

CITY OF PRAIRIE DU CHIEN

214 East Blackhawk Avenue - PO Box 324 - Prairie du Chien, WI 53821 * Phone: (608) 326-6406 * Fax: (608) 326-6407 * www.cityofpdc.com

Notice is hereby given according to State Statutes that the **COMMON COUNCIL** of the City of Prairie du Chien will meet on **Tuesday, March 3, 2026 at 7:00 P.M.** or **VIA Join Zoom Meeting Click on the link and/or copy and paste in web browser and you will be placed in the waiting room to join the meeting <https://us02web.zoom.us/j/82317778619>**

PROOF OF POSTING AFFIDAVIT: This agenda was posted more than 24 hours prior to the start of this meeting at: City Hall, 214 E. Blackhawk Avenue (kiosk) and on the official website above.

MEETING NOTICE – COMMON COUNCIL

Date: Tuesday, March 3, 2026

Time: 7:00 P.M.

Location: Council Chambers

ITEMS TO BE ACTED UPON:

- 1. Call to order/Roll Call.**
- 2. Certification of the open meeting law agenda requirements and approval of the agenda**
- 3. Pledge of Allegiance**

4. PUBLIC HEARINGS

5. CONSENT AGENDA:

- A. COMMON COUNCIL – February 17 and 25th, 2026**
- B. FINANCE – February 17, 2026**
- C. Change of premises from 108 East Blackhawk Avenue to 126 West Blackhawk Avenue for Forever Green Hemp Dispensary LLC.**

(Note: These items may be approved on a single motion and vote due to their routine nature or previous discussion. Please indicate to the Mayor if you would prefer separate discussion and action.)

6. ITEMS REMOVED FROM CONSENT AGENDA

7. CITIZENS' COMMENTS, RESOLUTIONS AND PRESENTATIONS

8. CITY ADMINISTRATORS REPORT

9. COMMITTEE REPORTS AND ACTION

A. FINANCE

- 1. DISCUSSION AND ACTION: Claims**

10. NEW BUSINESS (Including items for future agenda consideration or Committee assignment).

A. DISCUSSION AND ACTION: Director Mike Wallace to present update on Fort Fun and removal of old equipment.

B. DISCUSSION AND ACTION: Proposed Wastewater Treatment Facility Upgrade and setting the date for Public Hearing.

11. ADJOURN TO CLOSED SESSION

A. Under Wisconsin State Statute 19.85 (1) (c) Considering employment, promotion, compensation or performance data of any public R.E. City Administrator, Public Works Operator.

12. CONVENE INTO OPEN SESSION

13. ACTION FROM CLOSED SESSION

14. ADJOURN

Chad Abram

Chad Abram, City Administrator

NOTE: The next regularly scheduled Council meeting will be Tuesday, March 17, 2026.

Agenda posted at City Hall on February 27, 2026 at 12:00 P.M.

PERSONS WITH DISABILITIES: If you require special accommodations in order to attend this meeting, please contact City Hall at 608-326-6406 or at least 24 hours prior to meeting time.

MINUTES OF THE COMMON COUNCIL February 17, 2026

A meeting of the Prairie du Chien Common Council was held on Tuesday, February 17, 2026, at 7:00 P. M. in the Council Chambers of City Hall. Mayor Dave Hemmer called the meeting to order at 7:00 P.M.

GENERAL ITEMS TO BE ACTED UPON

1. Call to order/Roll Call – Riebe absent, Bowar, Ingham, and Granzow on Zoom. City Staff present, Mayor Dave Hemmer, Police Chief Kyle Teynor, and City Administrator Chad Abram, Utility Director Larry Gates, Public Works Superintendent Nick Gilberts, and City Planner Nate Gilberts.
2. Certification of the open meeting law agenda requirements and approval of the agenda.
Motion: Bremmer, Second: Cray, Roll Call Vote:7-0
3. Pledge of Allegiance: Waller

4. PUBLIC HEARINGS

5. CONSENT AGENDA:

- A. COMMON COUNCIL – February 3, 2026
- B. FINANCE – February 3, 2026
- C. PERSONNEL – February 3, 2026
- D. LARIVIRIE FARM PARK – November 19, 2025
- E. POLICE AND FIRE COMMISSION – December 3, 2025
- F. DESIGN AND PRESERVATION – September 8, 2025
- G. PLAN COMMISSION – January 5, 2026
- H. Shamrock Shuffle Saturday, March 14, 2026
- I. Saint Patrick's Day Parade Saturday, March 14, 2026

(Note: These items may be approved on a single motion and vote due to their routine nature or previous discussion. Please indicate to the Mayor if you would prefer separate discussion and action.) – Action: To pull letter I and approve the rest. Motion: Bremmer, Second: Waller, Voice Vote: 7-0.

6. ITEMS REMOVED FROM CONSENT AGENDA – Action: To approve the parade route presented by Chief Kyle Teynor. Motion: Bremmer, Second: Waller, Voice Vote: 7-0.

7. CITIZENS' COMMENTS, RESOLUTIONS AND PRESENTATIONS

A. Swearing in and Badge Ceremony for Officer Tyler Zach. – Officer Zach sworn in by Police Chief Kyle Teynor.

8. CITY ADMINISTRATORS REPORT

- Nate, Mayor Hemmer and I finalizing paperwork on a grant from Department of Energy for up to \$80,000.00 for LED lighting upgrade at Hoffman Hall.
- The PSB is currently on Quest for Bids until March 10.
- City Staff currently doing CPR/AED recertification in house, thank you Morgan for providing the class.
- Public works staff recently had a successful brush pile burn-neighbors were very happy with how it was done. May have 1 more day of burning in a month or so.

- Public works staff continues to trim trees that are overhanging the streets throughout the city.
- On Sunday, February 15, was National School Resource Officer Day, thank you to Max Erickson and the PDC School District for supporting this essential position.
- Eric Lingford from the WWTF passed away last week and his way home from a vacation our thoughts and prayers are with Eric finance Billie and his entire family.
- Our thoughts and prayers are also with the family of long-term fire fighter and Hoffman Hall employee Dwayne Koecke on his passing.
- There will be a public hearing in the next month on the Sewer Plant upgrades
- PIM for Illinois Street project will take place within the next month stay tuned to the website and Facebook.

9. COMMITTEE REPORTS AND ACTION

A. FINANCE

1. DISCUSSION AND ACTION: Claims – Action: To approve the claims. Motion: Waller, Second: Crary, Voice Vote: 7-0.

2. DISCUSSION AND ACTION: Request from the PDC Fire Association to lease 726 East Blackhawk Avenue from the City of Prairie du Chien upon completion of the new Public Safety Center. – No action.

B. PERSONNEL

1. DISCUSSION AND ACTION: Policy 2026-01 Volunteers for the City of Prairie du Chien. – Action: To approve Policy 2026-01 Volunteers. Motion: Crary, Second: Bremmer, Voice Vote: 7-0.

C. PLAN COMMISSION

1. DISCUSSION AND ACTION: on Plat Review - Being Part of Lot 1 of Certified Survey Map No. 1424, Document No. 330371 Volume 12, Page 66, 66A and 66B, Located in Farm Lot 39 of the Private Land Claims at Prairie du Chien, City of Prairie du Chien, Crawford County, Wisconsin. – brought Northeast Iowa Telephone Co. – Action: To approve the CSM for Northeast Iowa Telephone Co. Motion: Bremmer, Second: Waller, Voice Vote: 7-0.

2. DISCUSSION AND ACTION: on Plat Review - Being Part of Lot 1 of Certified Survey Map No. 325, Document No. 217100, Volume 2, Page 99 and 99A, Located in Farm Lot 30 of the Private Land Claims at Prairie du Chien, City of Prairie du Chien, Crawford County, Wisconsin. – brought Northeast Iowa Telephone Co. - Action: To approve the CSM for Northeast Iowa Telephone Co. Motion: Waller, Second: Ringgold, Voice Vote: 7-0.

10. NEW BUSINESS (Including items for future agenda consideration or Committee assignment).

A. DISCUSSION AND ACTION: Review and acceptance of bids for the Illinois Street reconstruction. – Action: To award the low bid to G-Pro for \$ 1,385,376.25 for the Illinois Street Project. Motion: Bremmer, Second: Crary, Roll Call Vote: 7-0.

B. DISCUSSION AND ACTION: Review and acceptance of bids for the Well #5 project. – Action: To approve Contract A for Well 5 for \$253,102.00 to Rock Church Construction and Contract B for Well 5 Pumphouse, SCADA updates and Well #2 demolition to Owens Excavating for \$1,118,047.49. Motion: Bremmer, Second: Ringgold, Roll Call Vote: 7-0.

11. ADJOURN (7:29 P.M.) – Motion: Crary, Second: Waller, Voice Vote: 7-0.

Chad Abram, City Administrator

MINUTES OF THE SPECIAL COMMON COUNCIL February 26, 2026

A meeting of the Prairie du Chien Common Council was held on Thursday, February 26, 2026, at 12:00 P. M. in the Council Chambers of City Hall. Mayor Dave Hemmer called the meeting to order at 12:00 P.M.

GENERAL ITEMS TO BE ACTED UPON

1. Call to order/Roll Call – All present. City Staff present, Mayor Dave Hemmer, Parks and Recreation Director Mike Wallace, City Administrator Chad Abram, and City Planner Nate Gilberts.
2. Certification of the open meeting law agenda requirements and approval of the agenda. Motion: Crary, Second: Ringgold, Roll Call Vote:8-0
3. Pledge of Allegiance: Ringgold

4. ACTION ITEMS

A. DISCUSSION AND ACTION: RESOLUTION 2026-02 AUTHORIZING RESOLUTION FOR OUTDOOR RECREATION GRANT APPLICATIONS. – Action: To approve Resolution 2026-02 and waive the first and second reading. Motion: Crary, Second: Ringgold, Roll Call Vote: 8-0.

5. ADJOURN (12:13 P.M.) – Motion: Crary, Second: Granzow, Voice Vote: 8-0.

Submitted By

Chad Abram
City Administrator

MINUTES OF THE FINANCE COMMITTEE- February 17, 2026

A meeting of the Prairie du Chien Finance Committee was held on Tuesday, February 17, 2026 at 6:30 P.M. in Conference Room 2. Chairperson Vicki Waller called the meeting to order at 6:30

GENERAL ITEMS TO BE ACTED UPON

1. Call to order/Roll Call – All present. City staff present, City Administrator Chad Abram, Police Chief Kyle Teynor, Utility Director Larry Gates, PW Superintendent Nick Gilberts, Fire Chief Tad Beutin, Firefighters Dan Gillitzer and Ben Pintz, City Clerk/Treasurer Tina Fuller, and Mayor Dave Hemmer.
2. Certification of the open meeting law agenda requirements and approval of the agenda. Motion: Bremmer, Second: Ringgold, Voice Vote: 4-0.
3. Approval of the minutes from the February 3, 2026 meeting. Motion: Crary, Second: Ringgold, Voice Vote: 4-0.

ACTION ITEMS

3. DISCUSSION AND ACTION: Claims. – Action: To approve the claims. Motion: Bremmer, Second: Crary, Voice Vote: 4-0.
5. DISCUSSION AND ACTION: Request from the Fire Association to lease the building at 726 East Blackhawk once the Public Safety Center is built. – No action
6. DISCUSSION AND ACTION: Request from Chief Beutin on funding for radios for new Fire Engine. – Action: To approve purchase from Baycom for \$19,116.24 for mobile radio and handholds for the new fire truck. Funds to come from overage paid for the engine. Motion: Bremmer, Second: Crary, Voice Vote: 4-0.
7. ADJOURN (6:52 P.M.) – Motion: Crary, Second: Bremmer, Voice Vote: 4-0.

Chad Abram, City Administrator

City of Prairie du Chien

Consent Agenda for Council Meeting Approval

Name/Event/Description	Event Date	Applying For:
Forever Green Hemp Dispensary 1 LLC dba Forever Green	3/4/2026	Change of Premises for Cigarette, Tobacco, & Electronic Vaping Device Retail License
Friest is requesting change of premises from 108 E Blackhawk Avenue to 126 W Blackhawk Avenue. Background checks were done in 2025 and were good	Bruce Friest -	owner & agent

MEMO

TO: Chad Abram and City Council Members
FROM: Mike Wallace, Director of Parks and Recreation
RE: Fort Fun Update and Playground Equipment Removal
DATE: February 25, 2026

To Whom It May Concern,

I am writing this to give an update on the progress of the Fort Fun Project. The Fort Fun Committee has raised \$350,000.00 of our \$500,000.00 goal for this project. We have been able to accomplish this through generous donations from the community and various fundraising events. We have been working on this project for almost a year and a half. We are hoping to complete our fundraising goal by May of 2026. If we can complete that task, we can have the new all-inclusive, all abilities playground in by the fall of 2026.

To have this progress continue, I am asking the City Council members to grant permission for the Public Works Department to start the removal of the old playground equipment. We would like to have this part completed when the ground is frozen, so the grounds are not disrupted as much.

Mike Wallace
Director of Parks and Recreation

DRAFT
Wastewater Facility Plan

March 3, 2026



City of Prairie du Chien
Wastewater Treatment Facility

WPDES Permit No. WI-0020257-09-0
400 West Lockwood Street
Prairie du Chien, Wisconsin 53821

Prepared by:

Delta 3 Engineering, Inc.

875 S Chestnut St. | Platteville, WI 53818
Phone: (608) 348-5355
mail@delta3eng.biz
www.delta3eng.biz



Project Number: D25-008

TABLE OF CONTENTS

Chapter I – Summary	1
1.1 General	1
1.2 Current and Future Conditions	1
1.3 Recommended Plan.....	1
Chapter II – Introduction.....	4
2.1 General	4
2.2 Purpose.....	4
Chapter III – Current Conditions	5
3.1 Wastewater Flows	5
3.2 Sludge Production.....	8
3.3 Existing Wastewater System.....	9
Chapter IV – Future Conditions	10
4.1 Population Projections.....	10
4.2 Projected Wastewater Flows	12
4.3 Projected Sludge Production.....	14
4.4 Evaluation of Existing Wastewater Treatment Facility	14
Chapter V – Evaluation Of Existing Wastewater Treatment Facility.....	15
5.1 Wastewater Collection System -	15
5.2 Wastewater Department Service Equipment -	17
5.3 Lab & Control Building	18
5.4 Headworks Building	19
5.5 Influent Bar Screen	20
5.6 Influent Monitoring.....	20
5.7 Influent Pumps.....	21
5.8 Screening Equipment	21
5.9 Grit Removal System.....	21
5.10 Aeration Tanks	21
5.11 Chemical Building.....	22
5.12 Chemical Feed System	22
5.13 Final Clarifier	23
5.14 Disinfection System.....	23
5.15 Effluent Monitoring.....	23
5.16 Aerobic Sludge Digesters.....	24
5.17 Truck Fill Station	24
5.18 Blower Building.....	24
5.19 Blowers	25
5.20 Sludge Pumps	26
5.21 Gravity Belt Thickener.....	27
5.22 Sludge Storage Tanks	27
5.23 Sludge Loading Pad	27
5.24 Storage Building	27

5.25	WWTF Site	28
Chapter VI - WPDES Permit Limits		29
6.1	Current Effluent Limits	29
6.2	Future Permit Limits	29
Chapter VII - Recommendations		29
Chapter VIII – General Facility Maintenance		30
8.1	Do Nothing.....	30
8.2	Wastewater Collection System Improvements.....	30
8.3	Wastewater Department Equipment Improvements.....	30
8.4	Lab & Control Building Improvements.....	30
8.5	Headworks Building Improvements.....	32
8.6	Chemical Storage Building Improvements	33
8.7	Final Clarifiers Improvements	34
8.8	Disinfection System Improvements	34
8.9	Effluent Monitoring Improvements.....	35
8.10	Aerobic Sludge Digestors Improvements.....	35
8.11	Blower Building Improvements	35
8.12	RAS/WAS Pump Improvements.....	36
8.13	Site Improvements.....	36
Chapter IX – Sludge Storage Upgrade		38
9.1	Do Nothing.....	38
9.2	New Concrete Storage	38
9.3	Replace Existing GBT.....	38
9.4	New Screw Press and Cake Storage Structure	39
Chapter X – Phosphorus Compliance Upgrade		41
10.1	General	41
10.2	Do Nothing.....	41
10.3	Alternative Discharge Location	41
10.4	Regionalization	41
10.5	Filtration Treatment Technologies	41
10.6	Spray Irrigation.....	42
10.7	Seepage Cells.....	42
10.8	Biological Phosphorus Removal (BPR) with Water Quality Trading (WQT)	43
10.9	Adaptive Management	44
Chapter XI - Alternatives Evaluation.....		45
11.1	Economic Evaluation.....	45
11.2	Non-Economic Evaluation.....	47
Chapter XII - Recommended Plan		52
12.1	Recommended Plan.....	52

APPENDICES

Appendix A – Additional Figures

Appendix B – WPDES Permit

Appendix C – Economic Evaluations

Appendix D – Design Calculations

Appendix E – Parallel Cost

CHAPTER I – SUMMARY

1.1 GENERAL

Chapter I contains a summary of the Wastewater Facility Plan which addresses the need for improvements to the Wastewater Treatment Facility (WWTF) or “facility” serving the City of Prairie du Chien. This report also contains an evaluation of various wastewater treatment process alternatives that could be used by the City to provide adequate wastewater treatment to meet permitted effluent limits.

1.2 CURRENT AND FUTURE CONDITIONS

The City of Prairie du Chien owns and operates a WWTF that was originally constructed in 1956 with many upgrades and repairs completed since. The WWTF currently serves a population of 5,509 persons. The facility currently operates at about 39% (0.775 million gallons per day (MGD)) of its average design flow rate. The WWTF utilizes a standard activated sludge process. The City of Prairie du Chien operates a WWTF consisting of a mechanical screen and grit removal system, aeration tank, final clarifier, and UV disinfection. Activated sludge settled in the final clarifiers is either returned to the reaeration tanks of the process for further treatment or wasted to the gravity belt thickener prior to the aerobic sludge storage tanks, where it is digested and stored prior to land application on DNR-approved sites. The current WWTF treats 0.775 MGD on an annual average with a design flow of 2.0 MGD. The City of Prairie du Chien’s WWTF has one (1) receiving waters and effluent discharge location: an unnamed channel east of the East Channel of the Mississippi river (Outfall 001) which is part of the Rush Creek watershed of the Bad Axe - La Crosse River Basin in Crawford County. Please refer to Figure 1.1 – WWTF Flow Schematic and Figure 1.2 – Treatment Facility Site in Appendix A for components of the existing WWTF.

The WWTF has been able to consistently meet its Wisconsin Pollutant Discharge Elimination System (WPDES) Permit limits for the outfall location and is likely to continue meeting their limits. However, components of the WWTF are considered out date and have a high probability of being unsafe to operators. Therefore, The City has begun the facility planning process.

1.3 RECOMMENDED PLAN

The existing facility provides adequate wastewater treatment. The City’s current WPDES Permit expired on June 30, 2023. Based on the existing condition of the City’s WWTF, the City has identified the following as primary needs at the facility:

- General Facility Maintenance
- Sludge Storage Upgrade
- Phosphorus Compliance Upgrade

The estimated average annual Residential User Sewer Charge would increase **\$97.96** in order to construct, operate, and maintain all of the proposed Recommendations.

