

AGENDA
BOARD OF PUBLIC WORKS MEETING
Tuesday, November 29, 2022 at 6:00 p.m.
Jackson Municipal Complex
Village Board Room
N168W19851 Main Street
Jackson, WI 53037

1. Call to Order and Roll Call
2. Approval of the Board of Public Works Minutes of October 25, 2022
3. WWTP Facility Plan Update – Town & Country Engineering
4. We-Energies Gas and Electric Easement – Cedar Parkway
5. Painting Quote for Public Works/Water Department Building
6. Quote for Overhead Garage Door Street Department
7. Purchase of Bobcat UW56 Toolcat Utility Work Machine
8. Director of Public Works Report
9. Citizens/Village Staff to address the Board
10. Adjourn

Persons with disabilities requiring special accommodations for attendance at the meeting should contact the Administration Department at the Jackson Municipal Complex at least one (1) business day prior to the meeting.

It is possible that members of the Village Board may attend the above meeting. No action will be taken by any governmental body at this meeting other than the governmental body specifically referred to in this meeting notice. This notice is given so that members of the Village Board may attend the meeting without violating the open meeting law.

DRAFT MINUTES
Board of Public Works Meeting
Tuesday, October 25, 2022 at 6:00 p.m.
Jackson Municipal Complex
Village Board Room
N168W19851 Main Street
Jackson, WI 53037

1. Call to Order and Roll Call

Chair Tr. Heckendorf called the meeting to order at 6:00 p.m.

Members Present: Tr. Engelhardt, Sarah Malchow, Tim Meffert, and Chris Sberna

Member Excused: Tr. Matter

Staff Present: Administrator Jen Keller, Director of Public Works Brian Kober and Clerk Jilline Dobratz

Also Present: Greg Droessler of Town & Country Engineering

2. Approval of the Board of Public Works Minutes of September 27, 2022

Motion by Sarah Malchow, second by Tim Meffert to approve the Board of Public Works minutes of September 27, 2022.

Vote: 5 ayes, 0 nays. Motion carried.

3. WWTP Facility Plan Update – Town & Country Engineering

Director Kober provided background information. The permit has been extended by the DNR. Professional Engineer Greg Droessler gave an update of the WWTF Facility Plan.

Phase 1 is scheduled for 2024. Expenses, revenues, and rate increases were discussed. All Board of Public Works Committee members stated which option they preferred. The item is for information only no action is necessary.

4. Review of Quotes for STH 60 – Utility Upgrades Project

Director Kober discussed the four bids which were received for the project.

Motion by Tr. Heckendorf, second by Tr. Engelhardt to recommend Budget & Finance and Village Board approve the contract from Advanced Construction for STH 60 – Utility Upgrades Project in the amount of \$2,713,433.75.

Vote: 5 ayes, 0 nays. Motion carried.

5. Resolution #22-20 Preliminary Intent to Special Assess for STH 60 – Utility Upgrades Project

Director Kober commented on the special assessment area and gave estimates of special assessments.

Motion by Tr. Heckendorf, second by Tim Meffert to recommend Budget & Finance and Village Board approve Resolution #22-20 Preliminary Intent to Special Asses for STH 60 – Utility Upgrades Project.

Vote: 5 ayes, 0 nays. Motion carried.

6. Announcing Public Information Meeting for STH 60 – Utility Upgrades Project

Director Kober stated Tuesday, November 1, 2022, is the meeting date for the Public Informational Meeting of STH 60 project. Letters to the property owners were mailed on October 14, 2022. The item is for information only no action is necessary.

7. Director of Public Works Report

Director Kober explained the report authored for the review of the Board.

Motion by Tr. Heckendorf, second by Chris Sberna to place the Director of Public Works Report on file.

Vote: 5 ayes, 0 nays. Motion carried.

8. Citizens/Village Staff to Address the Board

None.

9. Adjourn

Motion by Tr. Engelhardt, second by Sarah Malchow to adjourn.

Vote: 5 ayes, 0 nays. Meeting was adjourned at 7:21 p.m.

Respectfully submitted,

Jilline Dobratz, *CMC/WCPC*
Village Clerk

EXECUTIVE SUMMARY

General Overview

The Village of Jackson is undertaking facilities planning to develop and evaluate viable alternatives for its existing wastewater treatment facility (WWTF). The WWTF was originally constructed in 1978 as a rotating biological contactor (RBC) plant and has undergone major upgrades in 1994 and 2001. The blowers and tertiary filters were upgraded in 2012, and the digesters were refurbished in 2014. The WWTF supervisory control and data acquisition (SCADA) system was last upgraded in 2018 with new programmable logic controllers (PLCs), computers, and controls upgrades. The Village of Jackson has continued to grow steadily on a residential user basis, as well as some commercial and industrial growth. The hydraulic and pollutant design capacity will be increased to meet the Village's needs for the next 20 years. In addition to the need for increased capacity, most processes and equipment are reaching the end of their useful life and need replacement. There are necessary process improvements required to meet more stringent future effluent limits. The purpose of this Facilities Planning Document is to evaluate alternatives for meeting future loading conditions and complying with current and future permit requirements.

The planning process necessarily depends on input from various sectors of the community including Village officials and staff, private citizens, industries, and the commercial sector to become a successful planning tool. Historical records have been evaluated and projections have been made to establish long term needs. The rationale for development and selection of the recommended alternative is summarized in the following paragraphs; however, for a more detailed look at all alternatives evaluated, refer to the remaining chapters and appendices.

Planning Area and Regional Options

The Planning Area for this Facilities Planning Document includes the planning area from the Southeastern Wisconsin Regional Planning Commission's "*A Comprehensive Plan for the Village of Jackson: 2050 Washington County, Wisconsin*" (Comprehensive Plan) and covers all land within the Village boundaries, which encompasses approximately 3 square miles, and the Extraterritorial Jurisdiction Area, which extends 1-½ miles from the Village Limits.

Regionalization with neighboring communities was previously considered as part of the phosphorus compliance alternatives evaluation in 2021. There are a few neighboring WWTF discharges with the nearest being West Bend (approximately 9 miles) and Slinger (approximately 8 miles). Regionalization with these facilities was not considered cost-effective given the pumping distance and significant cost associated with pumping wastewater long distances. In addition, it is not expected that the neighboring WWTFs would be able to accommodate Jackson's projected loadings without an upgrade to their own existing facilities.

Evaluation of Needs and Alternatives

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Chapter 4 presents the future design conditions based on the projected growth for the planning area. Future population growth for the Village of Jackson was estimated using the projections in

the Department of Administration. A 2045 population of 10,839 was selected for planning purposes and represents a growth of 3,654 people over the next 23 years, using the 2020 Census population of 7,185 as the current base population. Based on current knowledge of possible growth areas, the Village feels this is a reasonable projection and is consistent with past growth.

The Village currently has only one significant industrial user, Kerry Ingredients. Kerry pretreats its wastewater prior to discharge to the Village's collection system and there is an agreement in place that limits Kerry to 60,000 gallons per day (gpd) with detailed nutrient requirements. No other specific industrial allocations are included in this Plan.

The projected flows and loads for the Village of Jackson will require capacity and hydraulic upgrades to the existing WWTF. Chapter 5 presents alternatives for specific unit processes on site. Most improvement to the WWTF will be required regardless of the specific unit process alternative selected. Based on the result of the capital cost analysis and conversations with staff, three Project Alternatives were developed to be analyzed on a present worth basis. Each project alternative includes the Base costs required at the facility, plus a combination of alternatives for the hauled waste receiving station upgrade or relocation, addition of primary clarifiers, and expansion of the anaerobic digestion or conversion to aerobic digestion.

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Current and future effluent limits have been taken into consideration in the development of alternatives. The current Wisconsin Pollutant Discharge Elimination System (WPDES) permit was issued in April 2020 and is effective for five years. The outfall is in the Milwaukee River – Cedar Creek Total Maximum Daily Load (TMDL) watershed. Monthly loading limits for phosphorus will begin in the Village's next permit cycle and are based on the TMDL allocations approved by the USEPA in March 2018. The WWTF requires a tertiary filtration upgrade to meet the final phosphorus requirements.

Chapter 6 provides a comparison of the three Project Alternatives in terms of capital costs, operation and maintenance (O&M), present worth, and non-economic factors. Each Project Alternative includes a common set of Base scope items, as well as a combination of Process Alternatives for processes throughout the WWTF. A cost-effectiveness evaluation was performed by comparing the 20-year present worth of all capital, O&M, and replacement costs of each Project Alternative. Differences in salvage values are negligible between alternatives and were not included the evaluation.

Chapter 6 also provides a description of the proposed project phasing. Due to the overall cost of the project and the varying timelines for when the improvements are needed, the Village intends to phase these improvements. The phases are intended to be staggered with Phase 1 for the Administration, Storage and Tertiary Treatment needs of the WWTF, followed by Phase 2A for Process Upgrades and Phase 2B for Solids Handling Upgrades. Due to the Phosphorus Compliance Schedule in the Village's WPDES permit, Phase 1 will need to be constructed in the next 3-4 years.

Phase 2A and Phase 2B are tentatively slated for construction in 2026 and 2028 respectively, but the exact start of these Phases is not known at this time as they are driven by the need for additional treatment capacity and the projected increase in solids loading at the WWTF.

Chapter 6 also considers non-economic factors beyond the capital and present worth costs for selection of a recommended alternative. The other factors analysis includes non-economic factors such as ease of operation, future growth potential, environmental impacts, and other considerations.

Conclusions

Project Alternative 3 is the lowest present worth cost at \$53.3, Project Alternative 1 is the second lowest at \$56.3 (5.5% greater than Alternative 1), and Project Alternative 2 is the highest at \$61.1M (14.7% greater than Project Alternative 1). According to the Wisconsin Department of Natural Resources (WDNR) guidance for cost effectiveness comparison, alternatives within 10% on a present worth basis are considered equal cost. This allows for Project Alternatives 1 and 3 to be considered.

A non-economic factor analysis is detailed in Section 6.6 to differentiate each of the proposed Alternatives on areas not directly relating to cost. Categories include Site Utilization, Operations, Environmental Impacts, and ability to meet possible future effluent limits, among others. Each category is assigned a maximum point value and each Alternative is scored based on its relative effectiveness to achieve the ideal result of the category. A total of 113 points are possible and Alternatives 1 through 3 achieved 92, 92, and 96 points, respectively. The full results of the analysis are presented in Table 6-7.

Recommendations

Based on the present worth and non-economic analysis, Project Alternative 3 is the recommended Alternative because it provides the most operational flexibility, is the most energy efficient, is safer and more operator friendly to operate, and has the ability to meet current and future nutrient limits. The Village Public Works Commission has voted to pursue Alternative 3.

Proposed items for Alternative 3 include: site improvements, utility upgrades, emergency power generation upgrade, renovation and expansion of the Service building, construction of a waste receiving station, headworks building, biological phosphorus removal train, third circular final clarifier, advanced tertiary filtration, UV Disinfection, and digester renovation.

