topic/ERReview/ITNoLowImpact.html) **provided that the follow-up actions below are implemented**. This BITP/A covers projects that the DNR has determined will have no impact or a minimal impact to endangered and threatened species in the state. Due to this coverage under the No/Low BITP/A, a formal review letter is not needed and only the actions listed below need to be followed to comply with state and/or federal endangered species laws, any take that may result from the proposed project is permitted/authorized for state-listed species.

Follow up actions:

The Bald Eagle (*Haliaeetus leucocephalus*) is Federally protected by the Bald & Golden Eagle Protection Act. An eagle nest has been recorded within 1 mile of the project area. Visit the USFWS Bald Eagle Management website (https://fws.gov/story/do-i-need-eagle-take-permit) for detailed guidelines and conservation measures for your specific project activity.

Visiting the website and following USFWS guidance will satisfy the project's Endangered Resources requirements.

A copy of this document can be kept on file and submitted with any other necessary DNR permit applications to show that the need for an ER Review has been met. This notice only addresses endangered resources issues. This notice does not constitute DNR authorization of the proposed project and does not exempt the project from securing necessary permits and approvals from the DNR and/or other permitting authorities.

Project Information

Landowner name	**Madeline Sanitary District**
Project address	**WWTP**
Project description	**Facility Plan**

Project Questions

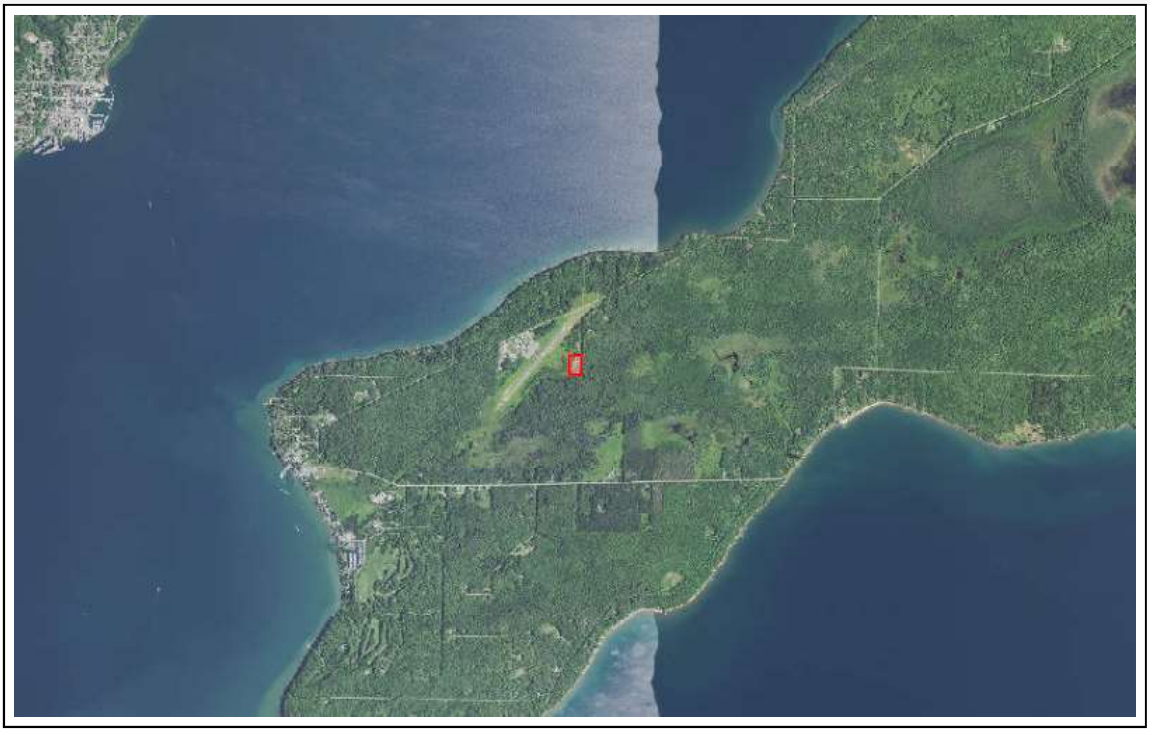
Does the project involve a public property?	**Yes**
Is there any federal involvement with the project?	**Yes**
Is the project a utility, agricultural, forestry or bulk sampling (associated with mining) project?	**Yes**
Is the project property in Managed Forest Law or Managed Forest Tax Law?	**No**
Project involves tree or shrub removal?	**No**