Chapter VIII – General Facility Maintenance -

The City recently evaluated the condition, age, and efficiency of various processes, structures, and equipment. Most of the structures and equipment are original to the 1995 WWTF Upgrade and are now in excess of 30 years old. After evaluating the existing WWTF the City has identified the general maintenance needs at the facility as follows:

- Wastewater Collection System Improvements
 - New Lift Station Site Lights
- Wastewater Department Equipment Improvements
 - 1/2-Ton Truck Replacement
 - 3/4-Ton Truck Replacement

- Jetter/Vac Truck Replacement
- Sewer Camera Replacement
- New Trash Pump
- Lab & Control Building Improvements
 - MCC Replacement
 - New SCADA System
 - Building Maintenance
 - Standby Generator Replacement
- Headworks Building Improvements
 - Screening Improvements
 - Grit Classifier and Piping Improvements
 - Raw Wastewater Pumps Replacement
 - Building Maintenance
- Chemical Storage Building Improvements
 - Chemical Storage Tanks Replacement
 - Chemical Feed Pumps and Piping Replacement
 - Building Maintenance
- Final Clarifiers Improvements
 - Final Clarifier #2 Rehabilitation
 - General Maintenance
- Disinfection System Improvements
 - UV Structure Rehabilitation
- Effluent Monitoring Improvements
 - Effluent Monitoring Improvements
- Aerobic Sludge Digestors Improvements
 - Aeration System Replacement
- Blower Building Improvements
 - New Blower Building
 - Blowers Replacement
- RAS/WAS Pump Station Improvements
 - Plug Valves Replacement
 - Sludge Pumps Replacement
- Site Improvements
 - Storage Building Improvements
 - Truck Fill Station Relocation
 - Site Lighting Improvements
 - New Solar Panels

The City intends to perform these maintenance items as necessary or convenient. The estimated average annual Residential User Sewer Charge would increase to **\$82.32** by performing all of the above maintenance items.

Chapter IX – Sludge Storage Upgrade Alternatives -

Due to the existing condition of the Gravity Belt Thickener (GBT) and associated appurtenances, Waste Activated Sludge (WAS) is sent directly to the aerobic sludge digestors. This deficiency causes the percent solids of the sludge to decrease which increases the amount of sludge storage necessary for holding the sludge. Alternatives for improving sludge storage and management include construction of a new concrete storage structure, replacement of the existing GBT, and installation of a new screw press with a cake storage structure. These alternatives can be viewed in Chapter IX – Sludge Storage Upgrade. After considering economic and non-economic factors associated with the alternatives, it is recommended the City proceed with Alternative 9.4 – New Screw Press with Cake Storage Structure.

The estimated average annual Residential User Sewer Charge would increase **\$5.22** in order to construct, operate, and maintain Alternative 9.4 – New Screw Press with Cake Storage Structure.

Chapter X – Phosphorus Compliance Upgrade Alternatives -

Many alternatives were considered, including Water Quality Trading (WQT), an alternate discharge location, regionalization, a filtration system, spray irrigation, seepage cells, and Biological Phosphorus Removal (BPR). These alternatives can be viewed in Chapter X – Phosphorous Compliance Upgrade. After considering economic and non-economic factors associated with the alternatives, it is recommended the City proceed with Alternative 10.9 – BPR with WQT.

The estimated average annual Residential User Sewer Charge would increase **\$10.42** in order to construct, operate, and maintain Alternative 10.8 – BPR with WQT.

Table 1.1 shows the Proposed Facility Schedule including milestone dates.

Table 1.1 - Project Schedule

Required Action	Due Date
Submit Plans and Specifications	September 30, 2027
Begin Construction	April 30, 2028
Complete Construction	October 31, 2029

CHAPTER II – INTRODUCTION

2.1 GENERAL

The City of Prairie du Chien is located at the intersection of State Trunk Highway (S.T.H.) '35' and S.T.H. '27' in Crawford County in southwestern Wisconsin and is located at the confluence of the Wisconsin River with the Mississippi River. The City currently has a population of 5,509 people and collects wastewater from the Town of Prairie du Chien (population 955) and the Town of Bridgeport (population 1,031). The City is located along the Mississippi River with grades sloping throughout the area in the range of 1% to 8%. Elevations in the area range from approximately 635' ± at the Wastewater Treatment Facility (WWTF) to 875± at the water reservoirs. Please refer to Figure 2.1 – Location and Topography Map and Figure 2.2 – Wetland Map in Appendix A.

The existing WWTF for the City of Prairie du Chien is located at 400 West Lockwood Street (Section 1, Town 6 North, Range 7 West of the Fourth Principal Meridian). The WWTF property is owned by the City of Prairie du Chien and is confined to the west by the Mississippi River.

The City currently operates a standard activated sludge treatment system. The City of Prairie du Chien operates a WWTF consisting of a manual bar screen and grit removal system, aeration tank, final clarifier, and UV disinfection. Activated sludge settled in the final clarifiers is either returned to the reaeration tanks for further treatment or wasted to the gravity belt thickener prior to the aerobic sludge storage tanks, where it is digested and stored prior to land application on DNR-approved sites. Currently, Alum is added to assist in the removal of phosphorus. This facility was originally constructed in 1956 with many upgrades and repairs completed since. Major upgrades include the 1971 Upgrade which introduced secondary treatment to the facility's process and the 1995 Upgrade which greatly increased the treatment capacity and efficiency of the WWTF. The current WWTF treats 0.775 million gallons per day (MGD) on an annual average with a design flow of 2.0 MGD. The City of Prairie du Chien's WWTF has one (1) receiving waters and effluent discharge location: an unnamed channel east of the East Channel of the Mississippi river (Outfall 001) which is part of the Rush Creek watershed of the Bad Axe - La Crosse River Basin in Crawford County. For hydrologic information regarding the WWTF site, see Figure 2.1 – Location and Topography Map and Figure 2.2 – Wetland Map in Appendix A.

This Wastewater Facility Plan contains the results of our evaluation regarding current and future treatment capacity needs and recommendations regarding how those needs may be met.

2.2 PURPOSE

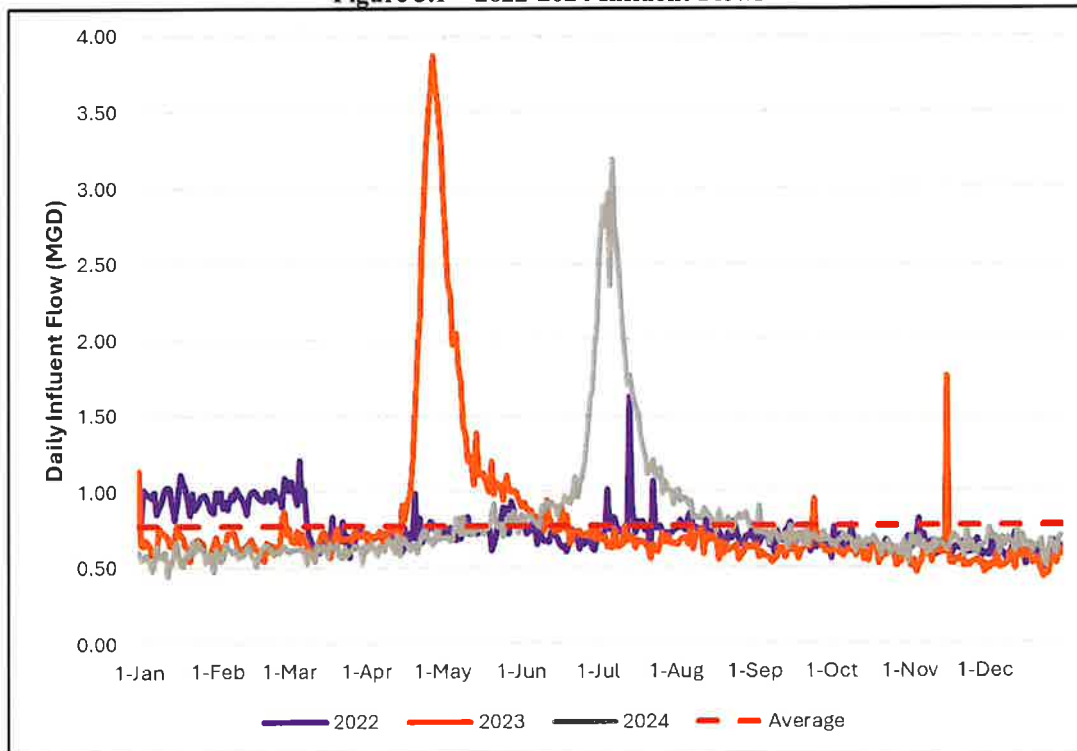
This Wastewater Facility Plan will address the need for improvements to the WWTF to satisfy its future WPDES Permit effluent limits and to continue to provide adequate treatment for the next 20 years. This report will first address the current conditions including population, flows, and the condition of the WWTF. The next section will address treatment needs for the next 20 years. After establishing the design parameters, wastewater treatment alternatives will be developed and evaluated with monetary and non-monetary criteria. Finally, this report will contain recommendations for the City to effectively manage their wastewater treatment for the future.

CHAPTER III – CURRENT CONDITIONS

3.1 WASTEWATER FLOWS

Monthly Wastewater Discharge Monitoring reports from the City were reviewed to obtain WWTF effluent flows and loadings data for the period of January 2022 through December 2024. The data includes influent flow, biochemical oxygen demand (BOD₅), and total suspended solids (TSS) concentrations. Influent flows for this period of time are provided below in Figure 3.1. Figures 3.2 and 3.3 below depict current BOD₅ and TSS respectively.

Figure 3.1 – 2022-2024 Influent Flows



According to the influent flow data, average daily influent flow rates have remained consistent around 0.775 MGD. In 2024, the WWTF received an average daily flow of 0.792 MGD. However, the influent flow data does not directly correlate with water use provided in the Public Service Commission report. Water use correlates with sewer volume charges. Average water use within the City of Prairie du Chien and the Town of Bridgeport in 2024 was approximately 0.697 MGD and 0.05 MGD respectively. The difference in water use compared to influent flow data is likely attributed to inflow and infiltration (I&I). For design purposes, the City intends to use the current influent flow as a baseline for future design flow estimates. The City monitors flow contributions from the Township's and other areas outside the City limits that discharge to the WWTF, the flows contributions are provided in Table 3.1. Current average daily flow estimates for the City, divided by category, for 2024 are provided in Table 3.2. The peak flow from 2022 through 2024 was 3.87 MGD in 2023. However, this was not a typical peak flow condition as it occurred following flooding of the Mississippi River. Per NR 110, for a community of 1,000 – 10,000 people, a typical peaking factor would be between 3.0 – 3.5. Expected peak daily flow would therefore be between 2.33 – 2.71 MGD. Assuming a peak daily flow of 2.71 MGD, peak hourly flow can be estimated using a peaking factor of 1.5 to convert peak day to peak hour. The estimated peak hourly flow rate would be 4.07 MGD.

Table 3.1 – Current Flow Contributions

Location	Residential Flow (gal/day)	Commercial Flow (gal/day)	Industrial Flow (gal/day)	Public Authority (gal/day)	Multi-Family (gal/day)
City of Prairie du Chien	211,353	144,438	225,438	97,189	18,641
Township of Bridgeport	19,112	24,427	4,227	282	5,871
Total	230,465	168,865	229,665	97,471	24,512

Table 3.2 – Current Average Daily Flow

Category	Number of Users	Influent Flow (gallons/day)	Percent of Total
Residential (40 gal/capita-day)	2,110 (5,774 capita)	230,465	29%
Commercial (516 gal/user-day)	327	168,865	22%
Industrial (5,468 gal/user-day)	42	229,665	29%
Public Authority (1,572 gal/user-day)	62	97,471	12%
Multi-Family (645 gal/user-day)	38	24,512	3%
Inflow and Infiltration (136 gal/day-in-mile)	-	40,705	5%
Total	-	791,683	100%

Since 2022, the WWTF has had 25 days that have exceeded the facilities design flow and 2 significant I&I events which are indicated by spikes in the Influent Flow in Figure 3.1. Limited I&I indicates that the existing collection system is in good operating condition and is directly related to maintenance projects that the City has performed within the sanitary collection system. The City intends to continue performing maintenance projects within the sanitary collection system based on information gathered from field inspections as well as sanitary sewer televising reports. The City also intends to continue the enforcement of the City Sewer Use Ordinance which prohibits clear water discharges to the sanitary sewer.

The existing flow conditions were calculated as a percentile of the 2022-2024 data set. Existing flow conditions are outlined in Table 3.3 below. Percent exceedance provided for each parameter are as follows:

Table 3.3 – Existing Flow Conditions

Parameter	Flowrate (MGD)	Peak Factor
Average Daily Flow (50% Exceedance)	0.683	1.0
Peak Monthly Flow (8.3% Exceedance)	1.009	1.5
Peak Weekly Flow (1.92% Exceedance)	2.288	3.4
Peak Daily Flow (0.27% Exceedance)	3.650	5.3
Peak Hourly Flow (0.011% Exceedance)	3.831	5.6

Figure 3.2 – 2022-2024 BOD₅ Loading

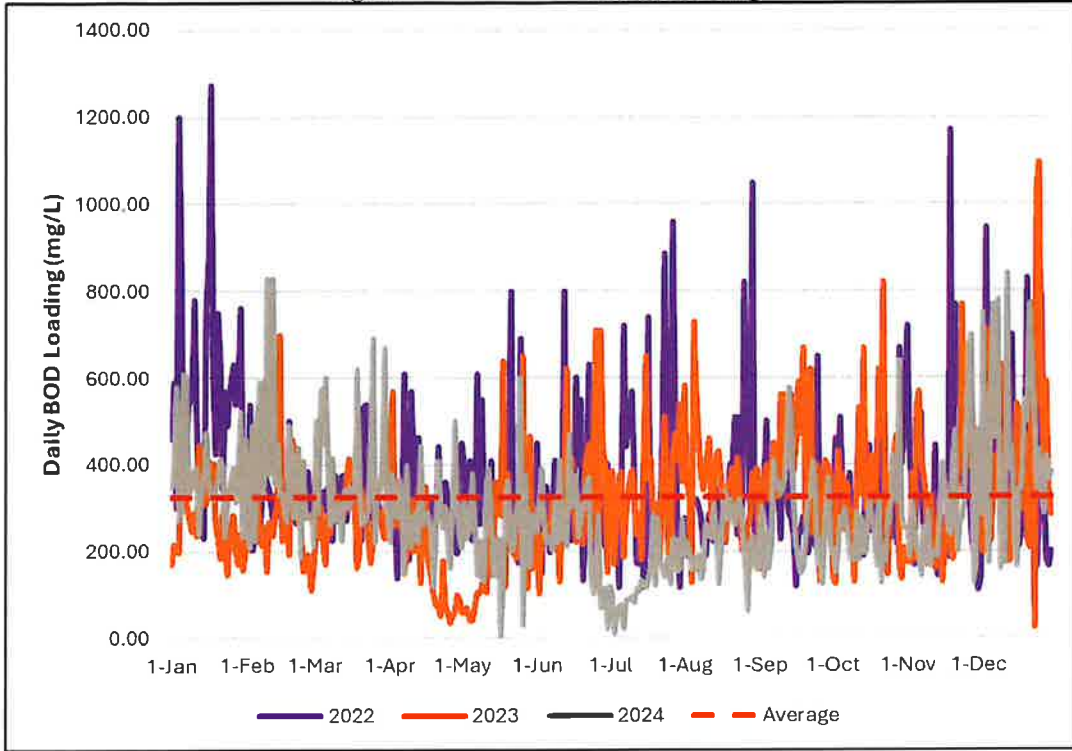
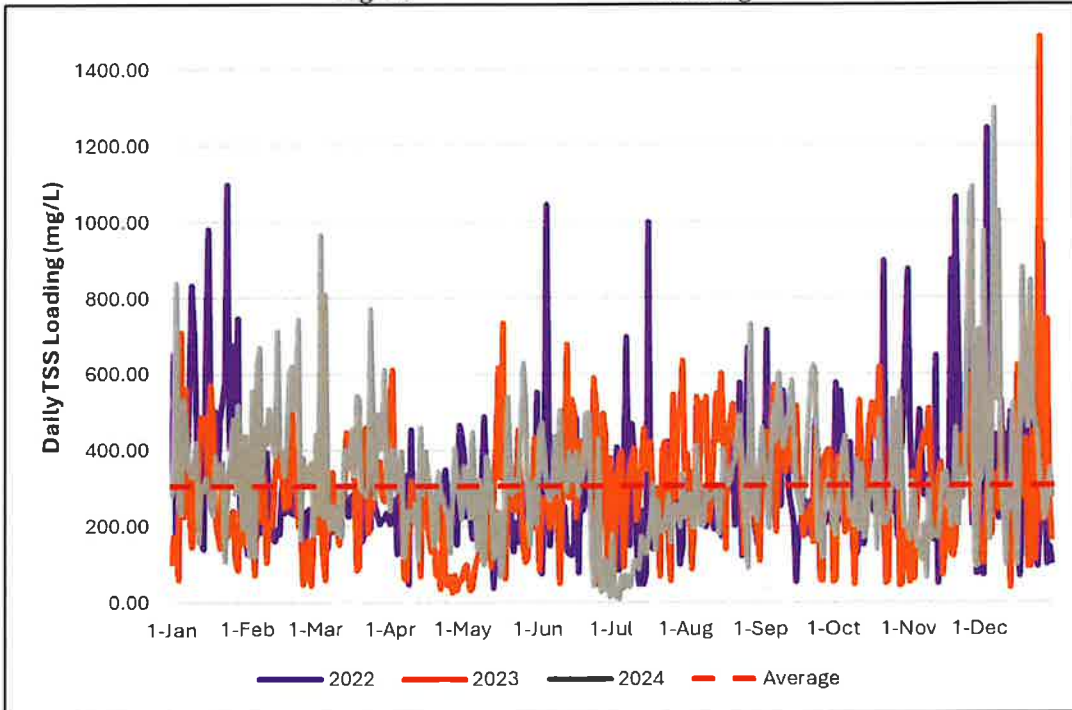


Figure 3.3 – 2022-2024 TSS Loading



The facility has historically not monitored influent or effluent Ammonia-Nitrogen (NH₃-N) or influent Total Phosphorus (TP) concentrations. Typical residential wastewater concentrations of 25 mg/L NH₃-N and 5 mg/L TP were used for planning purposes. Current average day flows and loadings for 2024 are summarized below in Table 3.4.

Table 3.4 – Current Average Day Flows and Loadings

Parameter	Average Concentration	Average Daily Loading
Influent Flow	-	0.792 MGD
BOD ₅	295 mg/L	1,949 lbs./day
TSS	326 mg/L	2,153 lbs./day
NH ₃ -N	25 mg/L	165 lbs./day
TP	5 mg/L	33 bs./day

3.2 SLUDGE PRODUCTION

For the years 2022 through 2024, the WWTF has produced an annual average of 1,065,333 gallons of sludge at 3.00% solids. The WWTF currently land applies regularly and has no issues with storage capacity or sludge management. The WWTF currently has 834,690 gallons of liquid biosolid storage capacity which meets and exceeds the 180-day minimum required by DNR.

Table 3.5 lists the annual sludge volume, percent solids, mass sludge, and pounds hauled in the years 2022 to 2024.

Table 3.5 – Annual Sludge Production

Year	Volume Hauled (Gallons)	Percent Solids (%)	*Calculated Mass Sludge (Dry Ton)	Calculated Mass Sludge (lbs.)	Daily Sludge Production (lbs./day)
2022	870,000	3.17	115.0	230,009	630.2
2023	910,000	3.19	121.1	242,102	663.3
2024	1,416,000	2.62	154.7	309,407	847.7
Average	1,065,333	3.00	130.0	260,506	713.7

*Calculated Mass Sludge (Dry Tons) = Volume (gallons) x Percent Solids (%) x 0.0000417

Under current operating conditions, the WWTF produces approximately 2,920 gallons of sludge daily. Sludge production over the last three (3) years has increased but is anticipated to remain between 900,000 – 1,400,000 gallons. The WWTF has adequate sludge storage and should have no issues handling sludge within the near future.

From Table 3.5 above, the average daily sludge loading in 2024 was 847.7 lbs./day, which equals 309,407 lbs. sludge/year. In 2024, BOD₅ loadings were approximately 1,949 lbs. BOD₅/day, which equals 711,385 lbs. BOD₅/year. Utilizing this information, a Sludge to BOD₅ Ratio of 0.435 lbs. sludge/lb. BOD₅ was calculated as demonstrated below.

$$\text{Sludge to BOD}_5 \text{ Ratio} = 309,407 \text{ lbs. sludge} / 711,385 \text{ lbs. BOD}_5 = 0.435 \text{ lbs. sludge} / \text{lb. BOD}_5$$

The Sludge to BOD₅ Ratio is relatively low compared to similar facilities. For design purposes, **0.43** lbs. sludge per lb. BOD₅ will be used as a typical value.