User Charge Impacts

Chapter 8 provides information on the total project cost, potential funding, revenue sources and estimates the user charge impacts of implementing the recommended project. The total project cost is estimated to be approximately \$32M for the WWTF upgrades. User charges for an average residential customer are expected to increase from the current average equivalent meter charge of \$32.33 per month to between \$55 and \$59 per month in the next six years at an estimated 8% annual increase. This assumes an average equivalent meter usage of 3,250 gallons per month, which would be a typical residential water use rate. It should be noted that other revenue-generating sources can be utilized such as impact fees, grants, energy grants/incentives and other funding mechanisms. If these methodologies are implemented, the rates presented would be reduced accordingly. The Village is planning to complete a detailed user rate analysis to better identify breakdown of costs between users, once project costs are further defined.

Implementation Schedule

The following implementation schedule is based on the proposed phases of construction for the selected alternative. The Village intends to apply for funding through the DNR's Clean Water Fund

Loan Program to finance construction and will be subject to timelines for this loan program, as well as requirements for agency review, approval, and permitting. The actual schedule will depend on the availability of financing, possible interim financing costs, and Village decisions on the ultimate phasing of construction projects.

Proposed Implementation Schedule

Action	Completion Date
Public Hearing on Facilities Plan	December 2022
Incorporate Public Hearing comments into the Final Facilities Plan.	December 2022
Submit Facilities Plan to WDNR	December 2022
Proceed with Preliminary Design	January 2023
WDNR Approval of Facilities Plan	March 2023
Proceed with Final Design	April 2023
Submit Plans and Specifications to WDNR	September 2023
Submit CWF Loan Application	September 2023
Apply for Required Construction Permits	October 2023
Approval of Plans and Specifications	December 2023
Advertise for Bids	January 2024
Open Bids	February 2024
Award Bids	March 2024
Start Construction	March 2024
Submit User Charge Rates/Ordinances	March 2024
Close on CWF Loan to Fund Construction	June 2024
Complete Construction	March 2026
Complete O&M Manual and Loan Closeout	July 2026
Phase 2A: Process Upgrades Design	2025
Phase 2A: Process Upgrades Construction	2026
Phase 2B: Solids Handling Upgrades Design	2027
Phase 2B: Solids Handling Upgrades Construction	2028



Wastewater Treatment Facility Facilities Planning Document

**Village of Jackson, Wisconsin
Wastewater Treatment Facility**

November 2022

FACILITIES PLANNING DOCUMENT

Village of Jackson, Wisconsin
Wastewater Treatment Facility

November 2022

TOWN & COUNTRY ENGINEERING, INC.

Madison ♦ Rhinelander ♦ Kenosha
6264 Nesbitt Road • Madison, WI 53719 • (608) 273-3350 • tce@tcengineers.net

FACILITIES PLANNING DOCUMENT

Village of Jackson, Wisconsin
Wastewater Treatment Facility

November 2022

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Current and future effluent limits have been taken into consideration in the development of alternatives. The current Wisconsin Pollutant Discharge Elimination System (WPDES) permit was issued in April 2020 and is effective for five years. The outfall is in the Milwaukee River – Cedar Creek Total Maximum Daily Load (TMDL) watershed. Monthly loading limits for phosphorus will begin in the Village's next permit cycle and are based on the TMDL allocations approved by the USEPA in March 2018. The WWTF requires a tertiary filtration upgrade to meet the final phosphorus requirements.

Chapter 6 provides a comparison of the three Project Alternatives in terms of capital costs, operation and maintenance (O&M), present worth, and non-economic factors. Each Project Alternative includes a common set of Base scope items, as well as a combination of Process Alternatives for processes throughout the WWTF. A cost-effectiveness evaluation was performed by comparing the 20-year present worth of all capital, O&M, and replacement costs of each Project Alternative. Differences in salvage values are negligible between alternatives and were not included the evaluation.

Chapter 6 also provides a description of the proposed project phasing. Due to the overall cost of the project and the varying timelines for when the improvements are needed, the Village intends to phase these improvements. The phases are intended to be staggered with Phase 1 for the Administration, Storage and Tertiary Treatment needs of the WWTF, followed by Phase 2A for Process Upgrades and Phase 2B for Solids Handling Upgrades. Due to the Phosphorus Compliance Schedule in the Village's WPDES permit, Phase 1 will need to be constructed in the next 3-4 years.

Phase 2A and Phase 2B are tentatively slated for construction in 2026 and 2028 respectively, but the exact start of these Phases is not known at this time as they are driven by the need for additional treatment capacity and the projected increase in solids loading at the WWTF.

Chapter 6 also considers non-economic factors beyond the capital and present worth costs for selection of a recommended alternative. The other factors analysis includes non-economic factors such as ease of operation, future growth potential, environmental impacts, and other considerations.

Conclusions

Project Alternative 3 is the lowest present worth cost at \$53.3, Project Alternative 1 is the second lowest at \$56.3 (5.5% greater than Alternative 1), and Project Alternative 2 is the highest at \$61.1M (14.7% greater than Project Alternative 1). According to the Wisconsin Department of Natural Resources (WDNR) guidance for cost effectiveness comparison, alternatives within 10% on a present worth basis are considered equal cost. This allows for Project Alternatives 1 and 3 to be considered.

A non-economic factor analysis is detailed in Section 6.6 to differentiate each of the proposed Alternatives on areas not directly relating to cost. Categories include Site Utilization, Operations, Environmental Impacts, and ability to meet possible future effluent limits, among others. Each category is assigned a maximum point value and each Alternative is scored based on its relative effectiveness to achieve the ideal result of the category. A total of 113 points are possible and Alternatives 1 through 3 achieved 92, 92, and 96 points, respectively. The full results of the analysis are presented in Table 6-7.

Recommendations

Based on the present worth and non-economic analysis, Project Alternative 3 is the recommended Alternative because it provides the most operational flexibility, is the most energy efficient, is safer and more operator friendly to operate, and has the ability to meet current and future nutrient limits. The Village Public Works Commission has voted to pursue Alternative 3.

Proposed items for Alternative 3 include: site improvements, utility upgrades, emergency power generation upgrade, renovation and expansion of the Service building, construction of a waste receiving station, headworks building, biological phosphorus removal train, third circular final clarifier, advanced tertiary filtration, UV Disinfection, and digester renovation.

User Charge Impacts

Chapter 8 provides information on the total project cost, potential funding, revenue sources and estimates the user charge impacts of implementing the recommended project. The total project cost is estimated to be approximately \$32M for the WWTF upgrades. User charges for an average residential customer are expected to increase from the current average equivalent meter charge of \$32.33 per month to between \$55 and \$59 per month in the next six years at an estimated 8% annual increase. This assumes an average equivalent meter usage of 3,250 gallons per month, which would be a typical residential water use rate. It should be noted that other revenue-generating sources can be utilized such as impact fees, grants, energy grants/incentives and other funding mechanisms. If these methodologies are implemented, the rates presented would be reduced accordingly. The Village is planning to complete a detailed user rate analysis to better identify breakdown of costs between users, once project costs are further defined.

Implementation Schedule

The following implementation schedule is based on the proposed phases of construction for the selected alternative. The Village intends to apply for funding through the DNR's Clean Water Fund

Loan Program to finance construction and will be subject to timelines for this loan program, as well as requirements for agency review, approval, and permitting. The actual schedule will depend on the availability of financing, possible interim financing costs, and Village decisions on the ultimate phasing of construction projects.

Proposed Implementation Schedule

Action	Completion Date
Public Hearing on Facilities Plan	December 2022
Incorporate Public Hearing comments into the Final Facilities Plan.	December 2022
Submit Facilities Plan to WDNR	December 2022
Proceed with Preliminary Design	January 2023
WDNR Approval of Facilities Plan	March 2023
Proceed with Final Design	April 2023
Submit Plans and Specifications to WDNR	September 2023
Submit CWF Loan Application	September 2023
Apply for Required Construction Permits	October 2023
Approval of Plans and Specifications	December 2023
Advertise for Bids	January 2024
Open Bids	February 2024
Award Bids	March 2024
Start Construction	March 2024
Submit User Charge Rates/Ordinances	March 2024
Close on CWF Loan to Fund Construction	June 2024
Complete Construction	March 2026
Complete O&M Manual and Loan Closeout	July 2026
Phase 2A: Process Upgrades Design	2025
Phase 2A: Process Upgrades Construction	2026
Phase 2B: Solids Handling Upgrades Design	2027
Phase 2B: Solids Handling Upgrades Construction	2028

1. INTRODUCTION

1.1 Planning Objectives

The intent of this Facilities Planning Document is to develop and evaluate viable alternatives for upgrade of the existing wastewater treatment facility (WWTF) for the Village of Jackson. The WWTF was originally constructed in 1978 and consisted of preliminary treatment, primary clarifiers, rotating biological contactors (RBCs), chemical phosphorus removal, tertiary filtration with traveling bridge sand filters, and chlorination for disinfection. Sludge was thickened and stabilized with anaerobic digestion and dried via sludge drying beds. The WWTF was expanded in 1994 with the addition of aeration basins (originally equalizations basins), blowers, and sludge storage and pumping facilities, and last underwent major renovations in 2001. The blowers and tertiary filters were upgraded in 2012, and the digesters were refurbished in 2014. The WWTF supervisory control and data acquisition (SCADA) system was last upgraded in 2018 with new programmable logic controllers (PLCs), computers, and controls upgrades.

The Village of Jackson has continued to grow steadily, such that additional capacity will be needed to meet the Village's needs for the next 20 years. Also, many of the processes and equipment are reaching the end of their useful life and need replacement or upgrading.

The Wisconsin Pollutant Discharge Elimination System (WPDES) permit that was issued to the Village and became effective in April 2020 (Appendix A) included proposed water quality-based effluent limits (WQBELs) for phosphorus. Jackson is a part of the Milwaukee River Basin Total Maximum Daily Load (TMDL) and, as such, has monthly mass-based limits for total phosphorus.

It is anticipated that with the proposed increases in design flow, effluent phosphorus target concentrations associated with the fixed mass TMDL allocations will continue to decrease for the WWTF. Therefore, filtration upgrades are required as a part of a facility upgrade for improved phosphorus removal. This facilities plan will evaluate options to ensure compliance with increasingly stringent effluent limitations in addition to the capacity increases and equipment replacement noted above.

1.2 Planning Area

The Village of Jackson is located in the center of Washington County in the southeastern portion of Wisconsin, approximately 30 miles northwest of Milwaukee. The Village is located at the interchange of USH 45 and STH 60 and makes the Village an ideal location for industrial and commercial growth. Surrounding municipalities include the City of West Bend to the north, the City of Cedarburg to the east, the Village of Germantown to the south, and the Village of Slinger to the west.