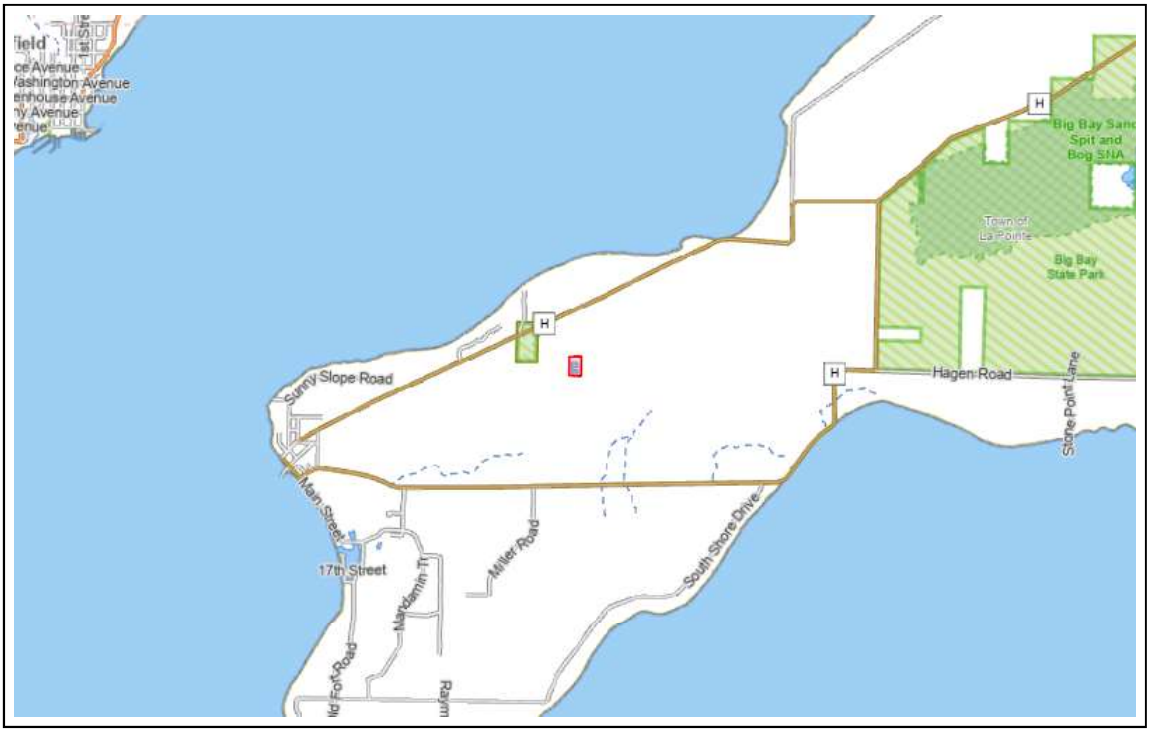
Is project near (within 300 ft) a waterbody or a shoreline?	DRAFT	No
Is project within a waterbody or along the shoreline?		No

Does the project area (including access routes, staging areas, laydown yards, select sites, source/fill sites, etc.) occur **entirely within** one or more of the following habitats?

Urban/residential	No
Manicured lawn	Yes
Artificial/paved surface	No
Agricultural land	No
Areas covered in crushed stone or gravel	Yes

Project Area Maps





WISCONSIN
DEPT. OF NATURAL RESOURCES

Endangered Resources Preliminary Assessment

Created on **12/5/2024**. This report is good for one year after the created date.

DNR staff will be reviewing the ER Preliminary Assessments to verify the results provided by the Public Portal. ER Preliminary Assessments are only valid if the project habitat and waterway-related questions are answered accurately based on current site conditions. If an assessment is deemed invalid, a full ER review may be required even if the assessment indicated otherwise.

Results

A search was conducted of the NHI Portal within a 1-mile buffer (for terrestrial and wetland species) and a 2-mile buffer (for aquatic species) of the project area. Based on these search results, below are your follow-up actions.

This project is covered by the Broad Incidental Take Permit/Authorization for No/Low Impact Activities (No/Low BITP/A) (https://dnr.wi.gov/topic/ERReview/ITNoLowImpact.html) **provided that the follow-up actions below are implemented**. This BITP/A covers projects that the DNR has determined will have no impact or a minimal impact to endangered and threatened species in the state. Due to this coverage under the No/Low BITP/A, a formal review letter is not needed and only the actions listed below need to be followed to comply with state and/or federal endangered species laws, any take that may result from the proposed project is permitted/authorized for state-listed species.