3.3 EXISTING WASTEWATER SYSTEM

This facility was originally constructed in 1956 with facility upgrades in 1971, 1982, 1987, 1992, 1995, and 1997. Major upgrades include the 1971 Upgrade which introduced secondary treatment to the facility's process and the 1995 Upgrade which greatly increased the treatment capacity and efficiency of the WWTF. The current WWTF provides secondary wastewater treatment with a standard activated sludge process. The WWTF is located at 400 West Lockwood. The WWTF operates and is regulated under the requirements of its Wisconsin Pollutant Discharge Elimination System (WPDES) Permit # WI-0020257-09-0.

The existing sanitary sewer collection system consists of individual sewer laterals from residents, businesses, industries, churches, and schools within the City limits and surrounding Townships, which discharge wastewater to sanitary sewer mains. The collection system consists of approximately 608 sanitary sewer manholes; and approximately 30 miles of sanitary sewer. Eight (8) lift stations are utilized throughout the system along with sanitary force main to assist with the delivery of wastewater to the WWTF. Please refer to Figure 3.4 – Sanitary Sewer Map in Appendix A for location of sanitary sewer collection system components. Sections of the existing sanitary collection system have been replaced in past years as various street construction projects were completed throughout the City to assist in the reduction of I&I. The City will continue to replace sections of the sanitary collection system as street construction projects progress based on the type of sanitary sewer main and its current condition.

From the influent force main the wastewater first enters the influent structure where wastewater passes through a manual bar screen for removal of inorganic materials and large debris then a grit trap for small debris. The chemical is injected prior to the aeration tanks for total phosphorus treatment. The chemical used is Alum which allows further coagulation and flocculation to aid in the removal of total phosphorus from the wastewater. The wastewater then enters the aeration tank which combines the influent with activated sludge for secondary treatment. Wastewater then enters the final clarifier where activated sludge solids and coagulated phosphorus molecules flocculate and settle. The final clarifier discharges effluent to the UV disinfection channel for disinfection prior to gravity discharge to Outfall 001. A site map of the existing facility and piping is provided in Figure 1.2 in Appendix A. The design flow for the existing WWTF is 2.0 MGD with a peak daily design flow of 3.66 MGD and a peak hourly flow of 5.00 MGD.

Table 3.6 summarizes the original design flows and loadings for the existing WWTF.

Table 3.6 – 1995 WWTF Design Flow and Loadings

Parameter	Average Day
Average Daily Flow	2.00 MGD
Peak Daily Flow	3.66 MGD
Peak Hourly Flow	5.00 MGD
BOD ₅	2,690 lbs./day
TSS	2,080 lbs./day

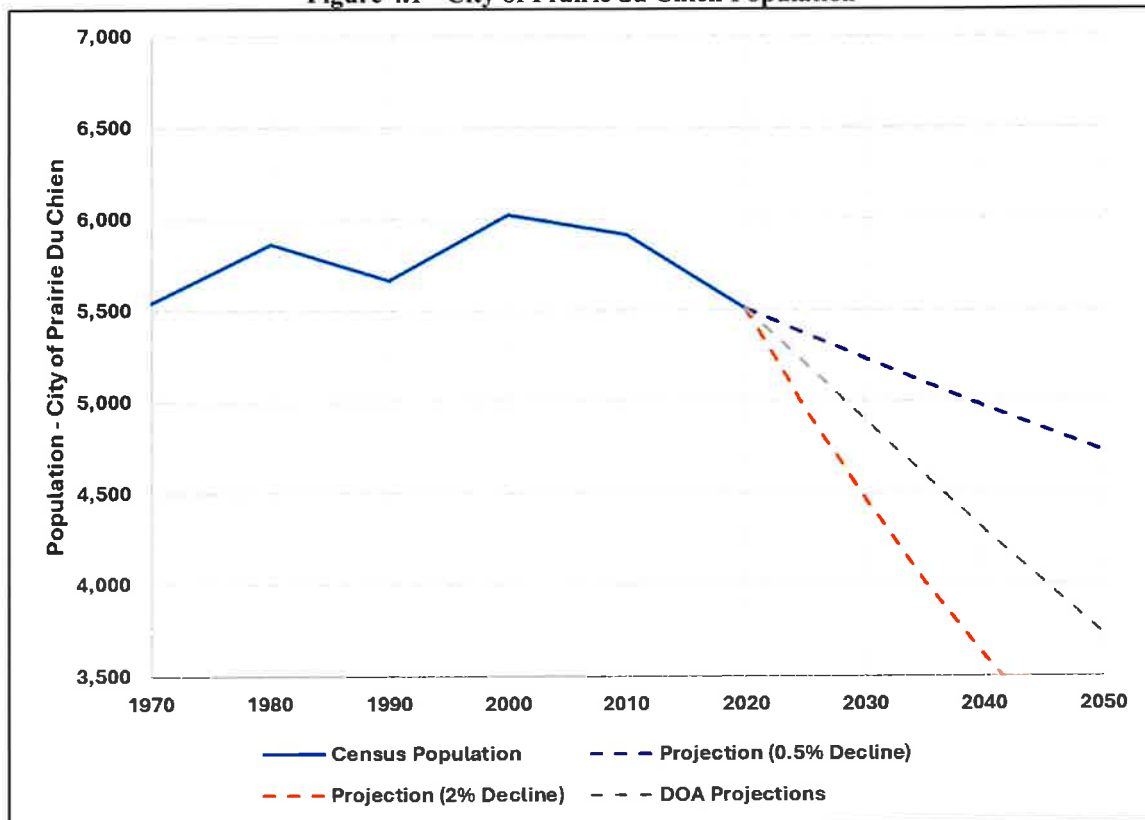
CHAPTER IV – FUTURE CONDITIONS

4.1 POPULATION PROJECTIONS

As mentioned, the Prairie du Chien WWTF receives wastewater from three municipalities, the City of Prairie du Chien, the Town of Prairie du Chien, and the Town of Bridgeport. The City of Prairie du Chien is the main contributor to the WWTF and has a population of approximately 5,509. The Town of Bridgeport has a population of approximately 1,031.

The City of Prairie du Chien is the largest municipality feeding the WWTF. The U.S. Census Bureau estimated the 2025 population of the City of Prairie du Chien at 5,509 people. In 1970, the population was 5,540 and grew steadily to a population of 6,018 in 2000 and has declined since. Figure 4.1 demonstrates the change in U.S. Census Bureau population over time while also providing population projections through 2050 for the City of Prairie du Chien.

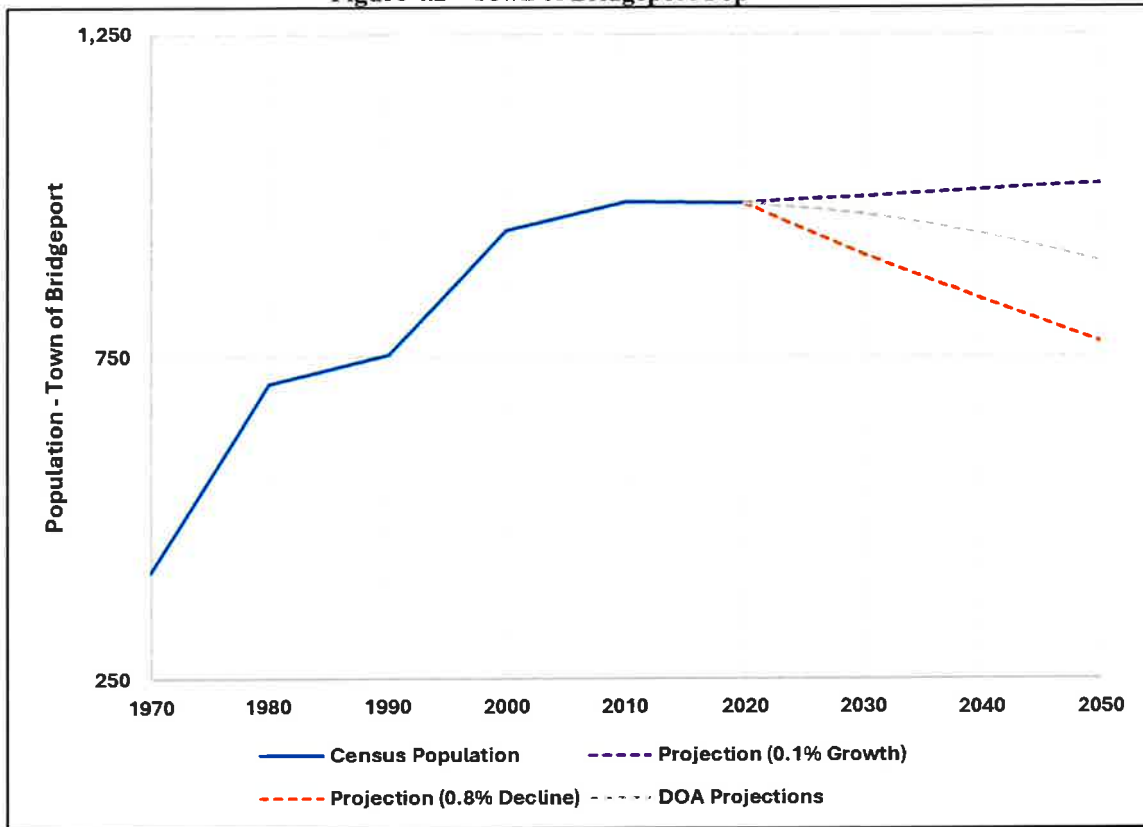
Figure 4.1 - City of Prairie du Chien Population



The City of Prairie du Chien has experienced population decline over the past 25 years, and it is projected that this trend will continue for the next 25 years. For design purposes, due to recent reductions in population, the design population for the City over the next 25 years will be approximately **3,725 people**, using the **DOA Projections**.

The Town of Bridgeport also inputs wastewater to the WWTF. The U.S. Census Bureau estimated the 2025 population of the Town of Bridgeport at 1,031 people. In 1970, the population was 416 and grew steadily to a population of 946 in 2000. Figure 4.2 demonstrates the change in U.S. Census Bureau population over time while also providing population projections through 2050 for the Town of Bridgeport.

Figure 4.2 - Town of Bridgeport Population



The Town of Bridgeport, unlike the City of Prairie du Chien, has experienced a steady increase in population over the past 25 years, however it is projected that the population will decline slightly in the next 25 years. So, for design purposes, the design population for the Town over the next 25 years will be approximately **899 people**, using the **DOA Projections**.

The Town of Bridgeport currently serves an estimated 265 residents. However, according to the DOA population projections, the Town is expected to experience an overall 9% decrease in population between 2020 and 2050. Assuming the population served changes proportionally with the total population, the number of residents served would decrease from approximately 265 to 241 people.

Table 4.1 summarizes the projected population for the City of Prairie du Chien and the Town of Bridgeport.

Table 4.1 – Projected Municipality Populations

Municipality	2020 Census	2050 DOA Projection	2050 Projected Population Served by City of Prairie du Chien
City of Prairie du Chien	5,506	3,725	3,725
Town of Bridgeport	988	899	241
Total	6,494	4,624	3,966

4.2 PROJECTED WASTEWATER FLOWS

Given the long-term population trend of the City, flows are expected to decrease slowly over time based on the anticipated decrease in population. Since flows are anticipated to decrease, the current flow is the highest anticipated flow for the design period and will therefore be used for design flow and loading calculations as demonstrated below.

Inflow and infiltration will likely increase as the collection system ages. Typical I&I within a collection system range from 100 to 10,000 gal/day-in.-mile. Based on 30 miles of 10” sanitary sewer at 200 gal/day-in.-mile as allowed per NR 110.13(2)(k)1, the City should expect I&I loading of approximately 60,000 gal/day. Projected flow contributions for the City of Prairie du Chien and the Town Bridgeport are provided in Table 4.2. Projected flows to the WWTF for each category are provided in Table 4.3.

Table 4.2 – Projected Flow Contributions

Location	Residential Flow (gal/day)	Commercial Flow (gal/day)	Industrial Flow (gal/day)	Public Authority (gal/day)	Multi-Family (gal/day)
City of Prairie du Chien	149,000	142,250	210,000	110,000	14,250
Township of Bridgeport	17,410	22,230	3,850	250	5,350
Total	166,410	164,480	213,850	110,250	19,600

Table 4.3 – Projected Average Daily Flow

Category	Number of Users	Influent Flow (gallons/day)	Percent of Total
Residential (40 gal/capita-day)	1,450 (3,966 capita)	158,640	25%
Commercial (520 gal/user-day)	250	130,000	20%
Industrial (5,500 gal/user-day)	35	192,500	30%
Public Authority (1,575 gal/user-day)	55	86,625	13%
Multi-Family (650 gal/user-day)	30	19,500	3%
Inflow and Infiltration (200 gal/day-in-mile)	-	60,000	9%
Total	-	647,265	100%

Residential = 40 gpcd x 3,966 capita = 158,640 gpd
 Commercial = 520 gpud x 250 users = 130,000 gpd
 Industrial = 5,500 gpud x 35 users = 192,500 gpd
 Public Authority = 1,575 gpud x 55 users = 86,625 gpd
 Multi-Family = 650 gpud x 30 users = 19,500 gpd
 Inflow and Infiltration = 200 gpimd x 300 in-miles = 60,000 gpd

Projected flows are outlined below:

- Projected Average Daily Flow = **0.647 MGD**
- Projected Peak Month Flow = **0.970 MGD** = 0.647 MGD x 1.5 (Peaking Factor)
- Projected Peak Week Flow = **2.200 MGD** = 0.647 MGD x 3.4 (Peaking Factor)
- Projected Peak Daily Flow = **3.429 MGD** = 0.647 MGD x 5.3 (Peaking Factor)
- Projected Peak Hourly Flow = **3.623 MGD** = 0.647 MGD x 5.6 (Peaking Factor)

Based on previous influent BOD5 data, the influent BOD5 concentration is approximately 295 mg/L.

- Projected BOD5 Loading = **323 mg/L**
1,742 lbs./day = 0.647 MGD x 323 mg/L x 8.34

Based on previous influent TSS data, the influent TSS concentration is approximately 306.0 mg/L.

- Projected TSS Loading = **306 mg/L**
1,651 lbs./day = 0.647 MGD x 306 mg/L x 8.34

Based on typical influent NH₃-N data, the influent NH₃-N concentration is approximately 25 mg/L.

- Projected NH₃-N Loading = **25 mg/L**
135 lbs./day = 0.647 MGD x 25 mg/L x 8.34

Based on typical influent TP data, the influent TP concentration is approximately 5 mg/L.

- Projected TP Loading = **5 mg/L**
27 lbs./day = 0.647 MGD x 5 mg/L x 8.34

Since the projected flows and loadings are less than the current flows and loadings, the current flows and loadings will be used for Design as provided below:

Design flows and loadings are outlined below:

- Design Average Daily Flow = **0.792 MGD**
- Design Peak Month Flow = **1.188 MGD** = 0.792 MGD x 1.5 (Peaking Factor)
- Design Peak Week Flow = **2.693 MGD** = 0.792 MGD x 3.4 (Peaking Factor)
- Design Peak Daily Flow = **4.198 MGD** = 0.792 MGD x 5.3 (Peaking Factor)
- Design Peak Hourly Flow = **4.435 MGD** = 0.792 MGD x 5.6 (Peaking Factor)

- Design BOD5 Loading = **295 mg/L**
1,949 lbs./day = 0.792 MGD x 295 mg/L x 8.34

- Projected TSS Loading = **326 mg/L**
2,153 lbs./day = 0.792 MGD x 326 mg/L x 8.34

- Projected NH₃-N Loading = **25 mg/L**
165 lbs./day = 0.792 MGD x 25 mg/L x 8.34

- Projected TP Loading = **5 mg/L**
33 lbs./day = 0.792 MGD x 5 mg/L x 8.34

4.3 PROJECTED SLUDGE PRODUCTION

Given the long-term population trend, socioeconomic factors, commercial and industrial presence within the City, flows and loadings are expected to remain consistent if not decrease over time. With additional sludge storage, the City is anticipated to optimize sludge digestion and thickening. Design for sludge solids will be 3.0% solids. Calculations for the projected sludge production are provided below to better understand the choice to design for the current condition:

Projected Sludge Production –

$$BOD_5 \text{ (lbs./day) (Based on Current Influent Data) = } \mathbf{1,949 \text{ lbs./day}}$$

$$\text{Mass Sludge (lbs./day) = } BOD_5 \text{ (lbs./day) } \times 0.43 \text{ Sludge / } BOD_5 \text{ Ratio} = \mathbf{838 \text{ lbs./day}}$$

$$\text{Volume Sludge (gal/day) = } \text{Mass Sludge (lbs./day) / } 1.02 \text{ (Specific Gravity of Sludge Solids) / } 8.34 \text{ lbs./gal (Water Density) / } 0.03 \text{ (Percent Solids) = } \mathbf{3,284 \text{ gal/day}}$$

The Operator currently has had no difficulties hauling sludge and is expected to remain well over the 180-day minimum required by DNR for holding sludge and will need to monitor its sludge storage to ensure it remains above the DNR minimum. Utilizing 3,284 gal/day, the City would be required to store 591,120 gallons for 180 days. Since the existing sludge storage facilities can store approximately 834,690 gallons currently, there is no need for additional sludge storage.

4.4 EVALUATION OF EXISTING WASTEWATER TREATMENT FACILITY

An evaluation of the WWTF was conducted in 2023. This included the investigation of the structures, buildings, treatment process equipment, controls, electrical, HVAC, plumbing, and other entities within the WWTF. The following sections will provide details of the currently known existing conditions.

CHAPTER V – EVALUATION OF EXISTING WASTEWATER TREATMENT FACILITY

5.1 WASTEWATER COLLECTION SYSTEM -

The existing sanitary sewer collection system consists of individual sewer laterals from residents, businesses, churches, and schools within the City limits which discharge wastewater to sanitary sewer mains. The collection system consists of approximately 608 sanitary sewer manholes; and approximately 30 miles of sanitary sewer. Eight (8) lift stations are utilized throughout the system along with sanitary force main to assist with the delivery of wastewater to the WWTF. Please refer to Figure 3.4 – Sanitary Sewer Map in Appendix A for location of sanitary sewer collection system components. Sections of the existing sanitary collection system have been replaced in past years as various street construction projects were completed throughout the City to assist in the removal of I&I. The City will continue to replace sections of the sanitary collection system as street construction projects progress based on the type of sanitary sewer main and its current condition.

1) Lift Station #1 – Cabela’s

Lift Station #1 is located within the north portion of the City adjacent to the south side of Prairie Pulverizing Inc. near the railroad tracks. The lift station is a duplex system provided with two (2) four-inch (4”) Goulds submersible pumps utilizing a precast concrete wet well and guide rail system. Both pump motors are five (5) horsepower, 208 volt. The lift station alarm system is equipped with telemetry that automatically notifies City staff via phone call in the event of power failure, pump failure, high water alarm etc. The lift station structure, pumps, control panel, and monitoring system are in fair working order. Lift Station #1 is in fair working condition. With proper maintenance, the lift station and components should provide the City sufficient years of service.

2) Lift Station #2 – North Main Street

Lift Station #2 is located in the west central portion of the City at the intersection North Main Street and Perry Street. In May 2023, a sanitary sewer overflow (SSO) occurred at the lift station. The SSO was a result of both pumps failing due to running non-stop over a 24-hour period after a prior flood event. City personnel took immediate corrective action and deterred all impacts from the SSO to the maximum extent possible. Since then, both pumps in the lift station have been replaced and the City keeps a spare pump on hand in the unlikely event of both pumps failing again in the future. The lift station is provided with submersible pumps utilizing a precast concrete wet well. The lift station is a duplex system provided with two (2) four-inch (4”) Hydromatic Model S4N, submersible, centrifugal sewage pumps. The pump motors are seven and a half (7.5) horsepower, 230 volt. The lift station alarm system is equipped with telemetry that automatically notifies City staff via phone call in the event of power failure, pump failure, high water alarm etc. The lift station structure, pumps, control panel, and monitoring system are in fair working order. Lift Station #2 is in fair working condition. With proper maintenance, the lift station and components should provide the City sufficient years of service.