The Village of Jackson developed "*A Comprehensive Plan for the Village of Jackson: 2050 Washington County, Wisconsin*"¹ (Comprehensive Plan) along with Southeast Wisconsin Regional Planning Commission in November 2019. The Planning Area for this Facilities Plan includes the planning area from the Village's 2019 Comprehensive Plan and covers all land within the Village boundaries which encompasses approximately 3 square miles as well as the unincorporated areas located within extraterritorial jurisdiction.

¹ A Comprehensive Plan for the Village of Jackson: 2050. WWW.Villageofjacksonwi.gov

The current sanitary sewer service area includes the area within the Village's municipal limits as well as areas outside of the Village, shown in Figure 1-1. The future sanitary sewer service area may include growth into the current rural area with future development and will require further amendment to the Village's service area. A map of the sanitary service area and Jackson zoning map is provided in Appendix B.

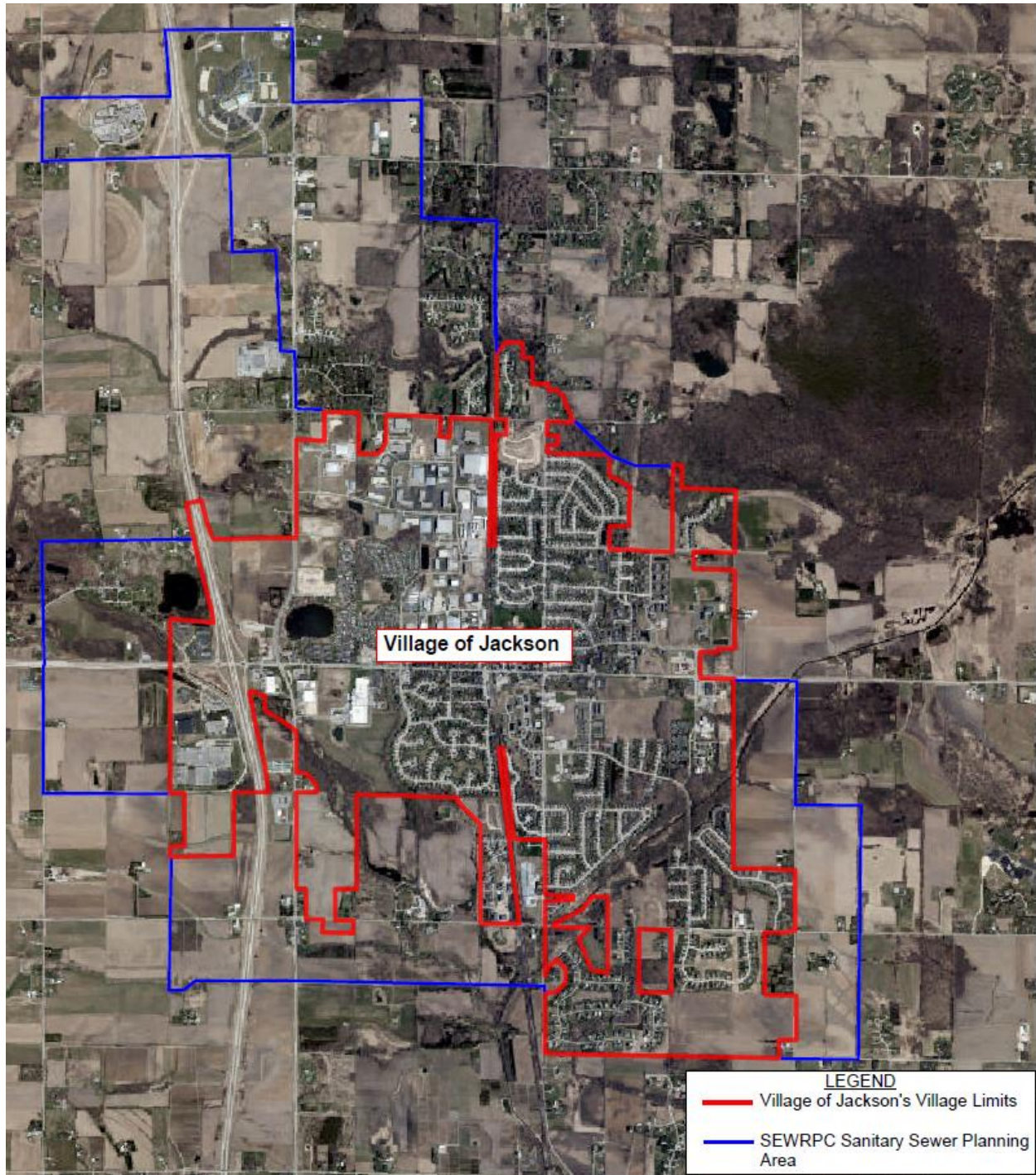


Figure 1-1 Village of Jackson Sewer Service Area

Regionalization with neighboring communities was previously considered as part of the phosphorus compliance alternatives evaluation in 2021. There are a few neighboring WWTF discharges with the nearest being West Bend (approximately 9 miles) and Slinger (approximately 8 miles). Regionalization with these facilities was not considered cost-effective given the pumping distance and significant cost associated with pumping wastewater long distances. In addition, it is not expected that the neighboring WWTFs would be able to accommodate Jackson's projected loadings without an upgrade to their own existing facilities.

1.3 Facilities Plan Approach

The facilities planning process begins with an evaluation of the existing facilities in terms of both condition and pollutant loadings, followed by development of future design parameters using historical data and appropriate demographic projections. Alternatives are developed and compared to arrive at a viable and cost-effective option that will meet the community's needs for the next 20 years. Although a 20-year time frame is used for planning, alternative development, and evaluation, consideration may be given to growth and capacity needs beyond 20 years.

Chapter 3 presents a detailed evaluation of existing equipment and building conditions, as well as an accounting of the existing loading data to the treatment facility. The baseline loading parameters for the facility include values for flow, biochemical oxygen demand (BOD), total suspended solids (TSS), ammonia, and phosphorus; all of which have limits included in the facility's current discharge permit.

Chapter 4 presents the projected loads for the WWTF. Future loading increases are based on population projections, future land use, and consideration of the needs of any current or future major dischargers to the Village's facility. Projections are based on information from the Village of Jackson's Comprehensive Plan as prepared by Southeast Wisconsin Regional Planning Commission (SEWRPC), the U.S. Census, and Department of Administration (DOA) population projections. Review and approval by the Village and regional planning entities is a crucial step, since these projections potentially have far reaching impacts for the design of future facilities. The facilities plan will be submitted to SEWRPC for approval concurrently with the DNR application.

The design loads presented in Chapter 4 are used to develop preliminary design alternatives for meeting future needs. These alternatives are presented in Chapter 5 and compared in Chapter 6. Typically, a new site alternate is included in the evaluation; however, given the space available at the existing site and the life expectancy of the existing structures, a new site was not considered as a part of this plan.

Alternatives must have the capacity to meet the anticipated water quality limits of future discharge permits. If an increase in the design capacity or change in outfall location is required or considered, then a request for planning effluent limits is made to the Wisconsin Department of Natural Resources (WDNR) based on the projected loading parameters. This request and projected permit limits are presented in Chapter 4.

The selection of the recommended alternative is based on both economic and non-economic evaluations in Chapter 6. The economic analyses include capital, operation and maintenance, replacement fund, and 20-year present worth cost evaluations for each alternative. Non-economic evaluations consider such factors as ease of operation, future growth potential, and an environmental assessment.

Chapter 7 presents the potential environmental impacts and mitigative measures for the recommended alternative. Potential funding sources and impacts to user rates are described in Chapter 8. This chapter also presents an estimated schedule for implementation based on the anticipated timelines for design and construction as well as adequate time for the community to secure project funding and undertake the associated debt load.

1.4 Community Engagement

With all public capital improvements projects, community engagement is necessary for a successful project. A public hearing will be held on December 14, 2022, to present planning considerations, inform the public of the need for a project, and address concerns that are brought up by the public. Additional public engagement has occurred and will continue at the Utility Commission and Village Council meeting level where the public has the opportunity to stay informed, ask questions, and voice concerns as the process progresses. The agenda and meeting minutes from this Public Hearing will be included in Appendix R.

2. DESCRIPTION OF PLANNING AREA

The following sections describe the features and setting for the Village of Jackson's planning area, as defined in Section 1.2, and its existing WWTF. The WWTF site is located on Eagle Drive on the east side of the Village, and discharges to Cedar Creek within the Milwaukee River Basin. See Appendix M for a map of the WWTF and outfall location.

2.1 Climate

Typical of the Great Lakes region, the Village experiences cold and snowy winters, hot summers, and moderate springs and autumns. The temperature ranges from an average high temperature of 25°F in January to 82°F in July. The average annual precipitation is 32 inches, the majority of which falls in April through September. Typically, the months of August and September are the wettest and February is the driest.

2.2 Physical Setting

Washington County was largely shaped by glacial deposits formed about 11,000 years ago. The Village is characterized by a layer of glacial till over a relatively shallow depth to bedrock (Silurian Dolomite). The landscape is characterized by gently rolling moraines and drumlins that were formed by material deposited along the edges of the ice sheet during the glacier's retreat. The Village does not have any state natural areas or wildlife areas within its boundaries; however, the Jackson Marsh State Wildlife Area is located immediately northeast of the Village and the WWTF. This area encompasses 6,179 acres.

Elevations in the Village typically range from 850 feet to 900 feet above mean sea level (AMSL). The center of the Jackson Marsh is approximate elevation of 835, and elevations at the Jackson WWTF site are approximately 850 feet AMSL according to digital topographic maps available on the Washington County Public GIS Viewer.

2.3 Soils

The Natural Resources Conservation Service (NRCS) soil resource report for the existing WWTF site and the vicinity is included in Appendix C. Generally, soils in this area can be classified as loamy till on slopes ranging from 0% to 3%. Most of the site is characterized as Casco-Hochheim-Sisson Association and Ozaukee-Martinton-Saylesville Association.

2.4 Water Resources

Surface water resources within the Village planning area include the Cedar Creek and unnamed tributaries to the creek, as well as two small lakes (Hasner Lake and Tillie Lake) within the Cedar Creek Watershed. The WWTF discharges to Cedar Creek which originates northwest of the Village at Cedar Lake, just north of Slinger. Cedar Creek is 28 miles long and flows eastward to the Milwaukee River downstream of the existing WWTF outfall. Cedar Creek is considered a Warm Mainstem under the state's Natural Community Determinations. The water is impaired for both total phosphorus and PCBs.

The WWTF discharge to Cedar Creek is located in the Jackson Marsh State Wildlife Area - Cedar Creek HUC 12 (40400030303) watershed. According to the WDNR PRESTO-Lite model results, the watershed for the Jackson WWTF outfall is approximately 53.1 square miles. The Jackson Marsh State Wildlife Area - Cedar Creek watershed upstream of the Jackson WWTF outfall consists mainly of agricultural fields (62%), urban (16%), forest (13%) and wetland (8%). The PRESTO-Lite Watershed Delineation Report is provided in Appendix D.