Follow up actions:

The Bald Eagle (*Haliaeetus leucocephalus*) is Federally protected by the Bald & Golden Eagle Protection Act. An eagle nest has been recorded within 1 mile of the project area. Visit the USFWS Bald Eagle Management website (https://fws.gov/story/do-i-need-eagle-take-permit) for detailed guidelines and conservation measures for your specific project activity.

Visiting the website and following USFWS guidance will satisfy the project's Endangered Resources requirements.

A copy of this document can be kept on file and submitted with any other necessary DNR permit applications to show that the need for an ER Review has been met. This notice only addresses endangered resources issues. This notice does not constitute DNR authorization of the proposed project and does not exempt the project from securing necessary permits and approvals from the DNR and/or other permitting authorities.

Project Information

Landowner name	**Madeline Sanitary District**
Project address	**LS**
Project description	**Facility Plan**

Project Questions

Does the project involve a public property?	**Yes**
Is there any federal involvement with the project?	**Yes**
Is the project a utility, agricultural, forestry or bulk sampling (associated with mining) project?	**Yes**
Is the project property in Managed Forest Law or Managed Forest Tax Law?	**No**
Project involves tree or shrub removal?	**No**

Is project near (within 300 ft) a waterbody or a shoreline?	DRAFT	**Yes**
Is project within a waterbody or along the shoreline?		**No**

Does the project area (including access routes, staging areas, laydown yards, select sites, source/fill sites, etc.) occur **entirely within** one or more of the following habitats?

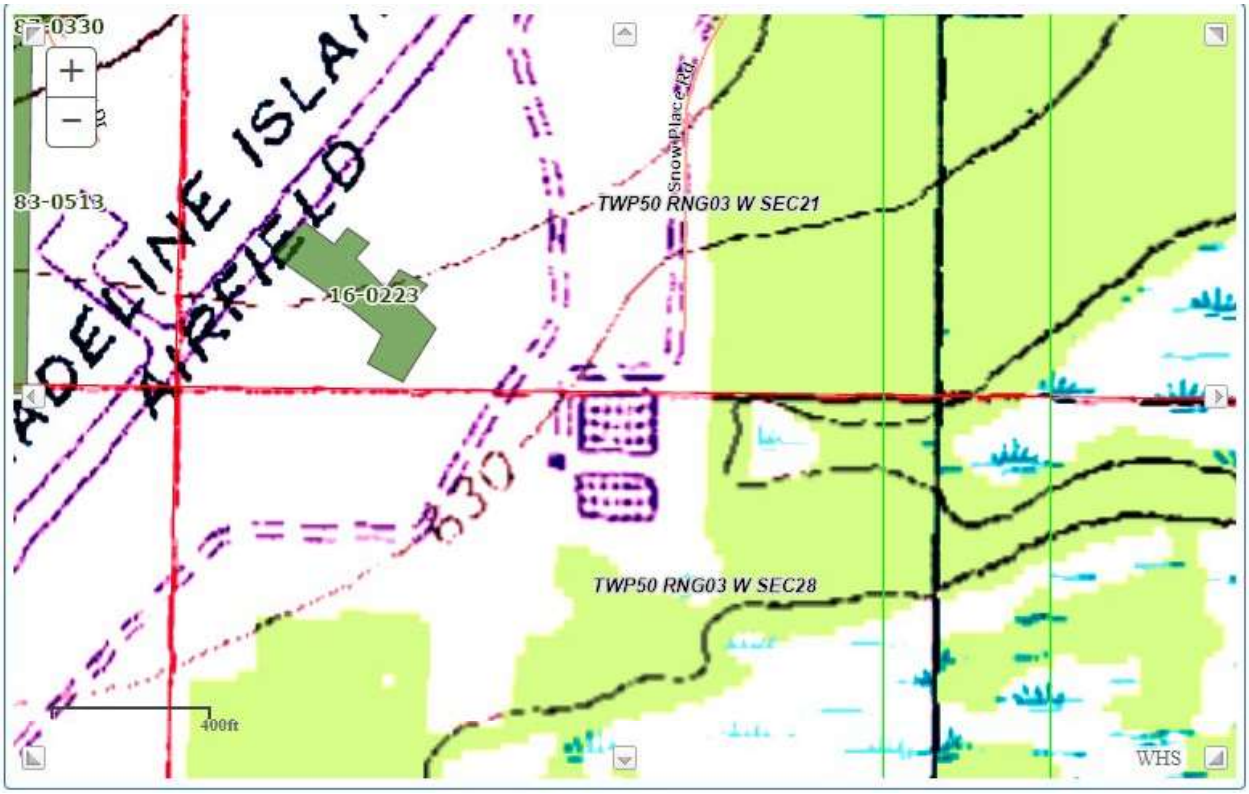
Urban/residential	**Yes**
Manicured lawn	**No**
Artificial/paved surface	**No**
Agricultural land	**No**
Areas covered in crushed stone or gravel	**No**