3) Lift Station #3 – Washington Street

Lift Station #3 is located in the east central portion of the City at the intersection of Ohio Street and Washington Street. A transfer switch and generator receptacle is included at the control panel for power failures and emergency operation and is in good condition. The lift station is provided with submersible pumps utilizing a precast concrete wet well and guide rail system. The lift station is a duplex system provided with two (2) four-inch (4”) Hydromatic submersible pumps. Both pump motors are seven and a half (7.5) horsepower, 230 volt. The lift station alarm system is equipped with telemetry that automatically notifies City staff via phone call in the event of power failure, pump failure, high water alarm etc. The lift station structure, pumps, control panel, and monitoring system

are in fair working order. Lift Station #3 is in fair working condition. With proper maintenance, the lift station and components should provide the City sufficient years of service.

4) Lift Station #4 – Iowa Street

Lift Station #4 is located in the east central portion of the City on the north side of Iowa Street between Dousman Street and State Street. A transfer switch and generator receptacle is included at the control panel for power failures and emergency operation and is in good condition. The lift station is provided with submersible pumps utilizing a precast concrete wet well and guide rail system. The lift station is a duplex system provided with two (2) four-inch (4") Ebara Model #100DMLEU65.52 submersible, centrifugal sewage pumps. Both pump motors are seven and a half (7.5) horsepower, 208/230 volt. The lift station alarm system is equipped with telemetry that automatically notifies City staff via phone call in the event of power failure, pump failure, high water alarm etc. The lift station structure, pumps, control panel, and monitoring system are in fair working order. Lift Station #4 is in fair working condition. With proper maintenance, the lift station and components should provide the City sufficient years of service.

5) Lift Station #5 – Brunson Court

Lift Station #5 is located in the southeast portion of the City on the south side of Broadway Street between 15th Street and 16th Street. A transfer switch and generator receptacle is included at the control panel for power failures and emergency operation and is in good condition. The lift station is provided with submersible pumps utilizing a precast concrete wet well and guide rail system. The lift station is a duplex system provided with two (2) four-inch (4") Hydromatic Model S4NX750 submersible pumps. Both pump motors are seven and a half (7.5) horsepower, 1750 RPM, 208 volt, 3-phase. The lift station alarm system is equipped with telemetry that automatically notifies City staff via phone call in the event of power failure, pump failure, high water alarm etc. The lift station structure, pumps, control panel, and monitoring system are in fair working order. Lift Station #5 is in fair working condition. With proper maintenance, the lift station and components should provide the City sufficient years of service.

6) Lift Station #6 – Wacouta Avenue

Lift Station #6 is located in the west central portion of the City on the east side of Wacouta Street, south of the Wacouta Street and Glenn Street intersection. A transfer switch and generator receptacle is included at the control panel for power failures and emergency operation and is in good condition. The lift station is provided with submersible grinder pumps utilizing a prefabricated wet well. The lift station is a duplex system provided with two (2) two-inch (2") Hydromatic Model HPG200M2-2 submersible grinder pumps. Both pump motors are two (2) horsepower, 3450 RPM, 230 volt, 1-phase. The lift station alarm system is equipped with telemetry that automatically notifies City staff via phone call in the event of power failure, pump failure, high water alarm etc. The lift station structure, pumps, control panel, and monitoring system are in fair working order. Lift Station #6 is in fair working condition. With proper maintenance, the lift station and components should provide the City sufficient years of service.

7) Lift Station #7 – Crossing Rivers

Lift Station #7 is located within the southeast portion of the City adjacent to Crossing Rivers Health Clinic. The lift station is owned by Crossing Rivers Health but maintained by the City of Prairie du Chien. Electrical is served from Crossing Rivers Health. Backup power is provided by Crossing Rivers Health onsite generator. The lift station is provided with submersible pumps utilizing a precast concrete wet well and guide rail system. The lift station is a duplex system provided with two (2) four-inch (4") Hydromatic submersible pumps. Both pump motors are five (5) horsepower, 480 volt. The lift station alarm system is equipped with telemetry that automatically notifies City staff via phone call in the event of power failure, pump failure, high water alarm etc. The lift station structure, pumps, control panel, and monitoring system are in fair working order. Lift Station #7 is in fair

working condition. With proper maintenance, the lift station and components should provide the City sufficient years of service.

8) Lift Station #8 – Meadow Lane

Lift Station #8 is located in the northern portion of the City at the west end of Meadow Lane on the north side of the street adjacent to the railroad tracks. The lift station is provided with submersible pumps utilizing a precast concrete wet well and guide rail system. The lift station is a duplex system provided with two (2) four-inch (4") Hydromatic submersible pumps. Both pump motors are three (3) horsepower, 208 volt. The lift station alarm system is equipped with telemetry that automatically notifies City staff via phone call in the event of power failure, pump failure, high water alarm etc. The lift station structure, pumps, control panel, and monitoring system are in fair working order. Lift Station #8 is in fair working condition. With proper maintenance, the lift station and components should provide the City sufficient years of service.

5.2 WASTEWATER DEPARTMENT SERVICE EQUIPMENT -

1) Utility Trucks

The Wastewater Department owns a truck fleet including one (1) 2013 Dodge Ram half ton truck and one (1) 2014 Ford F250. The Dodge Ram truck is equipped with a Tommy Lift Tailgate and is utilized to easily load and unload heavy equipment, chemical containers, etc. The Ford F250 is utilized primarily as a transport vehicle for City staff. Both trucks are in fair working condition and have been well maintained. The Utility Trucks are currently in fair condition and should provide the Wastewater Department with continued service for the next five (5) years.

2) Boom Truck

The Wastewater Department owns a 1995 Ford 700 Boom Truck for maintenance within the sanitary sewer system. The Boom Truck is in working order but has developed issues and is near the end of life expectancy. A new utility truck with a crane attachment is recommended to replace the Boom Truck.

3) Jetter/Vac Truck

The Wastewater Department owns a 2015 Freightliner Jetter/Vac Truck that is utilized for maintenance within the sanitary sewer system. This equipment is utilized for the cleaning of sanitary mains, manholes, lift stations, and various tanks and treatment processes within the WWTF. The existing Jetter/Vac Truck is in fair working condition and has been well maintained. The Jetter/Vac Truck is currently in fair condition and should provide the Wastewater Department with continued service for the next five (5) years.

4) Sludge Truck

The Wastewater Department owns a Sludge Truck that is utilized to land apply liquid sludge onto DNR-approved sites. The truck applies sludge via ground injection in order to meet vector attraction reduction requirements as set forth in NR 204.07(7). The truck is a 2011 Freightliner Sludge Truck with a capacity of 3,000 gallons. The Sludge Truck is in fair working condition and has been well maintained. The Sludge Truck is currently in good condition and should provide the Wastewater Department with continued service for the next five (5) years.

5) Sewer Camera

The Wastewater Department owns a 2021 MiniVu Sewer Camera that is utilized for maintenance within the sanitary sewer system. The Sewer Camera has a cable length of 200 feet and is in excellent condition. The Sewer Camera is currently in good condition and should provide the Wastewater Department with continued service for the next five (5) years.

6) Trash Pumps

The Wastewater Department owns two (2) Trash Pumps that are utilized for maintenance within the sanitary sewer system. One pump is a 2019 four-inch (4") Honda portable gas trash pump with a capacity of 380 gpm and 300 feet of hose. The other pump is a 2020 six-inch (6") Generac Venturi Dry Prime mobile diesel trash pump with a 75 horsepower motor and capacity of 2,750 gpm. Both Trash Pumps are in good condition and have been well maintained. The Honda Trash Pumps is currently in good condition and should provide the Wastewater Department with continued service for the next five (5) years. The Generac Trash Pump is in excellent condition and should provide the Wastewater Department sufficient years of service.

7) Portable Generator

The Wastewater Department owns a Portable Generator that is used to provide emergency power to the lift stations and other components of the sanitary sewer system. The Portable Generator is a 2010 Cummins, trailer mounted, diesel powered generator, is in good working condition, and has been well maintained. The Portable Generator is currently in good condition and should provide the Wastewater Department sufficient years of service.

5.3 LAB & CONTROL BUILDING

1) Structure:

The Lab & Control Building is constructed with wood stud or eight-inch (8") load-bearing masonry walls, exterior brick finish, and painted drywall or exposed masonry interior finish over standard depth concrete frost wall. The roof is constructed of pre-engineered wood trusses with standing seam metal roof finish or pre-engineered steel bar joists and metal panel with EPDM roof finish; the metal roof monoslopes to the north and free falls to the grade except above the walk door where a gutter and downspout is present. The standing seam metal roof appears to be in good condition. The metal top cap of the east wall appears to have rusted. All exterior joint sealants are cracked and separated. The exterior brick mortar joints have cracked or deteriorated over time. The exterior brick joint between exterior walls has separated. The exterior brick along the east wall has deteriorated over time and the brick sill below the east wall louver is damaged. All exterior walk doors are metal panel except for the Garage walk door which is wood panel. All metal walk doors appear to be in good/fair condition, but weather stripping is damaged or missing. The existing overhead doors appear to be in good condition. The exterior retaining wall on the north side of the building is failing due to water from the roof creating hydrostatic pressure acting on the retaining wall. Northwest corner of the concrete foundation wall has broken off. The interior floor finishes are exposed concrete or tile. There is floor cracking present at the interior door location between the Lab and Motor Control Center (MCC) Room. The interior ceiling finishes are painted drywall, suspended ceiling, or exposed steel bar joist. The suspended ceiling appears to be in poor condition. Generally, the structure appears to be in good repair with maintenance work required.

2) Electrical, Plumbing, & HVAC:

- Electrical and Lighting – Exterior wall mounted light-emitting diode (LED) wall packs are in working condition. Interior lights are fluorescent ballast fixtures with fluorescent bulbs. Outlets and conduits appear to be in working condition.
- Plumbing – The plumbing within the Lab & Control Building appears to be in working condition. The water heater is 13 or more years old, is working, and nearing its life expectancy.
- HVAC – The Lab & Control Building has two (2) furnaces feeding the Lab, Restroom, Shower/Laundry Room, Utility Room, Breakroom, Office, and Hallway. Unit heaters are present in the Garage, Generator Room, and MCC Electrical Room. The Garage has an exhaust fan

located on the west exterior wall. The Restroom and Shower/Laundry Room have electrical baseboard heaters and exhaust fans. The furnaces are 34 and 39 years old, in working condition, and past their life expectancy. The unit heater in the Garage is 17 years old, in working condition, and nearing its life expectancy. The unit heater located in the MCC Room is 37 years old, in working condition, and past its life expectancy. The unit heater located in the Generator Room age is unknown but appears to be the original to the building. The existing power louvers in the Generator Room are currently not operational, therefore, the operator no longer utilizes the existing automatic transfer switch for the Lab & Control Building Standby Generator.

3) Motor Control Center – Lab & Control Building:

The WWTF has two (2) Motor Control Centers (MCCs). One MCC is located within the Lab & Control Building at the WWTF. This MCC was originally constructed in 1987 and currently controls the Influent Pumps, Grit Pumps, Final Clarifiers, Flood Pump, Truck Fill Station, and Influent Monitoring. The WWTF has two (2) separate power services. One (1) service runs to the Lab and Control Building and is 480 volt, 3-phase power. The other service runs to the Blower Building. The MCC has spare openings on the panel for possible future expansions to possible subpanels within the facility. The MCC is in working order but has developed issues and is near the end of life expectancy.

Alarm signals from the lift stations and WWTF equipment are collected at a master controller located at the Wastewater Treatment Facility Lab & Control Building. The alarms are then relayed to a third-party alarm callout company, Security Plus. Security Plus then calls out to Wastewater Department staff to notify them of the alarm.

No Supervisory Control and Data Acquisition (SCADA) system is in place at the WWTF. SCADA is typically used in a WWTF for the monitoring or controlling wastewater processes and for collecting data within the treatment process.

4) WWTF Standby Generator – Lab & Control Building:

The WWTF is provided with two standby generators for emergency power. One generator is located in the Generator Room of the Lab & Control Building while the other is outside adjacent to the Blower Building. The Lab & Control Building Generator is a Cummins Model 175DGFB 175 kW; 60 Hz; 1800 RPM; 277/480 volt; 3-phase diesel generator and is original to the 1956 WWTF Construction. The Lab & Control Building Generator is sized to power everything associated with the Lab & Control Building, Headworks Building, Disinfection System, Chemical Building, and the Storage Building. The generator runs fairly well however is nearing the end of its life span.

A. Recommendation

Due to the age, condition, and limited flexibility of the existing Lab & Control Building Generator, installation of a new 600 kW generator with adequate standby power for the facility equipment is recommended.

5.4 HEADWORKS BUILDING

1) Structure:

The Headworks Building is constructed with eight-inch (8") load-bearing masonry walls, exterior brick finish, and painted masonry walls over standard concrete frost and basement walls. The roof is constructed of pre-engineered wood trusses and below a standing seam metal roof finish that appears to be in good condition. Gutter and downspouts are present with downspouts discharging above grade. The control joints of exterior walls are dry and cracked. The overhead doors appear to be in working condition, but the weather stripping should be replaced. The exterior walk doors appear to be in good condition except for one door which is in poor condition. The sealants around windows are cracked and need replacing to prevent water from siphoning into the building. The interior wall finishes are painted masonry, painted concrete, or fiber-reinforced plastic (FRP). There is cracking

along the interior masonry wall mortar joints at the north Garage wall and between the Grit Room and the Garage. The masonry joint cracking could be caused by foundation settlement issues. The basement FRP wall finish is deteriorated along lower sections of the wall. The interior floor finish is exposed concrete with multiple floor cracks throughout the building. The interior ceiling finishes are FRP or painted precast ceiling. The caulked precast ceiling panel joints are cracked and separating. The base of the stairs is rusted. Generally, the structure appears to be in need of maintenance work.

2) Electrical, Plumbing, & HVAC:

- Electrical and Lighting – Exterior wall mounted wall packs are LED and in working condition. Interior lights are fluorescent bulbs with ballast fixture. Outlets and conduits appear to be in working condition.
- Plumbing – Water service is piped from the Lab & Control Building and provides water to multiple hose bibbs. Floor drains and floor clean outs for the sanitary are present for the basement and main level. Trench drain and catch basin are located in the Garage. Water and sanitary systems appear to be in working condition.
- HVAC – The Headworks Building has a horizontal forced air unit that is hung from the ceiling located within the Garage. A make-up air unit is installed above the south exterior walk door. The furnace is seven (7) years old and in working condition. The make-up air unit is seven (7) or more years old and in working condition. Exhaust fans located throughout the building appear to be in working condition.

5.5 INFLUENT BAR SCREEN

An Influent Bar Screen is provided at the head of the WWTF to remove rags and other debris entering the facility. The bar screen is susceptible to plugging and requires continual maintenance to remove rags and other inorganics that accumulate on the bars. The Influent Bar Screen is located outside and below ground level. In order to clean the bar screen, the operator must first turn on an exhaust system that removes hazardous elements and odors from the influent structure. The operator then uses a stair descend approximately 23 feet to access the influent structure. Once the operator has removed debris from the screen, the operator has to manually carry the debris up the stairs to the garbage dumpster.

5.6 INFLUENT MONITORING

A 12" Parshall Flume is utilized to measure the influent flow entering the WWTF. The Parshall Flume maintains an accurate depth of flow and utilizes ultrasonic measurement to record the influent flows. The flow is recorded by an Eastech Ultrasonic Flow/Level Meter as required by the City's WPDES Permit.

The Influent Sampler is located in the basement of the Headworks Building. The sampler is an ISCO 5800 refrigerated Sampler. Composite samples are collected with a pump controlled by a timer. Samples are stored in the sampler's refrigerator prior to testing. The Influent Sampler is currently in good operating condition.

Maintenance should include keeping the Parshall Flume clean and in good working order. Because the Parshall Flume and ultrasonic measurement have no moving parts, the unit should provide many years of service to the WWTF. Additionally, the Operator should have a portable dissolved oxygen probe, pH meter, glassware, and other lab equipment for sampling and monitoring the wastewater process.

5.7 INFLUENT PUMPS

Six (6) four-inch (4") Influent Pumps are used to pump influent wastewater to the Screening Equipment. The pumps are Hydromatic S4MXP1000FC submersible, centrifugal sewage pumps with a capacity of 900 gpm at 76 feet TDH. All pump motors are 10 horsepower; 1750 RPM; 460 volt; 3-phase. The pumps are original to the 1956 construction and are in working order but are near the end of life expectancy with over 20,000 hours of operation each.

5.8 SCREENING EQUIPMENT

The WWTF currently utilizes two (2) mechanical screens to remove debris from the raw wastewater. The existing screens are 40" diameter stainless steel Rotomat Drum Screens with one-quarter-inch (1/4") openings. The screens are located after the Influent Pumps and therefore are unable to protect the influent pumps from harmful debris that have passed through the Influent Bar Screen. The Rotomat Drum Screens are of original 1995 installation, in poor condition, and currently not operational.

5.9 GRIT REMOVAL SYSTEM

The Grit Removal System is utilized to remove fine inorganics such as sand from the incoming sewage and disposes of it in an on-site dumpster. The Grit Removal System consists of a 7,660 gallon rectangular concrete Aerated Grit Chamber, two (2) Grit Pumps, and a Grit Classifier. The Grit Pumps are four-inch (4") Fairbanks Morse Model 4422 T-20 centrifugal, indirect drive pumps with a capacity of 500 gpm. The pump motor for Grit Pump #1 is a WATTSaver Model C215T17DB49D with 10 horsepower; 1765 RPM; 230/460 volt; 3-phase. The pump motor for Grit Pump #2 is a Marathon Electric Model 1VA215TTDR4026AN with 10 horsepower; 1745 RPM; 230/460 volt; 3-phase. The Grit Classifier is an Eutek Systems Teacup classifier. The classifier has a diameter of 56 inches and a capacity of 500 gpm. The Grit Removal System is original to the 1995 WWTF Upgrade. The Grit Classifier and dumpster are located in the center of the Headworks Building and cannot be easily accessed for servicing. Also, when the dumpster needs to be emptied, the operator has to push the heavy grit-filled dumpster through the building to the pickup location outside.

5.10 AERATION TANKS

The Aeration Tanks are located towards the center of the WWTF and are utilized to biologically treat influent wastewater. The Aeration Tanks consist of three (3) rectangular concrete tanks with fine bubble diffuser aeration systems. The diffusers distribute air within the tanks for aeration and mixing which is essential to the activated sludge treatment system. The two (2) smaller tanks with a capacity of 147,500 gallons each (Aeration Tanks #1 and #2), were the original final clarifiers constructed in 1956. However, in the 1995 Upgrade, these final clarifiers were repurposed into aeration tanks to increase treatment capacity at the WWTF. Aeration Tank #3 is the larger tank with a capacity of 295,000 gallons and is of the original 1956 construction. All three (3) tanks have a side water depth of 12 feet and a total volume of 590,000 gallons.

Aeration Tanks #1 and #2 are currently operated as an anaerobic and aerobic tank, respectively, as part of an ongoing Biological Phosphorus Removal (BPR) pilot study at the WWTF. Mixers were installed in Aeration Tanks #1 and #2 and operate on timers to maintain solids in suspension. In 2020, the WWTF used 110 tons of Alum and cost the Department \$20,650. Since the implementation of BPR in 2021, treatment at the WWTF has nearly eliminated Alum consumption while reducing effluent Total Phosphorus concentrations below 0.70 mg/L. Alum is currently being added to supplement the BPR treatment and prevent the chemical feed lines from freezing.

A 24" pipe is provided to transfer activated mixed liquor from Aeration Tank #2 to Aeration Tank #3. A leak was observed at the 24" pipe junction box during the evaluation. This leak allows mixed liquor to short circuit the treatment process of Aeration Tank #3.

Due to the inefficient and unreliable mechanical drum screens, excess trash has been allowed to enter the treatment system and has accumulated within the Aeration Tank #1 and Aeration Tank #2. Trash collected on the new mixer propellers and required frequent attention from the WWTF staff to keep mixers running. Inadequate mixing then led to sludge accumulation within the aeration tank along with filamentous bacteria.