2.5 Floodplain Surveys

Flood hazard area boundary maps produced by the Federal Emergency Management Agency (FEMA) were reviewed for the existing WWTF site. Based on available information, the developed portion of the existing WWTF site lies in an area of minimal flood hazard and mostly outside of the 100-year flood plain delineation. A small area in the southeast corner of the WWTF site is within the 100-year flood zone or flood fringe of the most recent floodplain map. A floodplain map is provided in Appendix D. The Village is currently working on a plan to update the floodplain mapping in this area independent of this project due to recent grading modifications in this area.

The floodplain in this area of the Village generally wraps around the east and south sides of the WWTF site; thus, limiting expansion beyond the existing site in those areas.

2.6 Wetlands

Based on a review of available resources, including the WDNR Surface Water Data Viewer and Wetland Inventory, there are mapped wetlands on the southeast corner of the WWTF site. The predominant soil characterization for the site, noted in Section 2.3, is identified as a maximum extent wetland indicator. Based on this inventory and the hydric soils present, a detailed wetlands delineation may need to be conducted. Wetlands were also found immediately south and east of the entire WWTF site.

2.7 Groundwater

According to the Village of Jackson Comprehensive Plan, groundwater supplies nearly all of the water for domestic, commercial, and industrial uses in the Village of Jackson. The Village provides water to its water utility customers from six groundwater wells located throughout the Village. The wells are approximately 260 – 504 feet deep. Water supplies are drawn from limestone / shale and Dolomite (Niagara) aquifers. Groundwater for the area is considered hard, with raw water sampling from 2021 indicating hardness levels of about 380 mg/L as calcium carbonate (CaCO_3).

2.8 Agriculture

There is no active agriculture at the existing WWTF site or adjacent to it. Land elsewhere within the current Village limits is actively being farmed. Contact will be made with the State of Wisconsin Department of Agriculture, Trade and Consumer Protection with regards to the potential impacts to agriculture land should a decision be made to use active agriculture land. This will be covered in more detail in Chapter 7.

2.9 Historic and Cultural Assets

The extent of historic and cultural assets at the proposed work sites are covered in detail in Chapter 7 of this planning document.

2.10 Population and Land Use

The Village of Jackson WWTF service area is described in Section 1.2. Maps and information on existing land use within this area are taken from the Village of Jackson Comprehensive Plan from November 2019. Existing land use is summarized in Table 2-1 below and maps are provided in Appendix B. Land use within the Village is primarily single-family residential (24.3%), industrial (15.3%), and rights-of-way (15.3%). According to the Comprehensive Plan, the Village is projected to increase the number of households by about 1,660 households (3,654 residents) between 2020 and 2050.

Table 2-1 Village of Jackson Existing Land Use Summary

Land Use	Acres	Percent
Agriculture	95.84	4.9%
Single-Family Residential	473.96	24.3%
Two-Family Residential	95.75	4.9%
Multi-Family Residential	105.83	5.4%
Manufactured Housing	64.42	3.3%
Retail Business and Service Uses	67.72	3.5%
Industrial Uses	298.75	15.3%
Institutional Uses	35.28	1.8%
Parks	75.74	3.9%
Undeveloped Land	167.28	8.5%
Floodway, Floodplain, Waterways	179.67	9.2%
Rights-of-Way	299.04	15.3%
TOTAL	1,959.30	100%

Village of Jackson Comprehensive Plan: September 2008

The population of Jackson has increased steadily from 2000 through 2020 with about 44% growth over the 20-year period, according to the Comprehensive Plan. Table 2-2 summarizes the census data for the Village.

Table 2-2 Village of Jackson Population Summary

2000 Census ²	2010 Census ³	2020 Census ⁴
4,983	6,753	7,185

The Village grew from 4,983 residents in 2000 to 6,753 residents in 2010, which represents a 35.5% increase. The Village grew by an additional 432 residents by 2020, an additional 6.4% growth. For this Facilities Planning Document, the current base population was assumed to be 7,185, the 2020 U.S. Census Bureau population. Projected population increases from this baseline figure will be used to estimate future flows and loadings in Chapter 4.

According to the Village's 2021 Billing Cycle for the sewer utility, the Village serves 2,404 residential customers, 91 commercial properties, 43 industries, 15 public authority sources, and 52 multifamily residences all inside the municipality.

² U.S. Census Bureau, 2000

³ U.S. Census Bureau, 2010

⁴ U.S. Census Bureau, 2020

3. EXISTING CONDITIONS

As stated in Section 1.1, the Jackson WWTF has equipment and processes that are near the end of their useful lives. This chapter provides a description of Jackson's sanitary sewer collection system and wastewater treatment facility, including an evaluation of facility capacity and identification of needs and deficiencies. This chapter also summarizes the current flows and loads and current WPDES permit requirements.

3.1 Description of Existing Facilities - Sanitary Sewer Collection System

The sanitary sewer collection system includes approximately 44 miles of sanitary sewer pipes ranging in size from 6 to 36 inches in diameter, and approximately 1,127 manholes. There is only one lift station outside of the WWTF. The sanitary sewer map is provided in Appendix E and Table 3-1 lists the various pipe sizes and lengths included in the sewerage system. Pipe materials include clay pipe, slip lined clay pipe, and PVC pipe.

Table 3-1 Existing Sanitary Sewer Inventory

Gravity Sewers Dia. (inches)	Installed Length (ft)	Installed Length (miles)
6"	2,358	0.45
8"	142,043	26.90
10"	17,642	3.34
12"	28,836	5.46
15"	11,344	2.15
18"	13,798	2.61
21"	4,601	0.87
24"	5,277	1.00
30"	5,846	1.11
36"	422	0.08
Total	232,168	43.97

Wastewater flows to the WWTF through a 36-inch interceptor from Eagle Drive. A 30-inch interceptor from the south conveys residential flow from most of the southern and western portion of the Village, while a 21-inch interceptor from the north picks up the portion of the Village east of the railroad and north of Main Street. The northern interceptor also serves the portion of the Village north of Cedar Creek Road out to Highway 45.

There is one lift station, Twin Creek lift station, that pumps wastewater to the WWTF. The lift station received a SCADA upgrade in 2018, and no significant upgrades have been made at this location since it was built approximately 20 years ago. A 2021 study identified a proposed Maplewood Farm development that may require expansion of this lift station when this farm does develop, but the timeline for this development is not known at this time.

The Village has performed routine maintenance and repairs on the collection system and will continue these repairs in the future. The main interceptor is scheduled to be televised in the fall of 2022.

3.2 Description of Existing Facilities - Wastewater Treatment

The Jackson WWTF treats the municipal wastewater collected by the sanitary sewerage system within the Village limits. The WWTF was originally constructed in 1978 and consisted of preliminary treatment, primary clarifiers, rotating biological contactors (RBCs), chemical phosphorus removal, tertiary filtration with traveling bridge sand filters, and chlorination for disinfection. Sludge was thickened and stabilized with anaerobic digestion and dried via sludge drying beds. The WWTF was expanded in 1994 with the addition of aeration basins, blowers, and sludge storage and pumping facilities, and last underwent major renovations in 2001. The blowers and tertiary filters were upgraded in 2012, and the digesters were refurbished in 2014. The WWTF SCADA system was last upgraded in 2018.

Wastewater treatment is achieved through preliminary and secondary processes, as well as tertiary processes that include filtration and disinfection. Preliminary treatment processes include fine screening and grit removal. Secondary treatment is achieved with activated sludge and chemical phosphorus removal followed by final clarification. The effluent is then treated with a disk filtration system followed by disinfection via chlorination and de-chlorination. After de-chlorination, the effluent is discharged to Cedar Creek. The waste activated sludge is gravity thickened, anaerobically digested in two primary anaerobic digesters, and stored onsite in a glass-lined steel storage tank until hauled for land application. Refer to Appendix F for site plans of the existing WWTF. The existing facilities, equipment, and processes are described in more detail below.

3.2.1 Buildings and Grounds

The following major structures are present on the Jackson WWTF site, with the original construction dates as noted:

- 10 – Service Building (1978)
- 15 – Influent Screening Building (2001)
- 20 – Pretreatment Building (1978)
- 22 – Waste Receiving Station (2001 / 2009)
- 25 – Septage Tanks (Primary Clarifiers) (1978)
- 30 – Aeration Basins (1994)
- 31 – RBC Tanks (1978)
- 35 – Aeration Control Building (2001)
- 40 – Secondary Clarifiers #1 & #2 (1978)
- 45 – Secondary Clarifiers #3 & #4 (2001)
- 50 – Secondary Sludge Building (2001)
- 55 – RAS Pumping Station (2001)
- 60 – Tertiary Filter Building (1978)
- 65 – Blower Building (1994)
- 70 – Disinfection Tank (1978)
- 75 – Gravity Thickener (1978)
- 80 – Anaerobic Digesters and Building (1978)
- 81 – Sludge Drying Beds (1978)
- 85 – Sludge Storage Tank (1994)
- 90 – Sludge Pumping Building (1994)
- 95 – Storage Garage (2003)

All of the major structures and buildings, with the exception of the Storage Garage, are over 28 years old, and are in need of replacements and repairs. The Village's largest concerns with the WWTF are related to equipment condition, facility processes accomplished with both hydraulic

and loading capacity, and facility needs. Upgrades to equipment will be discussed in the following sections of this report. Overall needs include improvements to lighting, HVAC, energy efficiency, windows, doors, and finishes/paintings.

3.2.2 Service Building (Structure 10)

The Service Building (Structure 10) houses the laboratory, office, break room, locker / toilet room, emergency generator room, garage, and electrical room, as well as the equipment room in the lower level. The building also houses the influent wetwell and the raw sewage pumping for the WWTF. The building appears to be in overall good condition, but the facility lacks proper office space, a meeting room, and record storage areas.

The laboratory houses all the equipment necessary for the testing required by the WWTF staff for the WPDES permit, including tests for ammonia, BOD, TSS, pH, total phosphorus and chlorides. The equipment in the lab is in good condition and only minor upgrades are required. The existing cabinets and counters are in good condition as they were replaced in the last five years. No modifications are anticipated at this time.



Service Building - Laboratory

The electrical room contains two separate MCCs with MCC-1 being mostly obsolete. The variable frequency drives (VFDs) for the raw sewage pumps are newer units in good condition, but the remaining original equipment in this space should be replaced due to age. This electrical room is connected to the equipment (raw sewage pump) room below via an open stairway, and it is likely that these areas will need to be separated as part of the upgrades to the facilities.

The room also contains the SCADA server and telephone equipment for the entire facility. The telephone equipment is obsolete and can be removed, but consideration should be given to relocating the SCADA server and associated equipment to a more secure location in the building as it is located in an unsecured, high traffic area.