Project Area Maps

Appendix G

WHPD Review

Madeline Sanitary District Wastewater Treatment Plant

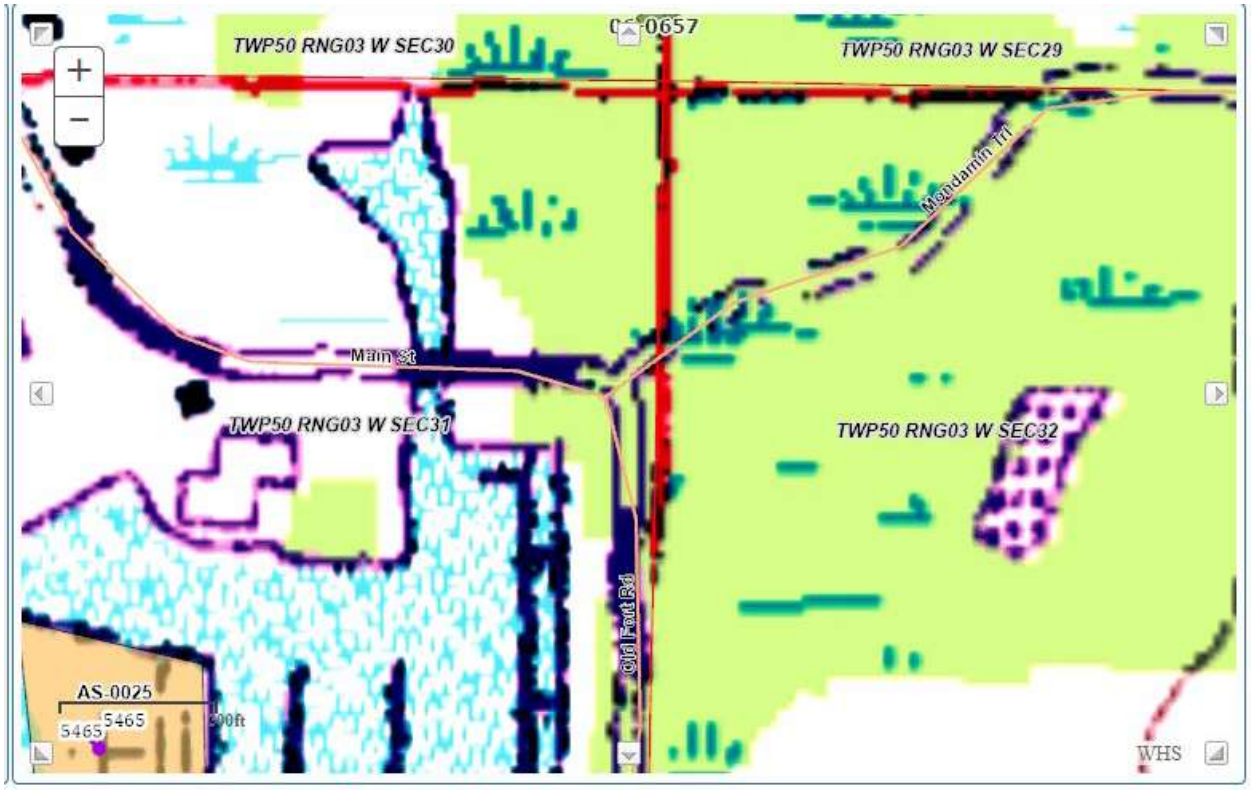


ARI 16-0223 (green polygon on SE side of Airport Runway)

WDOT Archaeological Survey Field Report: Major Gilbert Field Airport, Ashland County, Wisconsin-Stiles, Cynthia - In July 2015, Stiles conducted phase I survey for a weather station at Major Gilbert Field Airport project. No cultural materials were found.