The steel safety railing along the tank walls has been well maintained and the structures overall are in good condition.

5.11 CHEMICAL BUILDING

1) Structure:

The Chemical Building is constructed with eight-inch (8") load-bearing masonry walls, exterior painted masonry finish, and metal panel or FRP interior finish over concrete basement wall. The roof is constructed of pre-engineered wood trusses with a standing seam metal roof finish that appears to be in good condition. Gutters and downspouts are not present. The existing exterior windows are in poor condition. Doors appear in good condition, but the weather stripping is damaged or missing. The interior floor finish is exposed concrete. The basement wall finish is painted concrete walls that appear to be in good condition. The interior ceiling finishes are suspended ceiling or exposed precast plank. The suspended ceiling appears to be in poor condition. Generally, the structure appears to be in good repair with maintenance work required.

2) Electrical, Plumbing & HVAC

- Electrical and Lighting – Exterior wall mounted wall packs are LED and in working condition. Interior lights are fluorescent bulbs with ballast fixture. Outlets and conduits appear to be in walking condition.
- Plumbing – The plumbing within the Chemical Building appears to be in working condition.
- HVAC – A unit heater is present in the basement. The unit heater is five (5) years old and in working condition. The exhaust fans appear to be in working condition.

5.12 CHEMICAL FEED SYSTEM

The Chemical Feed System was constructed in the 1997 WWTF Upgrade to help aid in the removal of phosphorus by injecting Alum into the wastewater ahead of the Aeration Tanks. The Chemical Feed System consists of three (3), 2,000 gallon capacity, fiberglass Chemical Storage Tanks. A Chemical Feed Pump is utilized to inject Alum into the wastewater. The Chemical Feed Pump is a Stenner Model 85M5 peristaltic pump with a capacity of 85 gallons per day (gpd). A LMI Model B141-313SI metering pump is located on-site as a spare Chemical Feed Pump. Alum crystallization is present on all storage tanks where leaks have sprung at joints of the tanks. Furthermore, crystallization is present in the majority of associated Chemical Feed System Piping, deterring the efficiency of the system. The existing Chemical Feed System's Chemical Storage Tanks and all associated piping are near the end of life expectancy.

As previously discussed, in 2020, the WWTF used 110 tons of Alum and cost the Department \$20,650. Since the implementation of BPR in 2021, treatment at the WWTF has nearly eliminated Alum consumption while reducing effluent Total Phosphorus concentrations below 0.70 mg/L. Alum

is currently being added to supplement the BPR treatment and prevent the chemical feed lines from freezing.

5.13 FINAL CLARIFIER

1) Structure:

Each Final Clarifier is 56 feet inside diameter, round concrete structures, with a side water depth of 12 feet. Each clarifier is covered with a fiberglass dome and ventilated naturally. Each clarifier has natural ventilation 50% covered. The catwalk into the building is constructed of steel with steel grates, which are not fastened to the catwalk. The painted finish of the exterior and interior surface is chipped/peeling off. Joints of the fiberglass domes are dry and cracking. The concrete steps for each clarifier have shifted away from the entrance and the surface has cracked. Light source is not present at either entrance of the Final Clarifiers. Generally, the structure appears to be in need of maintenance.

2) Final Clarifier Drives and Mechanical:

The Final Clarifiers are utilized for settling solids from the treatment process. Settled solids are raked to the center of the clarifier via a rake arm, while fats, oils, and grease (FOGs) are scraped off the top of the wastewater via a skimmer arm. Settled solids drain from the Final Clarifiers to the RAS Pit. The rake and skimmer arms make up the drive system of the clarifier. The Final Clarifiers drive systems are both AMWELL Model 42H6 and powered by SEW-EURODRIVE Motors Model R27 DRN71MS4 with one quarter (1/4) horsepower. Gear motor, reducer, drive sprocket, drive chain, bearings, seals, and mechanicals for Final Clarifier #1 have been recently rehabilitated. The Gear motor, reducer, drive sprocket, drive chain, bearings, seals, and mechanicals for Final Clarifier #2 are of the original construction and no longer operate as efficiently as they used to. Flow into the Final Clarifiers is controlled by telescopic valves. The telescopic valves are of the original construction and are beginning to deteriorate.

5.14 DISINFECTION SYSTEM

1) Disinfection Tank:

The Disinfection Tank is a concrete structure utilized to receive final effluent from the Final Clarifiers and provide seasonal disinfection as required in the City's WPDES Permit prior to discharge to the East Channel of the Mississippi River. The Disinfection Tank is the former Chlorine Contact Tank that used to serve the WWTF.

A Flood Pump is located at the south end of the Disinfection Tank and is utilized to discharge effluent to Outfall 001. This Flood Pit and Pump are designed to be operated during periods of flooding. The outfall is isolated with a valve from the Disinfection Tank. Effluent is then pumped over a baffle wall to discharge to Outfall 001.

2) Disinfection System:

Currently the WWTF seasonally disinfects final effluent with two (2) Trojan UV3000B ultraviolet (UV) treatment apparatuses operated in series. The Trojan UV apparatuses are located within a baffled section of the existing Disinfection Tank. Currently the operator manually alternates which UV Disinfection apparatus is online because the alternating function in the existing UV Control Panel is no longer operational.

5.15 EFFLUENT MONITORING

A 12" Parshall Flume is utilized to measure the effluent flow discharged to the East Channel of the Mississippi River. The Parshall Flume maintains an accurate depth of flow and utilizes ultrasonic measurement to record the effluent flows. The ultrasonic measuring device is a SIEMENS

HydroRanger 200 ultrasonic transducer. The transducer was calibrated in May 2023 by Altronex Control Systems and is in good working order.

The Effluent Sampler is located in a small structure adjacent to the Disinfection Tank. The Effluent Monitoring Building is constructed with wood stud walls, exterior vinyl siding, and FRP interior finish over a concrete slab. The roof is constructed of wood rafters with standing seam metal roof with metal fascia and soffit panel. The metal walk door appears to be in good condition. The interior floor finish is exposed concrete with no containment present. Interior light is a globe fixture with fluorescent screw-in bulb. Electric base board heater provides heat for the building; there is no ventilation present. Generally, the structure appears to be in good repair, but the WWTF operator has requested the Effluent Sampler be relocated and the building demolished. The sampler is an ISCO 3710 refrigerated Sampler. Composite samples are collected with a pump controlled by a timer. Samples are stored in the sampler's refrigerator prior to testing. The Effluent Sampler is in working order but has developed issues and is near the end of life expectancy.

Maintenance should include keeping the Parshall Flume clean and in good working order. Because the Parshall Flume and ultrasonic measurement have no moving parts, the unit should provide many years of service to the WWTF. Additionally, the Operator should have a portable dissolved oxygen probe, pH meter, glassware, and other lab equipment for sampling and monitoring the wastewater process.

5.16 AEROBIC SLUDGE DIGESTERS

The Aerobic Sludge Digesters consist of two (2) circular concrete tanks with a volume of 196,250 gallons each and are utilized in the treatment process for sludge stabilization. The digesters utilize a coarse bubble aeration system which provides aeration and mixing for processing the waste sludge. The Aerobic Sludge Digesters are of the original construction and are in good operating condition.

5.17 TRUCK FILL STATION

The Truck Fill Station is located between the Aerobic Sludge Digesters and was constructed in 1956 as the original sludge loading station. The Truck Fill Station consists of a six-inch (6") standpipe with a four-inch (4") quick connect and a drain to collect spilled sludge. The existing concrete around the drain is flat and does not drain spilled sludge towards the drain as is required per the current Administrative Code NR 110.

5.18 BLOWER BUILDING

1) Structure:

The Blower Building is constructed with eight-inch (8") load-bearing masonry walls, exterior brick finish, and painted masonry walls over standard depth concrete frost wall or concrete basement wall. The roof is constructed of pre-engineered wood trusses with a standing seam metal roof finish in 2005 and appears to be in good condition. The fascia on the south side of roof is not present. Gutter and downspouts are present on the north side only with downspouts discharging to grade and appear to be in poor condition. The movement of the Blower Room exterior walls and floor is still present. Building movement is attributed to the leaking aeration piping which is readily visible as the air bubbles up through the sandy soil. Apparent soffit movement is also occurring. All exterior joint sealants are cracked and separated. Due to exterior wall movement, the sealants of doors and windows are cracked and separated. All metal walk doors appear to be in fair condition, but the weather stripping is damaged or missing. The overhead doors on the east side of the building are not fully utilized due to the close proximity of the Sludge Storage Tanks and the Blower Building Standby Generator. The west exterior door to the Blower Room is in poor condition. The interior floor finishes are exposed concrete or tile. There is floor cracking present at the interior door location

between the Solids Lab and Blower Room. The interior concrete floor for the Blower Room is separating away from interior masonry wall. The interior ceiling finishes are suspended ceiling, FRP, or exposed precast with caulk joints. The drop ceiling in the Solids Lab room is in poor condition. Basement walls appear to be in fair condition with minor wall cracks. The base plates for stairs have corroded. Generally, the structure above the basement appears to be in good repair with maintenance work required. The structure over slab on grade floor appears to be in poor repair with major maintenance work required.

2) Electrical, Plumbing & HVAC:

- Electrical and Lighting – Exterior wall mounted wall packs are LED and incandescent fixtures that are in working condition. Interior lights are fluorescent bulbs with ballast fixture. Outlets and conduits appear to be in working condition.
- Plumbing – Exterior hose bibbs are corroded. The interior plumbing appears to be in working condition.
- HVAC – The building has two (2) horizontal forced air units. The forced air units are located above the suspended ceiling in the Solids Lab room and hung from the ceiling in the Blower Room. The equipment that feeds the area over the basement appears to be in working condition. The equipment for the Blower Room is 29 plus years old, in working condition, and past its life expectancy. The exhaust fans appear to be in working condition.

3) Motor Control Center – Blower Building:

The second MCC is located within the Blower Building at the WWTF. This MCC installation was completed in the 1995 WWTF Upgrade and currently controls the Blowers, RAS Pumps, WAS Pump, Sludge Loading Pump, Gravity Belt Thickener (GBT), GBT Process Pump, and the Aeration Tank Mixers. The MCC has been well maintained and is currently in good operating condition. The MCC has spare openings on the panel for possible future expansions to possible subpanels within the facility.

4) WWTF Standby Generator – Blower Building:

The Blower Building Generator is a Cummins Model DQHAB-5935534 300kW; 60 Hz; 1800 RPM; 277/480 volt; 3-phase diesel generator and was installed in the 1995 WWTF Upgrade. The Blower Building Generator is sized to power everything associated with the Blower Building, Aeration Tanks, Aerobic Sludge Digesters, and Sludge Storage Tanks. The generator is in good working condition, however, was installed in a location that is difficult for the operator and other service technicians to maintain or service the generator.

5.19 BLOWERS

The existing WWTF consists of six (6) Sludge Blowers and five (5) Aeration Blowers. All Blowers were installed in the 1995 Upgrade. The Blowers are utilized to provide aeration and mixing within the treatment processes. All blowers are Dresser Industries, Roots Division Model 616 RCS-H Rotary Lobe Blowers. The motors are Marathon Electric, 1VH 364TTF6036AP Model 60 horsepower; 1775 RPM; 230/460 volt; 3-phase XRI High Efficiency Motors. The Aeration Blowers are needed to run 24/7 to meet treatment and mixing demands at the WWTF and are operated as “ON” or “OFF” and cannot be idled down to reduce the volume of air delivered to the Aeration Tanks. This leads to excess wear on the blowers as well as energy costs to deliver excess air to the treatment system. The constant running time at full speed produces a lot of heat and has caused the associated process piping to warp and damage bolts/fittings in the past. Currently, Aeration Blowers #1 and #2 are not operational.

5.20 SLUDGE PUMPS

The Sludge Pumps are located in the basement of the Blower Building. The Sludge Pumps are utilized for the following operations: return activated sludge (RAS) from the RAS Pit to the Aeration Tanks for additional treatment; waste activated sludge (WAS) from the RAS Pit to the Gravity Belt Thickener, Aerobic Sludge Digesters, or the Sludge Storage Tanks; transfer sludge in any combination between the Sludge Pit, Aerobic Sludge Digesters, or Sludge Storage Tanks; and pump sludge to the Sludge Loading Pad. Under typical operations, two (2) RAS Pumps run continuously returning activated sludge from the RAS Pit to Aeration Tank #1 for continued treatment. The WAS Pump is manually operated for wasting sludge from the RAS Pit to the GBT, Aerobic Sludge Digesters, or the Sludge Storage Tanks. The GBT Process Pump (Sludge Transfer Pump) is utilized to transfer sludge in any combination between the Sludge Pit, Aerobic Sludge Digesters, or Sludge Storage Tanks. Lastly, the Sludge Loading Pump is utilized to transfer sludge from the Aerobic Sludge Digesters or Sludge Storage Tanks to the Sludge Loading Pad. All check valves are in good operating condition while the plug valves are in poor condition. Sludge Pump data is provided as follows:

- **RAS Pump #1** is a five-inch (5") Fairbanks Morse Model B5423K, horizontal, non-clog, bladeless impeller sewage pump with a capacity of 600 gpm at 40 feet TDH. The pump motor for RAS Pump #1 is a Marathon Electric Model 1VC215TTDR4026AN with 10 horsepower; 1745 RPM; 230/460 volt; 3-phase. The pump and motor were both installed in the 1995 Upgrade.
- **RAS Pump #2** is a five-inch (5") Fairbanks Morse Model B5423K, horizontal, non-clog, bladeless impeller sewage pump with a capacity of 600 gpm at 40 feet TDH. The pump motor for RAS Pump #2 is a Marathon Electric Model 1VC215TTDR4026AN with 10 horsepower; 1745 RPM; 230/460 volt; 3-phase. The pump and motor were both installed in the 1995 Upgrade.
- **RAS Pump #3** is a five-inch (5") Fairbanks Morse Model B5423K, horizontal, non-clog, bladeless impeller sewage pump with a capacity of 600 gpm at 40 feet TDH. The pump motor for RAS Pump #3 is a Marathon Electric Model 1VC215TTDR4026AN with 10 horsepower; 1745 RPM; 230/460 volt; 3-phase. The pump and motor were both installed in the 1995 Upgrade.
- **RAS Pump #4** is a five-inch (5") Fairbanks Morse Model B5423K, horizontal, non-clog, bladeless impeller sewage pump with a capacity of 600 gpm at 40 feet TDH. The pump motor for RAS Pump #4 is a Marathon Electric Model 1VC215TTDR4026AN with 10 horsepower; 1745 RPM; 230/460 volt; 3-phase. The pump and motor were both installed in the 1995 Upgrade.
- **WAS Pump** is a four-inch (4") Fairbanks Morse Model B5422K, horizontal, non-clog, bladeless impeller, variable frequency pump with a capacity of 300 gpm at 30 feet TDH. The pump motor for the WAS Pump is an ECHTOP Model GR3-CI-TF-184TC-4-B-D-5 with five (5) horsepower; 1745 RPM; 230/460 volt; 3-phase. The pump was installed in the 1995 upgrade, and the original motor has since been replaced with the existing model.
- **GBT Process Pump (Sludge Transfer Pump)** is a six-inch (6") PennValley Model 94L05, double disk pump with a capacity of 400 gpm at 100 feet TDH. The pump motor for the GBT Process Pump is an Underwriter Laboratories Model M7043T with seven and a half (7.5) horsepower; 1170 RPM; 230/460 volt; 3-phase. The pump was installed in the 1995 Upgrade and the original motor has since been replaced.

- **Sludge Loading Pump** is a 5” Fairbanks Morse Model B5423K, horizontal, non-clog, bladeless impeller sewage pump with a capacity of 600 gpm at 40 feet TDH. The pump motor for the Sludge Loading Pump is a Marathon Electric Model 1VA215TTDR4026AN with 10 horsepower; 1745 RPM; 230/460 volt; 3-phase. The pump and motor were both installed in the 1995 Upgrade.

5.21 GRAVITY BELT THICKENER

The Gravity Belt Thickener (GBT) was installed in the 1995 Upgrade and is currently in poor condition and will need significant repairs to continue operation. Currently, the GBT is not in service at the WWTF and is bypassed by sending WAS directly to the Aerobic Sludge Digesters. When in operation, the GBT increases the percent solids in the sludge to approximately 3-5%. This thickened sludge is transferred to the Sludge Pit from the GBT for storage. The GBT is equipped with an Effluent Reuse System that pumps effluent from the Disinfection Tank to the GBT to backwash the GBT belt during operations. The Effluent Reuse System is original to the 1995 Upgrade and is currently not operational. A Polymer Feed System is provided with the GBT and is necessary to release free water and thicken the sludge that is put through the GBT. In 2021, the WWTF used 330 gallons of Polymer and cost the Department \$5,764.24. The Polymer Feed System is original and is in poor condition.

5.22 SLUDGE STORAGE TANKS

Three (3) rectangular concrete Sludge Storage Tanks are utilized for storing sludge at approximately 2% solids. Each tank has a side water depth of 16 feet and a capacity of 278,230 gallons or 834,690 gallons total. The tanks contain a coarse bubble aeration system which provide oxygen and circulation for processing the wasted sludge. The aeration system and concrete tanks were installed in the 1995 Upgrade and are currently in good operating condition. In 2020, the WWTF land applied 1,139,700 gallons of sludge. However, since AMPI stopped discharging, in 2023, the WWTF land applied 896,000 gallons of sludge. Assuming half of the sludge is land applied in the Spring and the other half is applied in the Fall, the 180-day storage requirement would be 448,000 gallons. Currently the WWTF has approximately 54% unused sludge storage capacity.

5.23 SLUDGE LOADING PAD

The existing Sludge Loading Pad was constructed in the 1995 Upgrade. The Sludge Loading Pad consists of a six-inch (6”) standpipe with a four-inch (4”) quick connect and a sloped concrete pad with a drain to collect spilled sludge. The Sludge Loading Pad is able to load sludge from the Aerobic Sludge Digesters and the Sludge Storage Tanks. The loading pad is utilized to load sludge for land application disposal on DNR approved sites. The Sludge Loading Pad is in good condition.

5.24 STORAGE BUILDING

1) Structure:

The Storage Building is constructed with wood stud walls, exterior brick finish, FRP interior finish, unknown roof truss system, standing seam metal roof, and over standard depth concrete frost wall. Gutter and downspouts are present with downspouts discharging above grade, their condition is poor. There are areas of displaced exterior brick on the west wall. All exterior walk doors are metal and appear to be in good condition. The interior ceiling finish is FRP. The floor is painted concrete; cracking is present. Each room has an electric unit heater and two (2) rooms have power exhaust ventilation. Interior lights are globe fixtures with fluorescent screw-in bulbs. Floor drains are present and appear to be in working condition. Generally, the structure appears to be in good repair with maintenance work required.

5.25 WWTF SITE

1) Bituminous Pavement:

The Bituminous Pavement is approximately 25,500 square feet of driveway/parking area. The pavement, overall, is in fair condition. Crack-sealing should be implemented as necessary to extend the life of the pavement. When the City performs a significant upgrade at the WWTF, the Bituminous Pavement and base should be removed and replaced as needed

2) Concrete Walkways:

The majority of the Concrete Walkways were constructed in the 1995 Upgrade and are typically in good condition with some sections that have lateral cracking. Areas that have developed cracks or settled should be replaced as needed. Overall, no immediate replacement is required, and the walkways should provide adequate service in the future.

3) WWTF Site Lighting:

The current WWTF Site Lighting consists of wall packs on the buildings to assist with visibility at the WWTF Site. Light poles are also provided throughout the site to provide required safety lighting. As previously stated, wall packs on the buildings appear to be in working condition. The light poles appear to be in working condition.