Electrical Room - MCCs

Currently, the heating for the building is from a series of gas-fired unit heaters for individual spaces, most of which date to the original construction in 1977. Ventilation for the individual spaces is also provided by older roof mounted ventilators and a makeup air unit. Future upgrades should include upgrades to the heating and ventilation for any space with a use change. This includes the lower level where the ventilation will likely need to be expanded to meet current code requirements for a lower-level pump room. The electrical room will also require air conditioning to protect the VFDs and related equipment located there.

The existing garage includes only one garage stall as the original two stall space was converted to a break room and small office in 2007. While the space is large enough to store a single service truck, the remaining available space for storage is limited and is inadequate for the needs of the facility. A building expansion should be evaluated in order to accommodate the two existing utility trucks, or the possible consolidation of these facilities at the existing garage.

The partial reconfiguration of the garage has left the building with an odd traffic pattern and it lacks office space and a meeting room. The existing small office could be converted to a SCADA / data storage room, and a new office and meeting room added in the converted generator space.

The existing standby generator is a Cummins unit rated for 500KW and was installed in the existing generator room in 1977. As the generator and transfer switch are 45-years old, the replacement of this equipment is likely necessary with the upgrades to the facility both due to age and capacity. The louvers associated with the generator will also need to be replaced if the generator is to be reinstalled in this location in lieu of outside.



Standby Generator



RAW Pumping Area



Reverse Osmosis Equipment

The lower-level equipment room houses the three vertical centrifugal raw sewage pumps and associated piping. These pumps were installed in 2001 and are each rated for 2,200 gpm (approximately 4,400 gpm with one out of service) but will require replacement due to the projected higher peak hourly flow at the facility. In addition to the pumps, the existing check valves should be replaced due to continued maintenance issues and overall age. The remaining raw sewage piping, fillings, flow instruments, and valves appear to be in good condition and suitable for continued use. The equipment room also houses a reverse osmosis water system for the lab that appears to be in good condition and suitable for continued use.

Adjacent to the pump area is an existing 10-foot by 18-foot covered wetwell that receives raw sewage at the WWTF. This area is sloped to direct wastewater to the intake piping for the raw sewage pumps. This wetwell is relatively small for the higher flows that the WWTF receives, and consideration should be given to expanding this wetwell and adding an additional pump(s). The discharge piping header for the raw sewage pumps appears to be sized and configured to allow for the addition of an additional wetwell south of the current wetwell and connection of the piping.

The septage tank piping that is routed through this space is prone to plugging and should be reconsidered with the relocation of the septage receiving facilities. This piping, valves, and flow meter appear to be in good condition but are poorly configured for this application and should be repositioned.

Other changes that should be considered for the Service Building include replacement of the lighting in the entire building, replacement of the cast iron plumbing with new PVC pipes, and replacement of the building roof.

3.2.3 Influent Screening Building (Structure 15)

Preliminary treatment for the WWTF takes place in the influent screening building (Structure 15) where sewage is screened after pumping and prior to grit removal. The building was constructed in 2001 and appears to be in good condition.

Flow enters Structure 15 from a 36-inch interceptor and flows through a 3-foot wide by 4-foot deep channel fitted with a mechanical screen to remove any large solids. These solids are washed and compacted in a compactor unit and discharged to a dumpster for removal. The Parkson Aquaguard mechanical fine screen with 1/4" openings that was sized for 7.0 MGD and was installed in 2001. The screen was rebuilt in 2017 and the Vulcan screenings washer/compactor was added at that time. A second 3-foot wide channel is located adjacent to the screen channel and is fitted with a stationary bar screen to be used during high-flow or mechanical screen failure conditions.



Screen and Screenings Washer / Compactor

Based on the existing equipment's age and the higher peak flow influent conditions observed at the WWTF, the influent screening equipment should be replaced. Consideration could be given to replacing this equipment as part of a second phase if warranted by the project schedule as the equipment is in fair condition after the rebuild in 2017.

The building is constructed with an electrical room separate from the screening areas to protect the electrical equipment. The existing power distribution and control equipment appears to be in good condition in this area, as is the HVAC in the electrical room.

Other improvements required at the building include:

- Replacement of the garage door opener.
- Replacement of the ventilation equipment in the screenings room and lower-level channel areas.
- Replacement of the lighting, switches, and other electrical components in the screening room and lower level.
- Replacement of the cast iron roof drain piping with PVC pipe.

3.2.4 Pretreatment Building (Structure 20)

After screening, the water then flows through a 10-foot diameter vortex grit removal basin. Grit is settled by a Smith & Loveless Pista grit paddle to the bottom of a 6-foot-deep sump and is extracted as a slurry using a grit pump. The existing vortex grit removal chamber was originally designed for a peak flow of 7.0 MGD. Grit is then pumped from the bottom of this basin by a grit pump prior to being sent to the Vulcan grit separator. This grit pump is rated for 200 gpm at approximately 30 feet of total dynamic head (TDH) and the control is time based. The grit slurry is pumped to the Vulcan grit classifier, an accelerated gravity grit removal system, and the clean grit is then discharged to a dumpster via the unit conveyor.



Grit Classifier and Grit Separator

The pretreatment building was originally built in 1978 and was expanded in 2001 with the addition of the grit channel and Pista system. The grit pump and original classier was installed in 2001, and the original grit classifier was upgraded in 2017.

In addition to the grit removal facilities at this building a 15.83-foot by 10-foot by 7.25-foot-deep grease tank is located adjacent to the building along with associated pumping facilities. This 8,500-gallon tank contains grease removed from the grit tank and channel if collected. These facilities should be eliminated along with the channel aeration equipment located immediately downstream of the grit removal as part of the upgrades if the septage tanks are converted to primary clarifiers.

The existing grit equipment, including the pump, valves, and separator have served their useful life and will need to be upgraded. While the grit system has sufficient capacity for the current flows, the grit channel may need to be expanded to handle the additional flow to the facility. The existing lighting, switches, and other equipment in this building are in need of replacement, as well as the existing plumbing and HVAC equipment.

No significant structural or architectural upgrades appear to be needed at this time.

3.2.5 Waste Receiving Station (Structure 22)

The facility uses a small plastic molded building to house the septage discharge box (rock collector) for the waste receiving station. The hauled waste is discharged to this box prior to being screened via a Lakeside mechanical screen / washer, and gravity flowing to the two septage tanks (Structure 25). The 6-foot by 6-foot discharge box was installed in 2001 at the location near the front of the WWTF where it is highly visible to the neighborhood and passing vehicles. The small plastic hut was added in the past few years as an attempt to control the odors associated with offloading this material at the WWTF.

The Village receives approximately 57,000 gallons per day at this receiving station, and the entire facility will need to be replaced and likely relocated as part of the upgrade.



Waste Receiving Station

3.2.6 Septage Tanks (Structure 25)

Sewage from the waste receiving station flows by gravity to the two septage tanks and stored until being metered at the service building and discharged at a controlled rate to the screening building. The operators control this release via SCADA to allow this material to be entered into the process during off-peak times of day.

The two septage tanks were originally constructed as conventional primary clarifiers in 1978 and were converted to their current use in 2001 when the current aeration process was introduced at the WWTF. The concrete tanks are 32-foot diameter, 10-foot deep, with an 8-foot water depth. Each tank has nearly 50,000 gallons of storage capacity.

The tanks were converted to their current configuration in 2001 when the tanks were each covered with new flat aluminum covers for odor control. The original steel bridges remain, but in 2010/2011 the clarifier drives and equipment were removed and replaced with aeration grids to prevent the material from going septic. The tanks were also fitted with small blowers to provide air to the individual tanks.

The original tanks are believed to be in good condition, as are the aluminum covers. Due to age, the bridges, blowers, and diffusers will all need to be replaced. The conversion of these tanks back to primary clarifiers will be considered further in Chapter 5.



Septage Tanks

3.2.7 Aeration Basins (Structure 30)

Wastewater from the grit tank flows by gravity to splitter box #1 where it is then divided via weir gates to the two 80-foot diameter aeration tanks. The flow control gates are electric actuated, but the electric motors do not work and the gates are instead manually positioned by the operators. The splitter box is also aerated, but this system will likely need to be replaced with upgrades discussed in Chapter 5.

The two aeration basins were constructed as equalization basins in 1994 and were converted to their current use as aeration basins in 2001. The concrete tanks are 80-foot diameter, sixteen-foot deep, with fourteen-feet of water depth. Each tank has over 526,000 gallons of capacity. The tanks utilize the Schreiber process which consists of a rotating center arm with an array of headers and 600 fine bubble tube diffusers that rotate 360-degrees around the tank, alternately aerating the tank on a continuous basis. This operation is intended to create aerated and anoxic zones within the tank on a continuous basis for biological phosphorus removal, but biological phosphorus removal was never realized.

Each of the assemblies have been rebuilt and is in fair operating condition, but the system is no longer supported by the manufacturer and will need to be replaced due to age. The bridges and diffusers will need to be removed, and the tanks retrofitted to more conventional aeration basins. The reconfiguration of these tanks will also consider conversion of them to zoned tanks for

biological phosphorus removal, as well as possible piping modifications to allow them to be operated in either series or parallel arrangement.

Modifications of the basins will also likely include the addition of handrails around the basins, and the removal of the existing fencing around the area to improve operator access to this area of the facility.



Aeration Basins

Flow leaves the aeration basins through 24-inch diameter transfer pipes to the splitter box #2 ahead of the final clarifiers.

Equipment replacements due to age are expected, however the tanks provide sufficient BOD loading capacity for current influent WWTF loadings. The tanks were originally designed at a BOD loading of 19 pounds BOD per 1,000 cubic feet per day, but this may be increased to a rate of up to 40 pounds of BOD per 1,000 cubic feet per day for a Peak Month condition. Each basin has treatment capacity for 2,815 pounds of BOD per day at 40 pounds per 1,000 cubic feet per day for a total capacity of 5,630 pounds of BOD per day for a Peak Month.

- Existing Aeration Basin BOD Loading Capacity: 2,604 lbs/day
- WWTF Maximum Month Loading Observed: 2,685 lbs/day

Chapter 5 will evaluate the loading of the two existing basins at a rate of up to 40 pounds per 1,000 cubic feet per day, as well as possibly adding primary clarifiers ahead of these basins to not add an additional aeration basin. The addition of selector basins ahead of these basins, or the creation of selector zones in each basin for biological phosphorus removal will also be evaluated further in Chapter 5.

3.2.8 RBC Tanks (Structure 31)

The RBC tanks were originally installed in 1978 but were removed from operation in 2001 when the current activated sludge process was added. These existing tanks are approximately 68-foot by 68-foot by 5.5-foot deep. The eight existing concrete RBC tanks have remained unused since

being decommissioned in 2001 and should be removed as part of the facility upgrade to make room for the new selector basins.