Letter Report: Major Gilbert Field/Madeline Island Municipal Airport, Ashland County, Wisconsin - Dickerson, Kent, Kathy Barri, and Sandra Le Grew - In July through August 2016 WHS-MAP and representatives of the Red Cliff Band conducted investigations and monitor of ground disturbance associated with the Madeline Island Municipal Airport in Ashland County, Wisconsin. Disturbance included construction of a 45 by 45 foot earth-filled pad, a fifteen-foot wide graded gravel access road, and vegetation clearance within a 1000 foot diameter area around the pad. Work was halted in July due to catastrophic flooding. Monitoring was resumed once conditions permitted. No cultural materials or features were observed.

Madeline Sanitary District Lift Station No. 2



No archeological or Historical reports within or adjacent to site area.

Appendix H

Public Education Material

Public Outreach for WWTP & Sanitary Sewer Improvements

The Madeline Sanitary District is embarking on a significant project to upgrade the wastewater treatment plant (WWTP) and lift stations on Madeline Island. This project aims to enhance the island's wastewater management system, ensuring compliance with environmental regulations and improving overall efficiency and reliability.

Project Overview: The project involves upgrading the existing WWTP and lift stations to meet future needs based on projected flows, loadings, and effluent requirements. The upgrades will include new equipment and revised processes to improve the treatment of wastewater.

Benefits: These improvements will result in better water quality, reduced environmental impact, and consistent protection of public health. The project will support the island's growing population and future needs.

Timeline: Design of the project is anticipated to begin in the spring of 2025, with construction starting in the spring of 2026. Construction is anticipated to run through late summer of 2027.

Funding: The project will be financed through The Clean Water Fund which includes grant money for eligible communities, including Madeline Island. Additional funding sources, including congressional appropriations, are also being explored.

Why are upgrades needed? The WWTP was originally constructed in 1974 and upgraded in 2009 with a new Headworks Building, fine bubble aeration, and a septage receiving station. Most of the collection system and lift station were constructed in 1974. Currently, the WWTP is challenged to adequately treat incoming ammonia and phosphorus, which can negatively impact the environment and public health.

Recommended Improvements:

- **Sanitary Sewer & Holding Tanks:** Make repairs where identified, continue to routinely inspect systems, and rehabilitate the Main Lift Station to the WWTP. This will reduce impacts to groundwater.
- **Wastewater Treatment Plant:** Specific improvements for the WWTP involve upgrading the existing plant by removing sludge, improving lagoon covers and slopes, replacing the UV disinfection system, and adding chemical feed systems for phosphorus removal and ammonia control. The plan also includes installing new lift stations to replace aging infrastructure. These upgrades aim to enhance the plant's efficiency and reliability while maintaining the current lagoon treatment system.

Community Involvement: The Madeline Sanitary District will organize a public hearing to present the project details, answer questions, and gather feedback from the community. This outreach plan aims to keep the community well-informed and engaged throughout the project, fostering a sense of ownership and support for the WWTP and lift station improvements.

Community Benefit: The upgrades to the WWTP and lift stations will enhance the treatment process, resulting in better water quality. This will reduce the environmental impact on local water bodies and contribute to a healthier ecosystem. By improving the efficiency and reliability of the

wastewater treatment system, the project will help protect public health. Properly treated wastewater reduces the risk of waterborne diseases and ensures a safer environment for residents. The project is designed to accommodate the island's growing population and future needs. This will ensure that the wastewater management system can handle increased demand and support sustainable growth on Madeline Island. Upgrading the WWTP and sanitary system will ensure compliance with environmental regulations. This will help the Madeline Sanitary District avoid potential fines and penalties, and demonstrate a commitment to environmental stewardship.

Next Steps:

- **Public Hearing:** Inform the public on the condition of facilities, recommend improvements, and receive comments.
- **Finalize the Facility Plan:** Submit the facility plan to the Wisconsin Department of Natural Resources (WDNR) for review and approval.
- **Design:** Complete design documents for constructing recommended improvements.
- **Construction:** Receive bids and award to a contractor to make the designed improvements.

What can you do? Wastewater is a byproduct of us, the customers. What we put down the drain impacts the performance of the wastewater treatment plant. Here are some tips you can follow to help:

1. Regular Inspections: Schedule regular inspections of septic tanks and sewer lines to catch potential issues early.
2. Mindful Flushing: Only flush toilet paper and human waste. Avoid flushing wipes (including flushable), feminine hygiene products, and other non-biodegradable items.
3. Proper Waste Disposal: Dispose of household chemicals, oils, and medications properly, not down the drain.
4. Water Conservation: Use water-saving fixtures and be mindful of water usage to reduce the load on sewer and septic systems.
5. Stormwater connections: Disconnect footing drains and downspouts from sewer lines. Adding stormwater to the sanitary sewer system strains equipment and can lead to poor WWTP performance ultimately harming the environment.