4) Security Fence:

The WWTF Site is protected by a chain link fence for safety and security purposes. The majority of the north and west sections of the Security Fence are of the original 1956 installation whereas the rest was replaced with the 1995 Upgrade. The fence varies between eight-feet (8') tall chain link topped with three (3) strands of galvanized 12 gauge barbed wire and 12 feet tall chain link with no barbed wire. Overall, the Security Fence is plum with one (1) hole in a chain link panel at the south end of the WWTF. The hole in the chain link panel, located at the south end of the WWTF, is recommended to be repaired. Annual maintenance should be completed to keep brush, small trees, and other vegetation from growing within the fence and causing damage. The WWTF Site needs to be in a secure environment to ensure safety and safeguard against any potential vandalism or wildlife harm. All gaps in the fencing should be repaired and closed as needed.

5) Storm Water Drainage and Yard Grading:

The WWTF Site currently has minimal erosion and drainage issues.

6) Flood Plain:

The WWTF Site is located between the Regulatory Floodway and the 1% Annual Chance Flood Hazard (100 year flood). The banks along the river side of the WWTF are protected with rip rap to prevent the WWTF Site from eroding during high water events. In April 2023, a 100-year flood occurred and the WWTF was surrounded by flood water and there was no access to or from the WWTF Site. currently has minimal erosion and drainage issues.

Due to the flood risk, the Wastewater Department should maintain an Emergency Response Plan which is also a requirement of the DNR Capacity, Management, Operation, and Maintenance (CMOM) Program. The Wastewater Department should also identify any boat(s) to be used for accessing the WWTF during flood events.

CHAPTER VI - WPDES PERMIT LIMITS

6.1 CURRENT EFFLUENT LIMITS

Effluent limits for the WWTF are provided within the WPDES Permit in Appendix B. The WWTF is typically able to meet its Wisconsin Pollutant Discharge Elimination System (WPDES) Permit limits.

6.2 FUTURE PERMIT LIMITS

Future permit limits are the main motivation for this facility planning effort. Though the facility is able to meet all current effluent limits consistently, The WWTF currently does not have a means of treating phosphorus to meet the future effluent Phosphorus limit of 0.100 mg/L. The City is currently typically treating phosphorus to an effluent concentration under 0.6 mg/L. The implementation of a phosphorus treatment alternative is necessary to maintain compliance with the WWTF's current effluent limits.

The remainder of the pollutant limits are anticipated to remain the same at this time. Effluent discharge limits are provided with the WPDES Permit in Appendix B.

CHAPTER VII - RECOMMENDATIONS

The existing facility provides adequate wastewater treatment. The City's current WPDES Permit expired on June 30, 2023. Based on the existing condition of the City's WWTF, the City has identified the following as a primary need at the facility:

- General Facility Maintenance
- Sludge Storage Upgrade
- Phosphorus Compliance Upgrade

Chapter VIII – General Facility Maintenance

The City recently evaluated the condition, age, and efficiency of various processes, structures, and equipment at the WWTF. Most of the structures and equipment are original to the 1995 upgrade and are now in excess of 30 years old. In order to maintain treatment levels at the WWTF, replacement and/or rehabilitation is recommended throughout the existing facilities within the next few years.

Chapter IX – Sludge Storage Upgrade

The GBT is currently not in service. This deficiency results in sludge with lower percent solids which increases required sludge storage capacity and volume of sludge to be hauled to land application sites.

Chapter X – Phosphorus Compliance Upgrade

The WWTF will be required to significantly reduce effluent TP in order to meet the State of Wisconsin's WQBEL. The WWTF currently utilizes a standard activated sludge treatment system with the addition of alum to assist in the removal of phosphorus, however, this approach is unable to meet current and anticipated future effluent TP limits.

CHAPTER VIII – GENERAL FACILITY MAINTENANCE

8.1 DO NOTHING

The WWTF could elect to “do nothing” for improving the existing WWTF components. This is only a valid alternative for as long as the current equipment remains in operable condition. However, due to the condition of the facility, the WWTF would be required to maintain out-of-date and hazardous equipment.

8.2 WASTEWATER COLLECTION SYSTEM IMPROVEMENTS

A. New Lift Station Site Lights –

New LED lights, poles, and electrical are recommended to be installed at each Lift Station to provide site lighting for safety and emergency maintenance.

8.3 WASTEWATER DEPARTMENT EQUIPMENT IMPROVEMENTS

B. 1/2-Ton Truck Replacement –

The 13 year old Dodge Ram 1/2-ton truck is recommended to be replaced within the next five (5) years and should be included in the budget for replacement.

C. 3/4-Ton Truck Replacement –

The 12 year old Ford F250 truck is recommended to be replaced within the next five (5) years and should be included in the budget for replacement. This truck should include a crane service body to replace the boom truck for servicing lift station pumps and WWTF equipment.

D. Jetter/Vac Truck Replacement –

The 11 year old Jetter/Vac truck is recommended to be replaced within the next five (5) years and should be included in the budget for replacement.

E. Sewer Camera Replacement –

The five (5) year sewer camera is recommended to be replaced within the next five (5) years and should be included in the budget for replacement.

F. New Trash Pump -

A new four-inch (4”) trash pump is recommended for WWTF maintenance and flood control operations.

8.4 LAB & CONTROL BUILDING IMPROVEMENTS

A. MCC Replacement –

The existing two (2) electrical services should be replaced by one (1) electrical service. Eliminating an electrical service will have a cost savings by eliminating a second service charge. A single electrical service will also reduce duplications within the on-site electrical system such as multiple transformers, on site generators, and on-site transfer switches. The electrical service should be replaced in combination with the Blower Building Upgrade and MCC replacement. Due to the age and limited availability of spare parts, the MCC is recommended for replacement. Installation of VFDs should be included with the MCC replacement.

Elimination of the callout system and installation of an automatic alarm dialer system would be recommended. An automatic dialer will allow the operator greater flexibility to remotely acknowledge and prioritize alarms within the sanitary sewer system and treatment processes. An automatic dialer will reduce emergency response time, reduce equipment downtime, and quickly restore treatment following equipment failure.

B. New SCADA System –

Replacement of the existing dialer a SCADA and alarm system should be considered. SCADA can perform the following benefits:

- Allows the operator to remotely monitor treatment processes
- Allows the operator to remotely control treatment processes
- Allows the operator to review pump, blower, and treatment trend data to better control wastewater processes for improved treatment
- Allows the operator to better review pump, blower, and treatment performance by providing data in a quick and readily accessible format.
- Reduce treatment electrical costs.

C. Building Maintenance –

Replace all exterior sealants at wall joints. Tuckpoint deteriorated brick to prevent additional moisture migration. Reinstall soffit panels. Add gutter & downspouts to the north and south side of the roof to prevent ground erosion and to direct water away from the retaining wall. Replace the retaining wall. Repair the damaged foundation to prevent further deterioration of the foundation wall. Clean and paint the exterior doors and install new weather stripping. Replace the existing wood Garage door with an insulated metal walk door. Clean the overhead doors and install new weather stripping. Replace exterior and interior sealants around the windows. Replace the damaged area of the drywall ceiling located in the Garage, near the unit heater. Grind Garage floor cracking to a uniform joint, then clean and seal the joints. Replace exterior deteriorated brick, louver sill, exterior door, metal wall caps, and suspended ceilings. Clean interior walls and floors.

Building Maintenance Summary:

- Replace sealant at wall joints
- Tuckpoint brick at joint separations
- Repair/replace falling soffit
- Install gutter & downspouts to the north and south side of the building
- Replace exterior retaining wall
- Repair northwest corner of the foundation wall
- Clean and paint walk doors; install new weather stripping
- Replace wooden Garage walk door
- Replace overhead doors weather stripping
- Replace window sealants
- Replace damaged drywall ceiling in the Garage near unit heater
- Repair and seal Garage concrete floor cracks
- Replace deteriorated brick
- Replace brick sill below louvers
- Replace the walk door
- Replace rusted metal roof cap
- Replace suspended ceiling
- Clean walls and floors
- Electrical and Lighting – Replace lighting fixtures with LED fixtures to achieve maximum efficiency.
- Plumbing – Replace existing water heater to provide a more efficient system.
- HVAC – Replace the existing power louvers and all other equipment that has reached its life expectancy with a more energy efficient equipment.

D. Standby Generator Replacement –

Two standby generators are currently utilized by the WWTF to provide power during power outages and emergency situations. One (1) 175 kW generator is located in the Lab & Control

Building and was installed in 1956. The Lab & Control Building generator is sized to power everything associated with the Lab & Control Building, Headworks Building, Disinfection System, Chemical Building, and the Storage Building. The generator runs well but is nearing the end of its life span.

The other generator is located near the Blower Building. This generator is a 300 kW generator and was installed in the 1995 upgrade. The Blower Building Generator is sized to power everything associated with the Blower Building, Aeration Tanks, Aerobic Sludge Digesters, and Sludge Storage Tanks.

It is recommended that with the installation of a single new electrical service to the entire WWTF, that the blower building generator be salvaged or repurposed and the Lab & Control Building generator be replaced with a 600 kW generator to provide adequate standby power to the entire facility.

8.5 HEADWORKS BUILDING IMPROVEMENTS

A. Screening Improvements –

The existing bar screen is located outside and below ground level. In order to clean the bar screen, the operator must first turn on an exhaust system that removes hazardous elements and odors from the influent structure. The operator then uses a staircase to descend approximately 23 feet to access the influent structure. Once the operator has removed debris from the screen by hand, the operator has to manually carry the debris up the stairs to the garbage dumpster.

The existing bar screen has been in use at WWTF in excess of 60 years. The bar screen is susceptible to plugging and doesn't provide adequate removal of inorganic materials. The influent bar screen is recommended to be replaced with a new mechanical fine screen for proper removal of inorganics and other debris from the raw influent wastewater prior to the influent raw pumps. The mechanical screen should be provided with a conveyor auger and compactor to deliver garbage to the garbage dumpster. The existing exhaust system is recommended to be replaced with more energy efficient equipment.

The existing drum screens are recommended to be removed and replaced with a mechanical fine screen. The mechanical fine screen would provide proper removal of inorganics and other debris from the raw influent wastewater prior to the influent pump station. The installation of a new mechanical bar screen would also remove the hazard to operators having to descend downstairs during adverse conditions and be subjected to hazardous elements to maintain proper function of the bar screen.

B. Grit Classifier and Piping Improvements –

Currently, the grit classifier and dumpster are located in the center of the Headworks building and cannot be easily accessed for servicing. Additionally, when the dumpster is full and needs to be emptied, the operator has to push the heavy grit-filled dumpster through the building to the pickup location outside.

Once the existing drum screens have been removed, it is recommended that the grit classifier, piping, and dumpster be relocated to the screen room. The screen room has an overhead door and elevated loading area for easy access to the garbage dumpster. Both Grit Pumps were recently rebuilt and are in fair working condition. The Grit Pumps are planned to be reused and should provide the City sufficient years of service.

C. Raw Wastewater Pumps Replacement –

The existing Influent Pumps are of the original installation and should be planned for replacement in the next 5-10 years. The six (6) Influent Pumps are recommended for replacement with the next major upgrade in order to provide and maintain continuous service.

Variable Frequency Drives (VFDs) are recommended for installation on the Influent Pumps in order to reduce electrical usage, allow the pumps to soft start and stop, and reduce pump wear.

D. Building Maintenance –

Tuckpoint deteriorated brick to prevent additional moisture migration through the wall. Seal and paint precast floor/ceiling plank joints. Replace all exterior sealants at wall joints. Investigate settlement concerns along the exterior walls. Replace exterior and interior sealants around the windows. Install downspout extensions and splash blocks to prevent erosion of the WWTF Site and divert water away from the foundation walls. Clean and paint all the exterior doors except for the door needing replacement; replace that door. Install new weather stripping at overhead door. Clean and paint the exterior and interior of the building. Replace deteriorating FRP finish. Clean, repair as needed and seal all foundation wall cracks. Clean and paint stairs with rust preventive paint. Grind floor cracking to a uniform joint, then clean and seal the joints.

Building Maintenance Summary:

- Tuckpoint exterior brick walls
- Seal and paint precast floor/ceiling
- Replace existing exterior control joints
- Investigate settlement issues
- Replace window sealants
- Install downspout extensions and splash block
- Clean and paint walk doors to remain
- Replace one walk door
- Install new weather stripping at overhead doors
- Replace deteriorating FRP
- Repair and seal concrete wall and floor cracks
- Clean and paint stairs
- Electrical and Lighting – Replace lighting fixtures with LED fixtures to achieve maximum efficiency.
- Plumbing – Clean trench drain and catch basin.
- HVAC – All equipment will reach its life expectancy within the next 5-10 years. Continued maintenance will be key to achieving the full life of all equipment.

8.6 CHEMICAL STORAGE BUILDING IMPROVEMENTS

A. Chemical Storage Tanks Replacement –

The existing chemical storage tanks are near the end of their useful life and are recommended to be replaced. With recent pilot studies and implementation of BPR in 2021, Alum consumption has nearly been eliminated, however, chemical addition should remain as a backup to supplement the BPR treatment. The existing chemical storage tanks are recommended to be replaced with smaller storage tanks.

B. Chemical Feed Pumps and Piping Replacement –

The existing chemical feed piping is near the end of its useful life, and it is recommended to be replaced. Furthermore, the spare LMI Chemical Feed Pump is recommended to be replaced with a Stenner Model. This way if the primary pump fails, the backup pump will operate under the same conditions as the primary pump and therefore maintain the level of treatment at the WWTF.

C. Building Maintenance –

Install gutters and downspouts to prevent erosion of the site and to divert water away from the foundation. Replace exterior windows. Clean and paint exterior doors and install new weather stripping. Clean interior walls, floors, and ceiling. Replace damaged suspended ceiling.

Building Maintenance Summary:

- Install gutters and downspouts
- Replace exterior windows
- Clean and paint walk doors; install new weather stripping
- Clean walls, floors, and ceiling
- Replace suspended ceiling
- Electrical and Lighting – Replace lighting fixtures with LED fixtures to achieve maximum efficiency.
- HVAC – The unit heater will reach its life expectancy within the next 10-15 years. Continued maintenance will be key to achieving the full life of that equipment.

8.7 FINAL CLARIFIERS IMPROVEMENTS

A. Final Clarifier #2 Rehabilitation –

The mechanical components for Clarifier #1 were rehabilitated in 2024, but the mechanical components for Clarifier #2 are of original to the 1992 upgrade, are in excess of 30 years in age, and no longer operate efficiently. The gear motor, reducer, drive sprocket, drive chain, bearings, seals, and other mechanical components are recommended to be replaced. Additionally, flow into the Final Clarifiers is controlled by telescopic valves, which are original to the 1992 upgrade and are beginning to deteriorate. It is recommended that all telescopic valves be replaced. Final Clarifier #2 has not been drawn down and inspected for an extended period of time. It is recommended that Final Clarifier #2 be drawn down for cleaning, inspection, and repairs.

Recommended repairs include:

- Repair/replace scrapers, bearings, seals, and other hardware
- Repair/replace scum trough and related valves
- Blast, clean, prime and paint any metal parts to extend the life of the hardware

B. General Maintenance –

Prep and repaint the fiberglass domes. Replace roof joints between fiberglass dome sections. Uncover all natural vents for proper ventilation. Fasten steel grates to the catwalk to prevent grates from falling and to provide a stable walk path. Install new concrete steps. Install LED light fixtures at the entrances.

General Maintenance Summary:

- Prep and paint the dome roofs
- Clean and seal dome roof joints
- Uncover all blocked ventilation louvers in the dome roofs
- Fasten steel grates to the catwalk
- Install new concrete steps at entry points
- Install LED light fixtures at entrances

8.8 DISINFECTION SYSTEM IMPROVEMENTS

A. UV Structure Rehabilitation –

Currently, effluent wastewater flows through the UV disinfection channel to the Old Chlorine Disinfection Contact Tank. The tank contains a series of baffles that increase both the surface area and the detention time within the tank. The added surface area and detention time contribute to algae and scum buildup, which reduces effluent quality and requires routine cleaning by the operator.

A bypass is recommended following UV disinfection to channel effluent directly to the Contact Tank discharge. Baffles may also be eliminated. FRP grating is recommended to be installed over the open channels to improve access for sampling and maintenance as well as reduce sunlight exposure and subsequent algae growth.

8.9 EFFLUENT MONITORING IMPROVEMENTS

A. Effluent Monitoring Improvements –

The Effluent Sampler is located in a small structure adjacent to the Disinfection Tank. Generally, the structure appears to be in good condition, but the WWTF operator has requested the Effluent Sampler be relocated. The sampler is an ISCO 3710 refrigerated Sampler and is in working order but has developed issues and is near the end-of-life expectancy.

It is recommended that a new effluent sampler be installed in the existing storage building or proposed Blower Building and the existing effluent monitoring building be demolished to make room for future upgrades at the WWTF.

8.10 AEROBIC SLUDGE DIGESTORS IMPROVEMENTS

A. Aeration System Replacement –

The Aerobic Sludge Digesters are currently in good condition. The digesters should be drawn down and hardware inspected. Repairs/improvements should be planned for the next WWTF Upgrade Project. Additionally, the coarse bubble aeration system is beyond its useful life and should be replaced with a fine bubble aeration system.

8.11 BLOWER BUILDING IMPROVEMENTS

A. New Blower Building –

Due to the deteriorated condition of the blower room portion of the Blower Building, the existing blower room is recommended to be demolished and a new Blower Building constructed within the greenspace north of the existing aeration tanks. The existing control room, GBT room, and basement are recommended to remain, as they are in good structural condition and will continue to be used for sludge pumps and sludge dewatering equipment. This option would require the following items:

- Construction of new Blower Building
- Installation of new aeration piping located above ground
- Installation of new MCC
- Installation of VFDs for Blowers and Sludge Pumps
- Relocation of Standby Generator
- Salvage equipment as applicable
- Demolish foundation, exterior walls, and floor slab of Blower Room

Please refer to Figure 8.1 – Proposed WWTF Improvements Site Plan in Appendix A for a plan view of proposed Blower Building location.

B. Blowers Replacement –

The existing WWTF consists of six (6) Sludge Blowers and five (5) Aeration Blowers. All Blowers were installed in the 1995 Upgrade. The Blowers are utilized to provide aeration and mixing within the treatment processes. The Aeration Blowers are needed to run 24/7 to meet treatment and mixing demands at the WWTF and are operated as “ON” or “OFF” and cannot be idled down to reduce the volume of air delivered to the Aeration Tanks. This leads to excess wear on the blowers as well as energy costs to deliver excess air to the treatment system. Currently, Aeration Blowers #1 and #2 are not operational.

For the Blower Upgrade, the operational Blowers and associated motors are recommended to be salvaged prior to demolition of the Blower Building. Four (4) salvaged Blowers are recommended to serve the Sludge Storage Tanks. The remaining existing Blowers should be salvaged as spares. Furthermore, it is proposed to provide four (4) new Blowers to serve the Aerobic Sludge Digesters, and four (4) new Blowers to serve the Aeration Tanks. The new Blowers would be installed in the proposed Blower Building with VFDs. Two (2) Blowers will be in operation for the Aerobic Sludge Digesters and Aeration Tanks, leaving two (2) Blowers in reserve for each.

C. Building Maintenance –

Building Maintenance Summary:

- Demolish existing roof, gutter, and downspouts
- Install new roof
- Install new gutter & downspouts
- Replace sealant at wall joints
- Replace window and door sealants
- Clean and paint walk doors; install new weather stripping
- Seal and precast joints
- Repair and seal concrete wall cracks
- Replace corroded steel base plates
- Replace suspended ceiling
- Clean interior walls and floors
- Electrical and Lighting – Replace lighting fixtures with LED fixtures to achieve maximum efficiency.
- Plumbing – Replace all corroded hose bibbs.
- HVAC – Equipment for the Solids Lab will reach its life expectancy within the next 10-15 years. Continued maintenance will be key to achieving the full life of equipment.

8.12 RAS/WAS PUMP IMPROVEMENTS

A. Plug Valves Replacement –

The existing plug valves are original to the 1992 upgrade. Due to the age of poor condition of the plug valves, the plug valves are recommended for replacement.

B. Sludge Pumps Replacement –

The blower building basement is recommended to stay intact with all blower building upgrade options and will be rehabilitated. All seven (7) sludge pumps are recommended to be replaced with direct drive sludge pumps equipped with VFDs. VFDs will allow the operator to adjust RAS/WAS rates, reduce electrical costs, allow the pumps to soft start and stop, and reduce pump wear.