3.2.9 Aeration Control Building (Structure 35)

The aeration control building was constructed in 2001 to house the process control equipment installed as part of the Schreiber process. Much of the process control equipment was removed in 2018 as part of the SCADA upgrades at the facility. The existing 16' by 16' masonry structure sits mostly empty at the site and simply houses a small amount of electrical equipment.

The continued use of this building will be evaluated as part of Chapter 5. The building may be modified by filling the sump portion of the floor to grade to allow for a more usable storage space in addition to an electrical control room.

3.2.10 Final Clarifiers #1 & #2 (Structure 40)

Mixed liquor from the aeration basins flows by gravity to the two small secondary clarifiers via 18-inch diameter pipes. The two structures were built in 1978 and are 40-foot in diameter with an 8-foot side-water depth. These two clarifiers are well below the 12-foot minimum design depth recommended in Great Lakes-Upper Mississippi River (10-State Standards) for Wastewater Facilities and other listed standards; thus, consideration should be given to replacing them with an appropriately sized basin.

Each clarifier has a suspended launder and the V-notch weirs on the launder control the water level within the clarifiers. No Stamford density current baffles existing in these tanks to redirect flow to the center of the clarifiers to minimize short circuiting in these shallow tanks.



Final Clarifiers – Original

While the clarifiers are in fair condition, they are typically only used during peak flow events or when final clarifiers #3 or #4 are out of service. Due to their shallow depth, smaller diameter, and overall age, consideration should be given to replacing these clarifiers with larger units as applicable. If the clarifiers are to be reused, they will each need to be rebuilt and painted.

The continued use of these clarifiers will be evaluated as part of Chapter 5.

3.2.11 Final Clarifiers #3 & #4 (Structure 45)

Mixed liquor from the aeration basins flows by gravity to the two larger secondary clarifiers via 30-inch diameter pipes. The two structures were built in 2001 and are 65-foot in diameter with a 13-foot side-water depth. Each clarifier has a suspended launder and the V-notch weirs on the launder control the water level within the clarifiers.



Final Clarifiers - Newer

The existing clarifiers utilize sludge scrapers with plow type collector arms on each side to collect settled sludge. With the current chemical phosphorus removal system, rapid sludge removal is not necessary. However, if biological phosphorus removal is utilized, a rapid sludge removal mechanism should be explored to minimize the opportunity for secondary release of phosphorus. Stamford baffles were added in 2014 to minimize short circuiting of flow in these clarifiers.

Surface scum skimming is provided on each clarifier to remove floating scum and debris. The clarifiers are equipped with exterior mounted scum boxes. More efficient scum removal could be explored with a full surface skimming mechanism arm. The clarifiers were rebuilt in 2019 and 2020 and are in good condition but need to be blasted and recoated for continued use. The existing clarifiers are expected to be re-used with future upgrades; however, additional clarifier capacity will be required due to influent flow at the WWTF and the resulting surface overflow rates, measured in gallons per day per square foot (gpd/sf).

- Average Design Flow Surface Overflow Rate: 255 gpd/sf
- Maximum Month Observed Surface Overflow Rate: 257gpd/sf

3.2.12 Secondary Sludge Building (Structure 50)

The secondary sludge building was constructed in 2001 as part of the conventional activated sludge upgrades. The building houses the four waste activated sludge (WAS) pumps used to transfer sludge from the clarifiers to the gravity thickener prior to the anaerobic digesters. The

building also houses ancillary equipment for these pumps, including air compressors and an air storage tank to support these air operated pumps.

The existing air operated diaphragm pumps pull sludge from each of the final clarifiers. The pumps are Dorr-Oliver pumps installed in 2001 and remain well maintained and in fair condition. The pumps, compressors, and ancillary equipment show signs of age and should be replaced.

The building lighting, plumbing, and ventilation should be upgraded due to the age of these systems. The building will also need to be evaluated for separation of the electrical equipment due to code requirements for this area.



WAS Sludge Pumps & Compressors

The lower area of this building will be evaluated for reconfiguration to fit new return activated sludge (RAS) pumps as part of the upgrades. The installation of new pumps, valves, flow meters, and associated piping, as well as one or more WAS pumps will be considered to reuse this space.

3.2.13 RAS Pumping Station (Structure 55)

The RAS pumping station was constructed in 2001 as part of the conventional activated sludge upgrades. The structure houses the RAS pumps used to transfer sludge from the clarifiers back to the two aeration basins.

The four RAS pumps are Archimedes screw style pumps that raise the RAS flow from a channel approximately 10 feet to the upper channel to return flow via gravity to the aeration basins. The 7.5 HP Schreiber pumps are 32-inch diameter tubes and each pump is rated for up to 1,325 gpm. The pumps have a capacity of approximately 5.7 MGD with one pump out of service.

The pumps appear to be in fair condition, but they are reported by the operators to be one of the most problematic operations at the facility as the flow rate is adjusted by either VFD speed control and/or manually raising or lowering the bottom of the pumps in the channel. Due to the age of the pumps and problematic operation, this entire pump station should be replaced with a more easily

adjusted and monitored pumping operation so as to allow the operators to adjust and monitor the flow from each individual final clarifier independent of the other clarifiers.

Ancillary equipment at this structure, including the overhead rail / electric lift and the flow control gates are also in fair condition and due for replacement if this structure is not eliminated as part of this project.



RAS Pumping Station w/ Archimedes Screws

The continued use of this RAS structure will be evaluated as part of Chapter 5.

3.2.14 Tertiary Filter Building (Structure 60)

The tertiary filter building was constructed in 1978 with two traveling bridge sand filters to provide tertiary treatment at the facility. These filters were replaced in 2012 with two Kruger (now Veolia) rotating disk style filters fitted with 10-micron polyester disks in a stainless-steel tank that removes suspended solids. Each of these filters is fitted with 9 disks and has a rated capacity of about 1.8 MGD based on a loading rate of 3 gpm / square foot of filter.

Based on the current rating of these filters they would appear to be undersized for the peak day flow. At flow rates above about 3.5 MGD the Village utilizes an overflow weir on a splitter box outside the filter building to send a portion of the flow around the tertiary filters to disinfection. With the more stringent phosphorus limits it is believed that the Village will need to send all flow through the tertiary filters to meet the new effluent limits. It would appear that additional filters will be required as part of this upgrade.

In addition to the filter equipment upgrades, the building will also need lighting upgrades, the exposed plumbing replaced, ventilation upgrades, the chlorine equipment removed from the filter room, and the chlorination and dechlorination facilities removed from the building. These chemical storage areas will be converted for reuse as part of the upgrades. The alum storage room will need new pumps and controls, but the existing storage tank will remain in place. No significant architectural or HVAC modifications are anticipated as the building roof and make-up air unit were recently replaced.

The Village will face a TMDL for effluent phosphorus that will require treatment to approximately 0.20 mg/L for a typical monthly average. To meet this more stringent limit, the Village will need to add a contact tank with flash mixing ahead of the filters to mix polymer and coagulant to create a larger floc particulate for removal with tertiary treatment. This will be addressed in Chapter 5.



Tertiary Filters

3.2.15 Blower Building (Structure 65)

The blower building was constructed in 1994 to house the blowers for the equalization basins, RBCs, and post aeration. The building also houses a separate electric room for power distribution for this area of the WWTF. The approximate 34-foot by 50-foot building is masonry construction with a sloped membrane roof. The building was renovated in 2012 with the removal of two original equalization tank blowers and two RBC blowers.

The blower room contains two 50 HP Neuros high-speed turbo blowers and one 40 HP Roots positive displacement blower as a backup. The backup blower was installed in 1994 and has not been used regularly for over 10 years. The turbo blowers were installed in 2012 and have rated capacity of 920 cubic feet per minute (cfm) at 8 psi. The turbo blowers have generally operated continuously since they were installed in 2012 but are reported to be in good condition. It is anticipated that the turbo blowers will remain and the positive displacement blower replaced, but the aeration demands of the new system will need to be closely evaluated as the increased BOD loading of the facility may require their upsizing. The future demand of this aeration system will largely depend on the addition of primary clarifiers and will be evaluated in Chapter 5.

The Village currently operates one turbo blower for each aeration basin, and uses an “aerate and drift” method whereby the blower is cycled on/off approximately 6 to 8 times per day once a dissolved oxygen (DO) setpoint has been reached. The blowers are operated based on a speed setpoint adjusted by the operators to control this method rather than using the controls to automatically adjust the blower speed to maintain a set DO.

The two smaller 7.5 HP positive displacement blowers were installed in 1994 to provide post aeration after disinfection to meet the WPDES dissolved oxygen limit. These blowers are generally operated seasonally as needed to maintain the required DO level. Due to the age of this equipment, both blowers should be replaced with new, more efficient units.



Turbo and Positive Displacement Blowers

Additional work at this building includes the replacement of the rusty overhead door, lighting and exposed plumbing upgrades, HVAC upgrades to the blower and electrical room for the new equipment, and piping modifications as needed for the blower upgrades. The existing transfer switch in the electrical room may also need to be upgraded with the replacement of the generator in the service building.

3.2.16 Disinfection Tank (Structure 70)

Filtered effluent from the tertiary filters flows by gravity to the disinfection tank via a 24-inch diameter pipe. The tank was built in 1978 as a 32-foot by 46-foot tank with serpentine channels to maximize the contact time for the chlorine. The approximate 54,000-gallon tank has an approximate 6-foot side-water depth, and fine bubble aeration and dechlorination was added to the basin in 1994 for final treatment ahead of discharge to the creek.

A small storage building was added near the tank to house the electrical equipment. It is assumed that this building will continue to house the effluent sampler and associated control equipment, but no other work is anticipated at this building.

Due to the age of the equipment and concerns with the handling and storage of the chlorine gas, the Village has decided to replace the existing chlorination and dechlorination processes at the WWTF with UV disinfection. The existing tank would appear to be suitable for retrofit for continued use with UV disinfection.

The tank would appear to be undersized for continued use as a chlorination tank as it does not meet the minimum 60-minute detention time at design average flow, or the 15 minute detention at peak flow.



Disinfection Tank

3.2.17 Gravity Thickener (Structure 75)

Waste activated sludge from the final clarifiers is pumped to the gravity thickener with the ODS pumps located in Structure 50. The tank was built in 1978 as a 20-foot diameter structure with an approximate 10-foot side-water depth. The structure is fitted with a top mounted steel bridge and rotating arm assembly to move the gravity thickened sludge to the center of the tank where it can then be pumped to the anaerobic digesters. The clear water overflows weirs and is returned to the front of the WWTF for treatment. An aluminum cover was added to the top of the tank in 2001 to control the odors at this location.



Gravity Thickener

The gravity thickener typically thickens sludge to about 4.5% solids with the use of polymer ahead of the anaerobic digesters. While the gravity thickener effectively thickens WAS, this system will likely re-release high levels of phosphorus if the WWTF converts to biological phosphorus removal. The tank may be used to thicken primary sludge if primary clarifiers are reintroduced at the facility. The repurposing of this equipment will be evaluated further in Chapter 5.