In Conclusion: the Madeline Sanitary District's project to upgrade the wastewater treatment plant and lift stations is a crucial step towards ensuring a sustainable and efficient wastewater management system for Madeline Island. These improvements will not only enhance water quality and public health but also support the island's growth. We encourage the community to stay informed, participate in public hearings, and adopt best practices in wastewater management to contribute to the success of this project. Together, we can create a cleaner and healthier environment for everyone.

DRAFT

Protect Our Environment: Avoid Harmful Substances Down the Drain

Why It Matters: Pouring harmful substances down the drain can lead to serious environmental and plumbing issues. These substances can contaminate local water supplies, harm wildlife, and cause costly damage to sewer and septic systems.

What Not to Put Down the Drain:

1. **Grease and Oils**:
    - **Why**: Grease and oils can solidify in pipes, causing blockages and backups.
    - **Alternative**: Let grease cool and solidify, then dispose of it in the trash.
2. **Chemicals and Cleaners**:
    - **Why**: Household chemicals, including bleach and ammonia, can disrupt the treatment process and contaminate water supplies.
    - **Alternative**: Use eco-friendly cleaning products and dispose of chemicals at designated hazardous waste facilities.
3. **Medications**:
    - **Why**: Pharmaceuticals can pass through treatment plants and enter waterways, affecting aquatic life.
    - **Alternative**: Return unused medications to pharmacies or take-back programs.
4. **Coffee Grounds and Food Scraps**:
    - **Why**: These can accumulate in pipes and cause blockages.
    - **Alternative**: Compost coffee grounds and food scraps or dispose of them in the trash.
5. **Paints and Solvents**:
    - **Why**: These substances contain harmful chemicals that can pollute water supplies.
    - **Alternative**: Dispose of paints and solvents at hazardous waste collection sites.
6. **Personal Care Products**:
    - **Why**: Items like wipes, cotton balls, and dental floss do not break down and can clog pipes.
    - **Alternative**: Dispose of these items in the trash.

By disposing of these materials in the proper manner you can protect wildlife, water sources, and avoid costly damage to your wastewater system.

Impact of Ammonia and Phosphorus on the Environment from Wastewater Treatment Plants (WWTP)

Ammonia:

1. **Toxicity to Aquatic Life**: Ammonia is highly toxic to aquatic organisms. Elevated levels can cause significant harm to fish and invertebrates, leading to reduced biodiversity in affected water bodies. [1].
2. **Eutrophication**: Ammonia contributes to nutrient pollution, which can lead to eutrophication. This process results in excessive growth of algae and aquatic plants, depleting oxygen levels in the water and creating dead zones where aquatic life cannot survive[2].
3. **Water Quality Degradation**: High ammonia levels can alter the pH of water, making it more alkaline. This change can further stress aquatic ecosystems and reduce water quality[3].

Phosphorus:

1. **Algal Blooms**: Phosphorus is a key nutrient that promotes the growth of algae. Excess phosphorus from WWTPs can lead to harmful algal blooms (HABs), which produce toxins harmful to both aquatic life and humans. [2].
2. **Oxygen Depletion**: When algae die and decompose, the process consumes large amounts of dissolved oxygen in the water. This can result in hypoxic conditions, which are detrimental to fish and other aquatic organisms[2].
3. **Impact on Drinking Water**: Phosphorus-induced algal blooms can affect the taste, odor, and safety of drinking water. Some algal toxins are resistant to conventional water treatment processes, posing health risks[2].

By managing and reducing the levels of ammonia and phosphorus discharged from WWTPs, we can protect aquatic ecosystems, improve water quality, and safeguard public health.

References

1. City of Fond du Lac Wastewater. Retrieved from City of Fond du Lac Wastewater
2. Wisconsin DNR - Phosphorus Program. Retrieved from Wisconsin DNR - Phosphorus Program
3. Wisconsin DNR - TMDL Implementation Guidance. Retrieved from Wisconsin DNR - TMDL Implementation Guidance

References

[1] Home - City of Fond Du Lac

[2] Programs & Initiatives - Wastewater - City of Fond du Lac

[3] News - Wastewater - City of Fond du Lac - Fond du Lac, Wisconsin

Appendix I

Public Hearing Minutes

DRAFT

Building a Better World for All of Us®

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

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

JOIN OUR SOCIAL COMMUNITIES