8.13 SITE IMPROVEMENTS

A. Storage Building Improvements –

Replace missing brick on the west wall. Replace existing damaged gutter and downspouts. Grind concrete floor cracking to a uniform joint, then clean and seal the joints. Replace lighting fixtures with LED fixtures. All equipment will reach its life expectancy within the next 10-15 years. Continued maintenance will be key to achieving the full life of all equipment. Clean interior walls and floors.

Building Maintenance Summary

- Install new bricks; match existing
- Replace gutters and downspouts
- Repair and seal concrete floor cracks
- Replace interior light fixtures with LED light fixtures
- Clean walls and floor

B. Truck Fill Station Relocation–

The Truck Fill Station pumps, controls, and associated materials shall be salvaged and relocated to accommodate the new sludge handling process.

C. Site Lighting Improvements –

Light poles are provided throughout the site to provide required safety lighting. The light poles appear to be in working condition. It is recommended that the existing light poles be replaced with LED fixtures to achieve maximum efficiency.

D. New Solar Panels –

Installation of Solar Panels is recommended due to current incentives through Focus on Energy, Solar Investment Tax Credit, and Clean Water Fund. Return on investment is less than 10 years. Solar panels may be located on buildings and/or in the remaining green space.

CHAPTER IX – SLUDGE STORAGE UPGRADE

9.1 DO NOTHING

The WWTF could elect to “do nothing” for improving the existing WWTF sludge storage, desludging, and associated components. This is only a valid alternative for as long as the current equipment remains in operable condition. However, due to the condition of the existing sludge storage system, the WWTF would be required to maintain out-of-date and ineffective equipment.

9.2 NEW CONCRETE STORAGE

Due to the existing condition of the GBT and its associated appurtenances, removal of the GBT is recommended. Under this alternative, the system would utilize the Aerobic Digester to thicken sludge to approximately 2% solids prior to transfer to anaerobic storage. This approach would reduce the percent solids in the sludge from the current 3% to approximately 2%. As a result, the overall sludge volume would increase, as demonstrated below.

Projected Sludge Production –

$$BOD_5 \text{ (lbs./day) (Based on Current Influent Data) = 1,949 lbs./day}$$

$$\text{Mass Sludge (lbs./day) = } BOD_5 \text{ (lbs./day) } \times 0.43 \text{ Sludge / } BOD_5 \text{ Ratio} = 838 \text{ lbs./day}$$

$$\text{Volume Sludge (gal/day) = Mass Sludge (lbs./day) / 1.02 (Specific Gravity of Sludge Solids) / } 8.34 \text{ lbs./gal (Water Density) / 0.02 (Percent Solids) = 4,925 gal/day}$$

Utilizing 4,925 gal/day, the City would be required to store 886,585 gallons of sludge for 180 days. The existing sludge storage facilities have a current capacity of approximately 834,690 gallons. As a result, the City would require additional sludge storage capacity to meet the 180-day storage requirement.

Under this alternative, a new concrete storage structure would be designed to accommodate all future sludge storage requirements. The system would include an aeration system for seasonal mixing prior to land application, along with associated monitoring equipment and controls. The proposed concrete sludge storage tank would be sized to match the existing sludge storage tanks, with a capacity of 278,230 gallons for a total of 1,113,000 gallons of sludge storage, which would meet the 180-day storage requirement. However, due to limited space at the WWTF site and with the existing Blower Building basement to remain and serve as the location for the sludge pumps, the new concrete storage tank would need to be constructed north of the aeration tanks. This configuration would require the construction of a second sludge loading station. In addition, the increased sludge volume would require the City to secure additional land for land application of the resulting sludge.

9.3 REPLACE EXISTING GBT

Due to the existing condition of the GBT and its associated appurtenances, replacement of the GBT is recommended. Under this alternative, the aerobic sludge digesters would be used for sludge digestion and gravity thickening to approximately 2% solids. The thickened sludge would then be transferred to the GBT for removal of excess water. This alternative would maintain the sludge solids concentration at the current level of approximately 3%. As a result, sludge volume would remain consistent with existing conditions, as demonstrated below.

Projected Sludge Production –

$$BOD_5 \text{ (lbs./day) (Based on Current Influent Data) = 1,949 lbs./day}$$

$$\text{Mass Sludge (lbs./day) = } BOD_5 \text{ (lbs./day) } \times 0.43 \text{ Sludge / } BOD_5 \text{ Ratio} = 838 \text{ lbs./day}$$

$$\text{Volume Sludge (gal/day) = Mass Sludge (lbs./day) / 1.02 (Specific Gravity of Sludge Solids) / }$$

$$8.34 \text{ lbs./gal (Water Density)} / 0.03 \text{ (Percent Solids)} = 3,284 \text{ gal/day}$$

Utilizing 3,284 gal/day, the City would be required to store 591,120 gallons of sludge for 180 days. Since the existing sludge storage facilities can store approximately 834,690 gallons currently, there would be no need for additional sludge storage.

Replacement of the existing GBT would increase the sludge solids concentration from approximately 2% to 3%, representing only a 1% increase. Given the relatively small increase in percent solids, replacement of the GBT would be a costly alternative when compared to other available options.

9.4 NEW SCREW PRESS AND CAKE STORAGE STRUCTURE

Due to the existing condition of the GBT and its associated appurtenances, replacement of the GBT with a screw press is recommended. Under this alternative, the aerobic sludge digester would be used for sludge digestion and treatment to approximately 2% solids. The sludge would then be transferred to the sludge storage tank for gravity settling prior to being conveyed to the screw press, where polymer would be added to aid in dewatering the sludge to approximately 15-18% solids. This alternative would increase the sludge solids concentration from the current 3% to approximately 18%. As a result, sludge volume would be significantly reduced, as demonstrated below.

Projected Sludge Production –

$$BOD_5 \text{ (lbs./day) (Based on Current Influent Data)} = 1,949 \text{ lbs./day}$$

$$\text{Mass Sludge (lbs./day)} = BOD_5 \text{ (lbs./day)} \times 0.43 \text{ Sludge / } BOD_5 \text{ Ratio} = 838 \text{ lbs./day}$$

$$\text{Volume Sludge (gal/day)} = \text{Mass Sludge (lbs./day)} / 1.02 \text{ (Specific Gravity of Sludge Solids)} / 8.34 \text{ lbs./gal (Water Density)} / 0.15 \text{ (Percent Solids)} = 656 \text{ gal/day}$$

$$\text{Volume Sludge (ft}^3\text{/day)} = \text{Volume Sludge (gal/day)} / 7.48 \text{ (gal/ft}^3\text{)} = 88 \text{ ft}^3\text{/day}$$

At 15% to 18% solids, the sludge is considered “cake” and does not flow readily. From the screw press, the cake will be transferred to the cake sludge storage building with an elevator conveyance system. Once at the cake storage building, the cake sludge will be moved and stored using a loader and/or skid steer. Cake sludge will ultimately be land applied. Utilizing 88 ft³/day, the City would be required to store 15,800 cubic feet of sludge for 180 days.

Dewatered cake sludge will significantly reduce the volume of sludge that will be required to be land applied each year. Hauling cake sludge will require fewer trips to application sites, resulting in reduced labor demands and lower fuel costs associated with hauling and land application activities. This reduction in hauling will also allow operators to devote more time to other critical plant operations. In addition, land application of cake sludge will require less total land area.

This alternative will consist of the retrofitting of the existing GBT Room and the construction of a new cake storage building. The existing GBT and associated appurtenances would need to be demolished and removed, the polymer feed system would need to be replaced, and the GBT Room would need to be retrofit to operate the Screw Press. Additionally, existing sludge storage tank #3 would need to be demolished and the sludge loading pad would need to be relocated to make room for the new Cake Storage Building.

Summary:

- Demolition of Sludge Storage Tank #3
- Demolition of Gravity Belt Thickener
- Relocation of Sludge Loading Pad

- Rehabilitation of Polymer Feed System
- Retrofit GBT Room for Screw Press
- Construction of new Cake Storage Building

CHAPTER X – PHOSPHORUS COMPLIANCE UPGRADE

10.1 GENERAL

The City has identified meeting Effluent Total Phosphorus (TP) Limits as a need at the facility. Low level Phosphorus removal will be essential to meeting future permit limits. Although the WWTF is treating the biological loadings and meeting the effluent limits for BOD₅ and Total Suspended Solids, the current facility will not be able to meet future effluent limits for Total Phosphorus under its current operation. Alternative evaluations will focus on the ability to meet Phosphorus limits via chemical precipitation or biological removal along with the supporting unit process upgrades included as part of the overall project costs.

10.2 DO NOTHING

This alternative contemplates continued use of the existing facility without any improvements. This “do nothing” alternative is not a feasible option as it would not address the forthcoming low-level Phosphorus limit and would be in violation of the compliance schedule in the current WPDES permit. This alternative will not be considered further.

10.3 ALTERNATIVE DISCHARGE LOCATION

An alternative discharge location could be investigated to achieve compliance with effluent TP limits. The City currently discharges effluent wastewater to the Mississippi River which is the nearest surface water body. The Mississippi River is currently listed on Wisconsin’s 2024 303(d) list of impaired waters for phosphorus-related impacts, resulting in an effluent TP limit of 0.1 mg/L for the City of Prairie du Chien. The City could alternatively discharge effluent via force main to the Wisconsin River, which is located more than two miles from the WWTF, and is not currently listed as impaired for phosphorus and would allow a less stringent effluent TP limit of 1.0 mg/L.

However, if the Wisconsin River were designated as a phosphorus-impaired water in the future, the City would have made a large investment toward relocating the City’s outfall and still be required to meet the 0.1 mg/L TP limit. Under this scenario, the City would either need to continue operating and maintaining the effluent force main to the Wisconsin River while complying with the stricter limit or revert to the existing outfall, which would also require compliance with the 0.1 mg/L TP limit. This alternative is a very risky long-term solution to the WWTF’s phosphorus compliance requirements and ultimately does not change the phosphorus loading to the Mississippi River. Therefore, this alternative will not be considered as a viable option and will no longer be considered.

10.4 REGIONALIZATION

Regionalization will not be considered as an alternative for meeting the effluent TP limits. Prairie du Chien is the largest community in the area and already receives wastewater from Bridgeport Sanitary District. The nearest potential community for additional regionalization is the Village of Wauzeka, which is located more than 17 miles away! The cost associated with constructing new force mains, pump stations, and upgrading treatment facilities to accommodate additional flow is not economically feasible. Furthermore, the WWTF would still be required to meet the effluent TP limit of 0.1 mg/L. Overall, regionalization would not address the WWTF’s current phosphorus compliance requirements and is therefore not considered a viable alternative.

10.5 FILTRATION TREATMENT TECHNOLOGIES

The monthly average concentration for the Effluent Total Suspended Solids (TSS) has been 8 mg/L over the past three (3) years. Reducing effluent TSS concentrations beyond this level is difficult to achieve by gravity settling alone. Even with chemical addition, flocs that are not settled in the final clarifier will exit with the remaining TSS. Greater removal of TSS will ensure more efficient removal of particulate

Phosphorus and will allow for optimized chemical addition. To achieve greater TSS removal, the WWTF may need to be upgraded with effluent filter technology.

The existing chemical addition system would continue to be utilized. The new filtration system would be installed following the final clarifier to polish effluent. Effluent from the final clarifier would proceed to the filter building where the additional Phosphorus containing solids would be removed using a disk filter, sand filter, ultrafiltration, or membrane bioreactor. During high flows, a portion of the effluent would bypass the filters and be recombined with the filtered effluent prior to discharge.

Pilot testing of disk filters around Wisconsin have shown that effluent Phosphorus concentrations of 0.05 mg/L are achievable on a consistent basis. Four (4) 0.500 MGD capacity filters would be provided, two duty and two as standby redundant units. Flows up to 1.00 MGD would receive filtration to reduce Phosphorus concentrations to 0.05 mg/L or less and flows above 0.500 MGD would bypass filtration with a Phosphorus concentration of 1.0 mg/L or less and be combined with the filtered effluent. Flows above the 0.500 MGD filter capacity do increase expected combined effluent Phosphorus concentrations, but compliance with monthly and seasonal limits would be maintained.

10.6 SPRAY IRRIGATION

This alternative would include the installation of a spray irrigation system. Implementing spray irrigation would eliminate the need to meet the low effluent Total Phosphorus limit by converting the WWTF's surface water discharge to land application. Wastewater would continue to be treated by the existing treatment system; however, additional infrastructure would be required, including a retention pond, associated process piping, and control systems to store the treated effluent during the non-growing season and distribute the effluent to the spray irrigation sites.

The spray irrigation system would need to be divided into multiple irrigation zones to ensure proper cycling and application of wastewater to cropland in accordance with Wisconsin Administrative Code NR 110.255(2). Additionally, spray irrigation is prohibited on frozen ground; therefore, the City would be required to store treated effluent throughout the winter months. Assuming a 180-day winter storage period and an average daily flow of 0.792 MGD, approximately 142.6 million gallons of treated effluent would need to be stored.

In addition, Wisconsin Administrative Code NR 214.14(3)(d) limits the hydraulic application rate for spray irrigation systems to a maximum of 10,000 gallons per acre per day. At a design flow of 0.792 MGD, the City would need to land apply approximately 289 million gallons annually. Assuming a 180-day growing season, this equates to an average daily application rate of approximately 1.61 million gallons, requiring a minimum of 161 acres of irrigable land.

The City does not currently possess sufficient land to meet these acreage and storage requirements. Consequently, spray irrigation is not a feasible alternative for the WWTF due to the extensive land area required for wastewater application and the substantial storage volume needed for winter effluent retention.

10.7 SEEPAGE CELLS

A seepage cell system could be evaluated as an alternative to eliminate the required low effluent Total Phosphorus limit by converting the WWTF's surface water discharge to a groundwater discharge through the use of seepage cells. In accordance with Wisconsin Administrative Code NR 110.255(1), new absorption pond systems are required to consist of a minimum of three (3) individual ponds of approximately equal size.

Assuming an average hydraulic application rate of 100,000 gallons per acre per day and a three-cell system of equal size, a design flow of 0.792 MGD would require each seepage cell to have an

approximate surface area of 8.0 acres, for a total area of approximately 24 acres. The existing WWTF site is approximately 3.4 acres in size and does not have sufficient land area to meet the hydraulic loading requirements for a seepage cell system. Consequently, a seepage cell system is not a feasible alternative for the WWTF at this time.

10.8 BIOLOGICAL PHOSPHORUS REMOVAL (BPR) WITH WATER QUALITY TRADING (WQT)

The City of Prairie du Chien completed a BPR pilot study in the Fall of 2021. The purpose of the pilot study was to reduce the amount of chemical used at the facility or eliminate the need for chemical addition entirely in order to meet current WPDES permit limits of 1.0 mg/L. Prior to implementation of BPR, the WWTF relied heavily on chemical treatment. In 2020, the facility used 110 tons of alum at a cost of \$20,650 to the Department.

As part of the pilot study, mixers were installed in Aeration Tanks #1 and #2 and operate on timers to maintain solids in suspension. Since the implementation of the BPR pilot in 2021, treatment at the WWTF has nearly eliminated Alum consumption while reducing effluent Total Phosphorus concentrations below 0.70 mg/L, with an average effluent TP concentration of 0.46 mg/L in 2024. Water Quality Trading would then be used to offset pounds of TP discharged above the Final Limit of 0.1 mg/L.

For permanent implementation of BPR, the aeration tanks would be drawn down, cleaned, and hardware inspected. Repairs/improvements should be planned for the next WWTF Upgrade Project. Recommended improvements include:

- Repair the 24" piping junction box at the west end of the Aeration Tank
- Repair/replace diffusers and associated hardware as needed
- Remove grit, trash, and other solids that have accumulated in the bottom of the Aeration Tanks
- Replace slide gates

Water Quality Trading (WQT) Calculations:

A) The 2024 Phosphorus loading discharged at the WWTF is calculated as follows:

2024 Average Daily Flow (Q) = 0.792 MGD
2024 Average Phosphorus Concentration = 0.46 mg/L

$$\text{lbs./year} = 0.46 \text{ mg/L} \times 0.792 \text{ MGD} \times 8.34 \times 365 \text{ days/yr.} = \mathbf{1,109 \text{ lbs./yr.}}$$

B) The proposed allowable annual Phosphorus mass limit at the WWTF is calculated as follows:

2024 Average Daily Flow (Q) = 0.792 MGD
Proposed Seasonal Phosphorus Concentration Limit = 0.100 mg/L

$$\text{lbs./year} = 0.100 \text{ mg/L} \times 0.792 \text{ MGD} \times 8.34 \times 365 \text{ days/yr.} = \mathbf{241 \text{ lbs./yr.}}$$

C) Reduction of TP required at WWTF -

$$1,109 \text{ lbs./yr.} - 241 \text{ lbs./yr.} = \mathbf{868 \text{ lbs./yr.}}$$

The guidelines for WQT require that a trade result in water quality improvement at a Point Source (PS) or Non-Point Source (NPS) providing credits to the WWTF which is also a Point Source. Methods, formulas, and trade ratios are dependent on type of land and improvements being completed for the NPS

reduction. For estimation purposes, a 2:1 final trade ratio was used (Example: 2 pounds of load reduction generated for each pound of credit available). Utilizing 2:1 trade ratio listed above, the required NPS Phosphorus reduction would be **1,736 lbs./year**.

The City has submitted a Notice of Intent to Conduct Water Quality Trading. The City has performed a streambank stabilization project along Campbell Coulee (WBIC 5035397). The City intends to complete additional investigations for projects along Mill Coulee, Picatee Creek, and Du Charme Creek to include in a Water Quality Trading Plan.

10.9 ADAPTIVE MANAGEMENT

Adaptive Management is completed by a Permittee improving water quality within a watershed by reducing in-stream Phosphorus concentrations through watershed improvements. The end goal of Adaptive Management is to meet the Water Quality Criteria. Calculations for Adaptive Management (AM) can be calculated as follows:

Current Point Source Phosphorus Load (Q):

Effluent Flow (MGD) x Phosphorus (mg/L) x 8.34 x 365 days/year

Current Load in Receiving Water (QR):

Flow of receiving water (MGD) x Phosphorus (mg/L) x 8.34 x 365 days/year

Allowable Load in Receiving Water:

(Effluent flow + Flow of receiving Water) x Receiving Water - water quality criterion (mg/L) x 8.34 x 365 days/year

Needed Reduction in Receiving Water:

$(Q + QR) - \text{Allowable Load in Receiving Water} = \text{Needed Reduction}$

Applicants' (WWTF) Percent Contribution Load:

$Q/QR \times 100 = \% \text{ Contribution Load}$

Proportional Share of Needed Reduction by Applicant (WWTF):

$\text{Needed Reduction} \times \% \text{ Contribution} = \text{Proportional Share by WWTF}$

Adaptive Management is not feasible for the Mississippi River Watershed due to the magnitude of TP reductions that would be required to quantify a noticeable reduction let alone meet the Water Quality Criteria.

CHAPTER XI - ALTERNATIVES EVALUATION

11.1 ECONOMIC EVALUATION

The criteria for selecting the most feasible and environmentally acceptable method of wastewater treatment includes monetary considerations, environmental impacts, implementation capability, and other considerations such as flexibility and reliability of operation and energy use. Monetary considerations are, however, a major factor in determining the most cost-effective alternative.

One of the major elements of identifying and selecting the most feasible alternative for wastewater treatment is to evaluate the present worth of the total project for each of the alternatives. When performing this evaluation, the cost of each of the alternatives is projected for a 20-year period. Initial capital cost, future capital costs, and annual operation and maintenance expenses over a 20-year period must be considered to determine the most cost-effective alternative. Operation and maintenance costs included are intended to aid decision making in differentiating alternatives rather than actual budgetary guidelines. These costs are discounted to present day dollars in a present worth analysis so that a fair cost comparison can be made among the alternatives. An annual interest rate of 1.485% was used for this evaluation based on the current DNR Environmental Loans Program. Appendix C contains detailed economic analysis for the previously mentioned Alternatives. Tables 11.1, 11.2, and 11.3 below summarize the economic evaluation of the General Facility Maintenance Items, Sludge Storage Improvements, and Phosphorus Compliance respectively.