The clarifier assembly and bridge are original to the tank and are reported to be in fair condition. Due to the age of the equipment, it should be replaced. The existing electrical equipment should also be replaced, and the piping will need to be blasted and recoated.

3.2.18 Anaerobic Digesters and Building (Structure 80)

The two anaerobic digesters and the digester control building were constructed in 1978 as part of the original WWTF. The digesters are each 35-foot in diameter and 26-foot-deep concrete tanks with a shallow sump in the center of each. Each tank has a capacity of about 170,000 gallons of sludge and the tanks are designed to be operated as either a primary and secondary digester, or both as primary digesters based on the needs of the facility. The digesters are currently both operated as primary digesters with the tanks maintained at temperatures between 95- and 100-degrees Fahrenheit.

The two digesters are connected by an approximate 28-feet by 35-feet building that houses the boiler / heat exchanger to heat the digesters, as well as the associated sludge recirculation and transfer pumps and piping. The existing boiler / heat exchanger is a Walker combination unit rated for 750,000 BTU boiler and a 500,000 BTU heat exchanger. The unit was last refurbished in 2014, but due to the age of this unit and marginal sizing it should be replaced with a newer more efficient model. A second boiler / heat exchanger unit will need to be added for redundancy as well as to meet the higher demand of the system.

The three recirculation pumps are centrifugal style pumps that draw sludge from the digesters and circulate it through the heat exchanger to transfer heat back to each digester. These pumps are rated for 150 gpm and should be replaced due to age (installed in 2005).

The two sludge transfer pumps are ODS diaphragm-style pumps that typically draw sludge from gravity thickener on a timed stroke cycle and transfer this sludge to the digesters. Sludge can also be transferred from the digesters between each tank, as well as to the sludge storage tank. These pumps are rated for 4.5 gallons per stroke and should be replaced along with their associated valves due to the age of the equipment.



Boiler / Heat Exchanger

Each digester is mixed with a Walker grinder-style pump rated for 1,000 gpm operated on a timed basis to keep the contents of each tank well mixed. The pumps and associated piping and nozzles were installed in 2014 as part of the digester upgrades. The pumps, piping, and nozzles all appear to be in good condition.



ODS Sludge Transfer Pump



Recirculation Pump

The tanks are each fitted with floating covers, a floating gas holder cover on digester #1 (east) and a truss-style cover on digester #2 (west). The covers were refurbished in 2014 with new wood and membrane installed on digester #2's cover, and fresh insulation applied to the top of digester #1. As each of these steel covers are approaching 45-years of age and have had a few pinhole leaks, each should be replaced.



Digester Floating Truss and Gasholder Covers

The lower level of the digester building also contains a sewer ejector station that pumps sewage from this building to the plant drain lines. Due to the age of this equipment, it should be replaced.

Waste gas with moderate to high levels of methane is stored in the gasholder cover for reuse in the combination boiler. This gas is conditioned by removing excess moisture via moisture traps in the various gas pipes. Excess gas that is not used by the boiler is wasted to a candlestick-style flare located south of the digesters. All of the gas pressure, moisture removal, and other conditioning or control equipment should be replaced due to the age. The flare will also need to be relocated further from the tanks to meet current code requirements, and it is assumed that a third digester will be added due to the increased biological loading of these facilities.

The two anaerobic digesters are well maintained, but most of the equipment, valves, and piping is approaching 45-years of age and should be replaced as needed. The digesters should also be fitted with new manways in the basement to aid in the access of the digesters for cleaning and maintenance operations. Building improvements should also include HVAC, plumbing, and lighting upgrades.

3.2.19 Sludge Drying Beds (Structure 81)

Sludge drying beds were constructed in 1978 as unlined sand drying beds. The sludge storage tank was constructed in 1994 to replace the drying beds, mainly due to the odors associated with them. These drying beds are currently only used sparingly for dewatering grit and materials removed from the sewers by the Village's vac truck. The drying beds are in poor condition and should be removed as part of the project as this space will likely be needed for other purposes. Soil testing of this area will likely be required prior to demolition.



Sludge Drying Beds

3.2.20 Sludge Storage Tank (Structure 85)

The Village constructed the 1.6 MG sludge storage tank in 1994 to replace the original sludge drying beds. The tank is a 120.25-foot diameter glass-lined steel tank with a 19.25-foot total

height. The tank has a flat concrete floor, and a series of mixing piping located beneath the floor with six nozzles located around the base of the tank.

The tank and associated piping are in good condition and suitable for reuse with no modifications. The only modifications required for this structure is the addition of new stairs and platforms to access the top of the tank.

3.2.21 Sludge Pumping Building (Structure 90)

The sludge pumping building was constructed in 1994 along with the sludge storage tank. The building is an uninsulated block structure with three 60 HP pumps rated at 1,200 gpm with all pumps in service to be used to both mix the tank and to load out sludge to the truck fill station. The Vaughn chopper-style pumps were installed original with the building in 1994 but are in fair operating condition.

The pumps will need to be rebuilt or replaced as part of the planned upgrades due to age and condition. The pumps should also be fitted with VFD drives and inverter-duty motors to allow for more flexible operation and less water hammer when in operation. The Village experiences issues when loading trucks due to the nearly instantaneous 500 gpm flow currently produced by these pumps.

The existing plumbing and HVAC equipment are in poor condition and should be upgraded as part of the project. The sanitary sump pump piping for the lower area discharges to a rock pit outside the building and should be extended to discharge to the WWTF's collection system. The ceiling of the building was also left unfinished and uninsulated; thus a ceiling should be added to improve the space. The building will also need a gantry or other style crane to move equipment in this space.

The electrical equipment in this building is located on the grating inside the pump room in the same space as the pumps and piping. While this equipment appears to be in good condition, the space would appear to be classified and the equipment is not rated for this space. A separate electrical room will need to be created for this space to meet current code, or the ventilation ran continuously in this space to meet the room requirements. Additional electrical upgrades also include new lighting, switches, and boxes in this area.



Electrical Equipment



Pumps and Piping

3.2.22 Storage Garage (Structure 95)

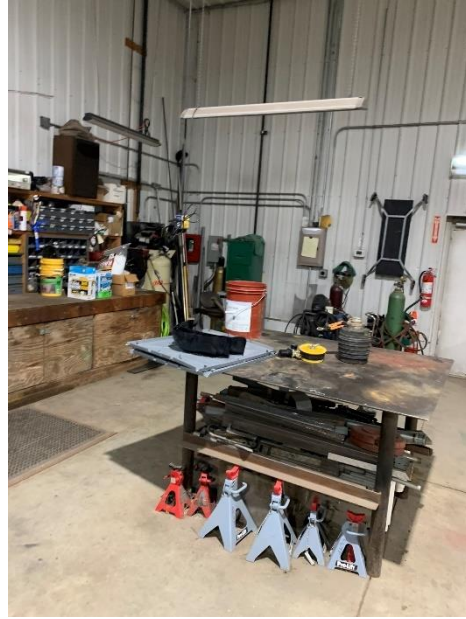
The existing storage building was initially constructed in 2003. The approximate 50-foot by 80-foot by 16-foot tall structure has both interior and exterior steel siding and is used for vehicle and equipment storage. With the potential loss of vehicle storage in the Service Building, consideration should be given to expanding these facilities. The building also houses a small shop and tool storage that serves as the primary maintenance area for the WWTF staff.

The storage garage lacks restroom facilities and consideration should be given to adding a restroom and/or locker room for this area as it is typically the first stop for staff as they return from call outs in the Village. Mezzanine or other equipment storage space would also allow the Village to store regular maintenance items in this area.

The existing lighting is in fair condition but should be upgraded to LED lighting with any upgrades to this building. Ventilation upgrades would likely be required with any significant upgrades to this space.



Vehicle storage Area



Maintenance Area / Shop

3.2.23 Site Piping and Utilities

3.2.23.1 Site Piping

Most of the existing site piping dates to the original construction in 1978, with expansion of the piping systems in 1994 and 2001 as needed for the preliminary treatment and activated sludge upgrades. Any piping that is over 40 years old should be evaluated for replacement and considered as part of any plant improvement. Future peak flows are projected in Chapter 4 and WWTF hydraulics will be considered and improvements to site piping recommended as necessary in Chapter 5.

3.2.23.2 Electrical Service

Electrical service to the facility is supplied by WE Energies and is 480 volt, 3 phase power. Power from the utility flows through a pad mounted transformer located east of Structure 10. The main breaker on the main switchboard is an 800-amp breaker. Downstream motor control centers (MCC) are protected with breakers ranging from 200 to 400 amps. In general, electrical conduit is concrete encased throughout the plant. All components of the electrical system will be assessed for replacement due to age.

3.2.23.3 Standby Generator

A diesel-fueled generator is located in the generator room on the southeast end of Structure 10. The automatic transfer switch, which will switch from utility power to generator power during a power failure, is located in the same room as the generator. There is an additional ATS in the blower building downstream of the main ATS that also needs to work in conjunction with the main ATS. The existing generator and transfer switch is rated for 500 kilowatts (kW) and is anticipated to be removed and replaced with a new standby generator.

3.2.23.4 Odor Control

An ozone type odor control system is located near the septage tanks and RBCs to provide odor control for most of the preliminary treatment processes at the WWTF. This equipment was pad mounted outside in 2010 and is in good condition. The odor control unit is connected to these processes via a network of PVC piping routed over-ground to it. Modification to the odor control at the WWTF will be recommended as necessary in Chapter 5.



Odor Control Unit

3.2.23.5 Water Service

Water is supplied to the WWTF site through a 6-inch diameter water service line from the Village from the west side of the site. The service enters the equipment room of Structure 10 from the north. Once inside, water is metered before splitting between the two backflow preventers. A 1-1/2-inch backflow preventer is installed on the potable (W1) system which serves the bathroom, lab, and boiler equipment. The non-potable (W2) system is protected with a 2-inch backflow preventer and serves hose bibs and hydrants across the WWTF site.

3.2.23.6 Natural Gas

Natural gas provided by the utility is conveyed through a main that enters the site from the west, travels north of Structure 15 and enters Structure 10 from the west. Gas is metered then utilized by the individual heaters and laboratory. The existing gas main is routed throughout the site to the various other buildings for heat, as well as to the digester for use in the boiler. Future improvements should consider expanding the natural gas network to other structures throughout the site.

3.2.24 Controls/SCADA

The SCADA system was installed at the facility in 2001 and was upgraded in 2018 throughout the facility. New PLCs, computers, touchscreen displays and control modifications were added at that time. It is anticipated that much of this system will remain, but that the system will be expanded to incorporate the new processes to be added or expanded.

3.3 Existing Facility Evaluation

Table 3-2 below summarizes the design capacity of the existing WWTF compared to current flows and loads.