Table 11.1 - Economic Evaluation Summary for General Facility Maintenance

Alternatives	Initial Cost	Annual O&M	Total Annual Worth	Total Present Worth
8.2 Wastewater Collection System Improvements	\$79,000	-	\$4,600	\$79,000
8.3 Wastewater Dept. Equipment	\$329,000	-	\$20,000	\$329,000
8.4 Lab & Control Building Improvements	\$1,536,000	-	\$89,400	\$1,536,000
8.5 Headworks Building Improvements	\$1,100,000	-	\$64,000	\$1,100,000
8.6 Chemical Storage Building Improvements	\$234,000	-	\$13,600	\$234,000
8.7 Final Clarifiers Improvements	\$182,000	-	\$10,600	\$182,000
8.8 Disinfection System Improvements	\$106,000	-	\$6,200	\$106,000
8.9 Effluent Monitoring Improvements	\$29,000	-	\$1,700	\$29,000
8.10 Aerobic Sludge Digestors Improvements	\$141,000	-	\$8,200	\$141,000
8.11 Blower Building Improvements	\$4,763,000	-	\$265,700	\$4,763,000
8.12 RAS/WAS Pump Improvements	\$339,000	-	\$18,200	\$339,000
8.13 Site Improvements	\$1,493,000	-	\$77,100	\$1,493,000
Total	\$10,331,000	-	\$579,300	\$10,331,000

Table 11.2 - Economic Evaluation Summary for Sludge Storage Upgrade

Alternatives	Initial Cost	Additional Annual O&M	Total Annual Worth	Total Present Worth
9.2 New Concrete Sludge Storage	\$620,000	\$43,000	\$73,900	\$1,483,000
9.3 Replace Existing GBT	\$544,000	\$12,125	\$38,400	\$796,000
9.4 New Screw Press and Cake Storage Building	\$2,567,000	-\$83,000	\$36,800	\$788,000

Table 11.3 - Economic Evaluation Summary for Phosphorus Compliance Upgrade

Alternatives	Initial Cost	Additional Annual O&M	Total Annual Worth	Total Present Worth
10.5 Filtration Treatment Technologies	\$3,113,000	\$32,500	\$369,800	\$3,413,000
10.8 BPR with WQT	\$1,367,000	- \$6,250	\$73,300	\$1,260,000

The following are the current residential Sewer User Charge Rates utilized by the City of Prairie du Chien in the operation of the Sewer Utility:

Billing Cycle - Quarterly
 Residential Base Rate = \$44.50/Quarter
 Volume Charge = \$3.38/748 gal (100 cu. ft.)

Utilizing the 2024 Public Service Commission (PSC) Annual Report, the City received 77,144,000 gallons of sanitary sewer discharged from 2,004 residential customers.

77,144,000 gallons/2,004 users = 38,495 gallons/yr./user or 9,624 gallons/qtr./user
 9,624 gallons/qtr. x \$3.38/748 = \$43.49
Base Charge = \$44.50
 Average Sewer Charge = \$87.99/qtr./user = \$351.96/yr./user

Currently, residential users pay approximately **\$87.99 per quarter (\$351.96 annually)** for sewer service. The median average residential user rate for communities with 5,001 to 10,000 people in the state is approximately \$103.25 per quarter (\$413 annually) according to MSA’s 2022 Sewer User Charge Survey. The effects on user rates for each improvement were calculated by dividing the annual worth among 2,110 residential users. Since residential water usage accounts for 30% of the total sanitary sewer discharged, only 30% of the new pollution control cost was used to calculate additional pollution control costs per household. The total annual cost per user is calculated by adding the current annual residential user rate plus the new annual pollution control cost per user. The financial impact for each proposed WWTF General Facilities Maintenance item are provided in Table 11.4. Additionally, the Sludge Storage Upgrade Alternatives and Phosphorus Compliance Upgrade Alternatives financial impacts are provided in Table 11.5 and 11.6, respectively. The Median Household Income (MHI) for the City of Prairie du Chien, according to the Wisconsin DNR Environmental Loans – SFY 2026 Projects, is **\$52,670**.

Table 11.4 - Economic Impact for General Facility Maintenance

Alternative	Total Annual Worth	Additional Annual Pollution Control Cost Per User	Total Annual Cost Per User
8.2 Wastewater Collection System Improvements	\$4,600	\$0.65	
8.3 Wastewater Dept. Equipment Improvements	\$20,000	\$2.84	
8.4 Lab & Control Building Improvements	\$89,400	\$12.70	
8.5 Headworks Building Improvements	\$64,000	\$9.10	
8.6 Chemical Storage Building Improvements	\$13,600	\$1.93	
8.7 Final Clarifiers Improvements	\$10,600	\$1.50	
8.8 Disinfection System Improvements	\$6,200	\$0.88	
8.9 Effluent Monitoring Improvements	\$1,700	\$0.24	
8.10 Aerobic Sludge Digestors Improvements	\$8,200	\$1.17	
8.11 Blower Building Improvements	\$265,700	\$37.77	
8.12 RAS/WAS Pump Improvements	\$18,200	\$2.58	
8.13 Site Improvements	\$77,100	\$10.96	
Total	\$579,300	\$82.32	\$434.28

As demonstrated, the implementation of all general facility maintenance items would increase user rates by **\$82.32/yr.**

Table 11.5 - Economic Impact for Sludge Storage Upgrade

Alternative	Total Annual Worth	Additional Annual Pollution Control Cost Per User	Total Annual Cost Per User
9.2 New Concrete Sludge Storage	\$73,900	\$10.51	\$362.47
9.3 Replace Existing GBT	\$38,400	\$5.45	\$357.41
9.4 New Screw Press and Cake Storage Building	\$36,800	\$5.22	\$357.18

As demonstrated, the most cost-effective alternative for Sludge Storage is Alternative 9.4 – Screw Press and Cake Storage Building which would increase user rates by **\$5.22/yr.**

Table 11.6 - Economic Impact for Phosphorus Compliance Upgrade

Alternative	Total Annual Worth	Additional Annual Pollution Control Cost Per User	Total Annual Cost Per User
10.5 Filtration Treatment Technologies	\$369,800	\$52.58	\$404.54
10.8 BPR with WQT	\$73,300	\$10.42	\$362.38

As demonstrated, the most cost-effective alternative for Phosphorus Compliance is Alternative 10.8 Biological Phosphorus Removal with Water Quality Trading and would increase user rates by **\$10.42/yr.**

11.2 NON-ECONOMIC EVALUATION

Non-monetary factors should also be considered in evaluating the alternatives. Some of these factors include environmental issues, construction sequencing, flexibility, and reliability of the new facilities.

Energy and Resource Usage -

General Facility Maintenance Item 8.2 – The Lab & Control Building Upgrade will increase energy consumption to support operation of a new SCADA system and automatic dialer; however, these improvements will significantly enhance system efficiency and reliability. Replacing the existing callout system with an automatic dialer will reduce emergency response time, minimize equipment downtime, and enable faster restoration of treatment processes following equipment failure. Installation of a new SCADA system will allow operators to remotely monitor and control the treatment system, improving operational efficiency and reducing overall treatment related electrical costs. In addition, eliminating one electrical service will reduce redundancy within the on-site electrical system, such as multiple transformers, generators, and transfer switches, and result in cost savings by eliminating a second service charge. The replacement of the MCC will include the installation of VFDs which would significantly reduce facility power consumption at the WWTF. These would prevent the facility blowers and pumps from operating at their full power consumption at all times and reduce wear on associated components. As blowers typically consist of the majority of a facilities energy consumption, the throttling the blowers down with VFD's will decrease facility power consumption. The Lab & Control Building Upgrade would allow for existing components to be managed more efficiently, reduce overall energy consumption of non-optimized components, and reduce future maintenance resources for structure repairs.

General Facility Maintenance Item 8.3 – The Headworks Upgrade will increase energy consumption for powering the proposed mechanical bar screen as compared to the existing manual bar screen. The existing manual bar screen has been in use at WWTF in excess of 60 years and is susceptible to plugging. Replacement of the influent pumps would significantly reduce facility power consumption with the addition of VFD's. These would prevent the pumps from operating at their full power consumption at all times and reduce wear on associated components. The Headworks Upgrade would allow for existing components to be managed more efficiently, reduce overall energy consumption of non-optimized components, and reduce future maintenance resources for structure repairs.

General Facility Maintenance Item 8.9 – The Blower Maintenance would significantly reduce facility power consumption with the addition of VFDs. These would prevent the facility blowers from operating at their full power consumption at all times and reduce wear on associated components. As blowers typically consist of the majority of a facilities energy consumption, the throttling back of their energy consumption with VFD's will decrease facility power consumption greatly.

General Facility Maintenance Item 8.11E – The installation of Solar Panels will allow the WWTF to create solar energy and offset their energy consumption at the WWTF and reduce their billed energy consumption.

Sludge Storage Upgrade Alternative 9.4 – Cake sludge would require the continued use of polymer feed for sludge thickening and dewatering. The proposed screw press would consume more power to operate compared to the other listed alternatives. However, the use of cake sludge would reduce the overall sludge volume, thereby decreasing fuel consumption associated with sludge hauling.

Phosphorus Compliance Upgrade Alternative 10.5 – The addition of effluent filtration would consume additional electricity to operate the filter system. Additionally, the effluent filtration process will generate additional sludge that would need to be disposed of.

Environmental and Social Factors -

All of the retained alternatives will meet water quality permit limits while also maintaining treatment performance during construction. The air quality/nuisance odors around the WWTF will not significantly change with any of the proposed alternatives and maintenance items. Due to the 500 feet isolation

requirement from mechanical wastewater treatment facilities as required in NR 110.15, construction at the WWTF will require property owners within 500 feet to be notified. Please see Figure 11.1 of Appendix A for an Isolation Boundary Map and list of Property Owner(s) to be contacted.

Phosphorus Compliance Upgrade 10.8 – WQT will require the City to form partnerships with local property owners. Projects such as streambank stabilization will require the existing trees to be removed and the eroding banks will be graded and riprapped (as needed). In-stream habitat improvements will also be included with the streambank stabilization to alleviate stream impairments. Removing trees and altering the natural look of a stream can draw public discernment and should be considered in the WQT Plan and Trade Agreements.

Environmental –

The WWTF Upgrade will minimally increase impervious surface area and will disturb less than one (1) acre. The headworks upgrade will remove garbage from the wastewater that would otherwise be land applied with the municipal sludge. Sludge storage improvements will reduce potential groundwater contamination from the previously used sludge drying beds.

Sludge Storage Upgrade Alternative 9.2 – This alternative would increase the volume of sludge produced and would require the WWTF to land-apply additional sludge. This would increase the risk of overloading agricultural fields with excess nutrients and may therefore be detrimental to nearby surface water bodies.

Sludge Storage Upgrade Alternative 9.3 – This alternative would maintain sludge production at the WWTF at levels consistent with existing conditions.

Sludge Storage Upgrade Alternative 9.4 – This alternative would significantly reduce the volume of sludge produced and subsequently land applied from the WWTF. The reduction in sludge volume would decrease the land area required for land application, allowing for improved loading cycles on agricultural fields and reducing the risk of nutrient overloading. This, in turn, would lower the potential for excessive application of phosphorus, nitrogen, heavy metals, and other nutrients, thereby improving the water quality of nearby surface water bodies.

Phosphorus Compliance Upgrade Alternative 10.9 – WQT utilizes a hefty safety factor in calculating accrued TP Credits from BMP installations. This means the City will reduce the non-point TP loading to the stream more than if the City were to solely perform a WWTF Upgrade. The BMPs will also aid in reducing other non-point source pollutant loads such as nutrients, TSS, heavy metals, etc. However, if not maintained, BMPs, such as detention ponds, can become a source of contamination due to accumulated pollutants.

Floodplain – The WWTF is located within Zone A (0.2% Annual Chance Flood Hazard) and is just outside the Regulatory Floodway based on Figure 11.2 – Flood Hazard Map.

Wetlands – The WWTF Project will not permanently impact wetlands as depicted in Figure 2.2 – Wetland Location Map.

Historic Preservation – The WWTF Site will not need to be evaluated by the DNR during the permit application process for Historic Preservation Sites within the construction area as it will be utilizing existing structures and footprints for all alternatives.

Use of Existing Facilities -

The WWTF Upgrade will utilize the existing WWTF property and will utilize the existing structures and piping where feasible. Specific items to be reused are as follows:

1. Influent Force Main
2. Influent Structure
3. Lab & Control Building
4. Chemical Storage Building
5. Blower Building Basement
6. Control Room and GBT Room of the Blower Building
7. Final Clarifier Structure
8. Aeration Tank Structure
9. Aerobic Digestors
10. Sludge Storage Tanks #1 and #2
11. UV Disinfection System
12. Outfall 001

Sludge Storage Upgrade Alternative 9.2 – This alternative would utilize the existing aerobic digesters and sludge storage tanks, and the existing blower building basement would remain in place. The existing GBT would be removed.

Sludge Storage Upgrade Alternative 9.3 – This alternative would not impact the existing WWTF and could be utilized in conjunction with any of the proposed alternatives in Chapters VIII and X of this Facility Plan.

Sludge Storage Upgrade Alternative 9.4 – This alternative would include the removal of the existing GBT and sludge storage tank #3. The aerobic digesters and the remaining sludge storage tanks would remain in place. This alternative could be implemented in conjunction with any of the proposed alternatives in Chapters VIII and X of this Facility Plan.

Phosphorus Compliance Upgrade Alternative 10.5 – This alternative would require relocation of the chemical addition point, along with the associated chemical feed piping. This alternative would not impact existing WWTF operations and could be implemented in conjunction with any of the proposed alternatives described in Chapters VIII and IX of this Facility Plan.

Phosphorus Compliance Upgrade Alternative 10.8 – The permanent installation of BPR for the WWTF would not impact existing WWTF operations, except that it would nearly eliminate the need for chemical addition and could be implemented in conjunction with any of the proposed alternatives described in Chapters VIII and IX of this Facility Plan.

WWTF Operator -

The operator's skill and knowledge should always be considered while evaluating the complexity of operation and maintenance for the given alternatives. Since it will be the operator who will have to run and maintain the wastewater treatment system after construction, his/her opinion, mentality, and knowledge of the chosen alternative correlates directly to the ability of the alternative to effectively manage and treat wastewater as designed. With any alternative chosen and equipment implementation, the operator will need to receive proper education and guidance as well as an operation and maintenance manual.

General Facility Maintenance Item 8.3 – Mechanical bar screens are relatively common in southwest Wisconsin, which would allow operators to gain valuable support and experience from nearby facilities. Mechanical bar screens would require fewer daily activities, such as manual screen clearing; however, they would require routine maintenance that may involve more time and troubleshooting to complete.

Sludge Storage Upgrade Alternative 9.2 – This alternative will remove the GBT, resulting in a simpler process and therefore will require minimal training.

Sludge Storage Upgrade Alternative 9.3 – This alternative will utilize the existing process and will require minimal training.

Sludge Storage Upgrade Alternative 9.4 – Screw Press systems are rarely used in Southwestern Wisconsin as they are among the more complex and costly alternatives listed. Therefore, available knowledge from nearby operators would be limited if problems arise. The operator would then rely on the provider of the system for guidance.

Phosphorus Compliance Upgrade Alternative 10.5 – Filtration systems are rarely used in Southwestern Wisconsin as they are among the more complex and costly alternatives listed. Therefore, available knowledge from nearby operators would be limited if problems arise. The operator would then rely on the provider of the system for guidance.

Phosphorus Compliance Upgrade Alternative 10.8 – WQT has been a compliance option for Treatment Facilities for a number of years but has been limited in use until Facilities were required to meet low-level TP limits. Since this alternative is new to most operators, the operator depends heavily on Engineers, Conservation Groups, County Conservationist, and DNR for knowledge and expertise. However, the City has completed two (2) streambank stabilization projects and has direct experience with operation and maintenance activities associated with these improvement projects.

CHAPTER XII - RECOMMENDED PLAN

12.1 RECOMMENDED PLAN

The existing facility provides adequate wastewater treatment. The City's current WPDES Permit expired on June 30, 2023. Based on the existing condition of the City's WWTF, the City has identified the following as primary needs at the facility:

- General Facility Maintenance
- Sludge Storage Upgrade
- Phosphorus Compliance Upgrade

The estimated average annual Residential User Sewer Charge would increase **\$97.96** in order to construct, operate, and maintain all of the proposed Recommendations.

Chapter VIII – General Facility Maintenance -

The City recently evaluated the condition, age, and efficiency of various processes, structures, and equipment. Most of the structures and equipment are original to the 1995 WWTF Upgrade and are now in excess of 30 years old. After evaluating the existing WWTF the City has identified the general maintenance needs at the facility as follows:

- Wastewater Collection System Improvements
 - New Lift Station Site Lights
- Wastewater Department Equipment Improvements
 - 1/2-Ton Truck Replacement
 - 3/4-Ton Truck Replacement
 - Jetter/Vac Truck Replacement
 - Sewer Camera Replacement
 - New Trash Pump
- Lab & Control Building Improvements
 - MCC Replacement
 - New SCADA System
 - Building Maintenance
 - Standby Generator Replacement
- Headworks Building Improvements
 - Screening Improvements
 - Grit Classifier and Piping Improvements
 - Raw Wastewater Pumps Replacement
 - Building Maintenance
- Chemical Storage Building Improvements
 - Chemical Storage Tanks Replacement
 - Chemical Feed Pumps and Piping Replacement
 - Building Maintenance
- Final Clarifiers Improvements
 - Final Clarifier #2 Rehabilitation
 - General Maintenance
- Disinfection System Improvements
 - UV Structure Rehabilitation
- Effluent Monitoring Improvements
 - Effluent Monitoring Improvements
- Aerobic Sludge Digestors Improvements
 - Aeration System Replacement
- Blower Building Improvements

- New Blower Building
- Blowers Replacement
- RAS/WAS Pump Station Improvements
 - Plug Valves Replacement
 - Sludge Pumps Replacement
- Site Improvements
 - Storage Building Improvements
 - Truck Fill Station Relocation
 - Site Lighting Improvements
 - New Solar Panels

The City intends to perform these maintenance items as necessary or convenient. The estimated average annual Residential User Sewer Charge would increase to **\$82.32** by performing all of the above maintenance items.

Chapter IX – Sludge Storage Upgrade Alternatives -

Due to the existing condition of the Gravity Belt Thickener (GBT) and associated appurtenances, Waste Activated Sludge (WAS) is sent directly to the aerobic sludge digestors. This deficiency causes the percent solids of the sludge to decrease which increases the amount of sludge storage necessary for holding the sludge. Alternatives for improving sludge storage and management include construction of a new concrete storage structure, replacement of the existing GBT, and installation of a new screw press with a cake storage structure. These alternatives can be viewed in Chapter IX – Sludge Storage Upgrade. After considering economic and non-economic factors associated with the alternatives, it is recommended the City proceed with Alternative 9.4 – New Screw Press with Cake Storage Structure.

The estimated average annual Residential User Sewer Charge would increase **\$5.22** in order to construct, operate, and maintain Alternative 9.4 – New Screw Press with Cake Storage Structure.

Chapter X – Phosphorus Compliance Upgrade Alternatives -

Many alternatives were considered, including Water Quality Trading (WQT), an alternate discharge location, regionalization, a filtration system, spray irrigation, seepage cells, and Biological Phosphorus Removal (BPR). These alternatives can be viewed in Chapter X – Phosphorous Compliance Upgrade. After considering economic and non-economic factors associated with the alternatives, it is recommended the City proceed with Alternative 10.9 – BPR with WQT.

The estimated average annual Residential User Sewer Charge would increase **\$10.42** in order to construct, operate, and maintain Alternative 10.8 – BPR with WQT.

Table 12.1 shows the Proposed Facility Schedule including milestone dates.

Table 12.1 - Project Schedule

Required Action	Due Date
Submit Plans and Specifications	September 30, 2027
Begin Construction	April 30, 2028
Complete Construction	October 31, 2029