Table 3-2 Existing Facility Capacities

Parameter	Units	Current Design	Annual Average (2017-2021)	Max Annual Month Avg (2017-2021)
Annual Average Flow	MGD	1.69	1.227	1.357
Max Day Flow	MGD	n/a	n/a	3.170
Peak Hourly Flow	MGD	6.250	n/a	6.250
BOD	lbs/day	2,710	2,555	2,685
TSS	lbs/day	3,188	3,233	3,699
NH ₃ -N	lbs/day	320	213	216
Phosphorus	lbs/day	64	64	73

As described further in Section 3.5, the flows and loadings to the facility are often exceeding the rated design capacity. The current WWTF has several pressing issues and improvements have been identified for further consideration in this facilities plan, as follows:

- Service Building (Structure 10)
 - Reconfigure the existing building space to create an office, meeting room, and storage area. Also expand the locker room facilities and/or restroom facilities.
 - Replace aging HVAC and plumbing systems.
 - Replace the lighting, MCC equipment, and relocate the SCADA server to a more secure area.
 - Replace the existing generator and ATS.
 - Relocate the vehicle storage area to the storage garage.
 - Replace the raw sewage pumps and check valves.
 - Separate the lower area and the electrical room to meet electrical space requirements for the equipment rating.
 - Reconfigure the septage lines in the lower area to minimize the risk of plugging.
 - Replace the building roof and minor architectural upgrades such as painting, replacement of rusted doors, etc.
- Influent Screening Building (Structure 15)
 - Replace the HVAC and plumbing in the screening room and lower area.
 - Replace the lighting in the building, as well as all electrical components in the screening room and lower area.
 - Replace the mechanical screen and washer/compactor unit.
 - Replace the overhead door and operator.
- Pretreatment Building (Structure 20)
 - Replace the grit pump and valves, as well as the grit classifier.
 - Replace the HVAC and plumbing in the entire building.
 - Replace the lighting in the building, as well as all electrical components in the grit room.
 - Add a bypass channel to the grit removal system.
 - Replace the Pista Grit separator.
 - Eliminate the grease removal facilities at this tank and instead configure to carry the grease to the primary clarifiers. Also look to eliminate the aeration in the channels to promote biological phosphorus removal.
- Septage Tanks (Structure 25)
 - Remove the existing covers.

- Remove the internal mechanical components and potentially modify the tank for reuse as primary clarifiers.
- Aeration Basins (Structure 30)
 - Remove and replace the rotating aerators with new fine membrane diffusers.
 - Eliminate the bridge structures.
 - Add baffles or divider walls to prevent the tanks from short circuiting.
 - Add handrails for safety.
 - Modify the piping to allow the tanks to be run in series and/or parallel operation.
- RBC Tanks (Structure 31)
 - Remove existing tanks and associated piping.
- Aeration Control Building (Structure 35)
 - Raise the floor for improved access to the building.
- Secondary Clarifiers #1 & #2 (Structure 40)
 - Rebuild the clarifier drives and bridge assembly.
 - Blast and recoat the equipment paint.
 - Consider removal and replacement with one properly sized, deeper clarifier.
- Secondary Clarifiers #3 & #4 (Structure 45)
 - Blast and recoat the equipment paint.
 - Install algae covers over the weirs and baffles.
 - Increase clarification capacity.
- Secondary Sludge Building (Structure 50)
 - Replace the HVAC and plumbing in the entire building.
 - Replace the lighting in the building.
 - Add a wall to separate the rated basement space from the unrated electrical room.
 - Replace the pumps, add flow meters, and modify piping to convert the lower area for new RAS/WAS pumping.
- RAS Pumping Station (Structure 55)
 - Remove the existing tank and associated equipment.
 - Replace the pumps and related system to allow for more effective RAS pumping from the clarifiers.
- Tertiary Filter Building (Structure 60)
 - Replace the HVAC and plumbing in the entire building.
 - Replace the lighting in the building.
 - Evaluate the expansion of the tertiary filters to meet the future peak day demands.
 - Remove the chlorination and dechlorination facilities from the building.
 - Modify the upstream piping to allow for more effective phosphorus removal with the filters. This will also include a small floc tank as well.
- Blower Building (Structure 65)
 - Replace the two post aeration blowers and one older positive displacement blower with larger capacity and more efficient equipment.
 - Overall improvements for blower building space, including painting the building and replacing the overhead door.
 - Replace the HVAC, plumbing, and lighting in the building.
 - Replace the transfer switch along with the generator at the facility.
- Disinfection Tank (Structure 70)
 - Replace the chlorination and dechlorination equipment with UV disinfection equipment.
- Gravity Thickener (Structure 75)
 - Convert the gravity thickener to be used with primary sludge in lieu of waste activated sludge as it will likely release phosphorus from the biological phosphorus process.
- Anaerobic Digesters and Building (Structure 80)

- Replace the boiler / heat exchanger.
- Replace the digester covers.
- Replace the sludge recirculation and transfer pumps.
- Replace aging sludge valves
- Replace the ejector / sump pumps and piping
- Add a manway to each of the digesters from the lower level of the building.
- Replace the HVAC, plumbing, and lighting in the building.
- Sludge Drying Beds (Structure 81)
 - Remove the existing sludge drying beds.
 - Keep a small receiving station for dewatering vac truck waste.
- Sludge Storage Tank (Structure 85)
 - No significant upgrades are anticipated.
- Sludge Pumping Building (Structure 90)
 - Replace the sludge transfer pumps and check valves.
 - Overall improvements for building space, including painting, finished ceiling, and insulation.
 - Replace the HVAC, plumbing, and lighting in the building. Extend the plumbing to the sanitary sewer outside the building.
 - Relocate the electrical equipment as applicable for code compliance.
- Storage Garage (Structure 95)
 - Add a restroom and locker room at this building for the staff.
 - Add storage for parts and equipment storage.
- Evaluation of the hydraulics of future peak flows to identify potential bottlenecks and site piping to be upsized. Additionally, any piping that is over 40 years old should be considered for replacement as part of any plant improvement.
- Replacement of aging MCCs/electrical components and upgrades to SCADA, instrumentation and controls as needed throughout the WWTF.
- General buildings improvements including lighting, HVAC, energy efficiency, windows, doors, and finishes/painting.

3.4 Existing WPDES Summary

The discharge limits in the WPDES Permit No. WI-0021806-07-1, with an effective date of October 1, 2020, for the Village of Jackson WWTF are summarized in Table 3-3. See Appendix A for a copy of the complete permit.

A part of the permit includes requirements under the Milwaukee River TMDL. In the TMDL, which was approved by the US Environmental Protection Agency in March 2018, monthly average total phosphorus waste load allocations were assigned to the WWTF. The monthly allocation is listed in pounds per day that the WWTF must comply with and will become effective for the WWTF starting in October 2026. It was reported in the Final Compliance Alternatives Plan, dated September 2021, that an equivalent concentration of 0.14 mg/L would be targeted for effluent phosphorus based upon historical flows and monthly TMDL allocations.

Table 3-3 Existing WPDES Permit Limits

Parameter	Limits
BOD (weekly average)	12 mg/L (May - October) 17 mg/L (November - April)
BOD (monthly average)	12 mg/L (May - October) 17 mg/L (November - April)
TSS (weekly average)	12 mg/L (Year round)
TSS (monthly average)	12 mg/L (Year round)
pH Field (daily maximum)	9.0 su
pH Field (daily minimum)	6.0 su
Dissolved Oxygen (daily minimum)	7.0 mg/L
Fecal Coliform (mean- weekly)	780 # / 100 mL
Fecal Coliform (mean- monthly)	400 # / 100 mL
Nitrogen, Ammonia (NH ₃ -N) (Daily Maximum)	14 mg/L
Nitrogen, Ammonia (NH ₃ -N) (weekly average)	8.5 mg/L (April) 7.4 mg/L (May) 5.0 mg/L (June - September) 8.4 mg/L (October) 14 mg/L (November – March)
Nitrogen, Ammonia (NH ₃ -N) (monthly average)	4.3 mg/L (April) 5.7 mg/L (May) 3.9 mg/L (June - September) 4.3 mg/L (October) 7.0 mg/L (November – March)
Phosphorus, Total (Monthly Average)	0.85 mg/L
Phosphorus, Total	3.03 #/day (January) 3.12 #/day (February) 2.11 #/day (March) 2.02 #/day (April) 3.65 #/day (May) 2.85 #/day (June) 2.51 #/day (July) 2.79 #/day (August) 3.78 #/day (September) 2.72 #/day (October) 3.49 #/day (November) 2.86 #/day (December)
Chlorine, Total Residual (daily max)	38 ug/L (May – September)
Chlorine, Total Residual (weekly & monthly average)	7.7 ug/L (May - September)

3.5 Wastewater Flows and Loadings

Wastewater treated by the Jackson WWTF includes flow from residential, commercial, industrial, and public authority users within the Village of Jackson. Kerry Ingredients is the only significant industrial contributor. Other additional contributors include hauled waste from outside of the Village limits.

3.5.1 Influent Wastewater Flow

In order to differentiate between actual wastewater flow and infiltration and inflow (I/I), historical water use and facility influent records were evaluated. After separating I/I as a quantified component in the overall influent flow value, future flow increases can be better determined from actual wastewater flows from the residential, commercial, public authority and general industrial sectors of the community.

The Jackson water and sewer utility billing reports for 2017-2020 were referenced for sewer usage information and are summarized below in Table 3-4. The billed sewer flow for the various categories is based on metered water usage, including customers that have sewer/deduct meters to adjust for water purchased but not discharged to the Village's collection system. Water and sewer use records for the period of evaluation are provided in Appendix G. Although categorized independently by the Utility, multi-family residential flows were added to residential flows for this analysis.

Table 3-4 Summary of Annual Metered Sewer Use (MGD)

Year	Residential	Commercial	General Industrial	Public	Annual Average
2017	0.399	0.076	0.094	0.016	0.585
2018	0.399	0.074	0.091	0.012	0.575
2019	0.391	0.069	0.093	0.008	0.562
2020	0.415	0.073	0.084	0.008	0.580
Average	0.401	0.073	0.091	0.011	0.576
% of Total	70%	13%	16%	2%	

The Village receives a significant volume of hauled waste at the WWTF on a daily basis that impacts the biological loading of the facility. Table 3-5 below summarized the average daily holding tank and septage volumes received in 2017 – 2020.

Table 3-5 Hauled Waste Annual Totals

Year	Holding Tank (gpd)	Septage (gpd)
2017	50,551	9,420
2018	53,186	9,435
2019	48,308	8,140
2020	43,373	8,051
Average	48,855	8,761

The metered sewer use for each sector was analyzed to develop per capita and per customer usage rates on an annual average basis, summarized in Table 3-6. Residential flows are calculated on a per capita basis, based on the DOA population in the Village of Jackson, for the respective year. Commercial, general industrial, and public authority usage rates have been calculated on a per customer basis, based on the Utility's number of customers served for the given year.

Table 3-6 Annual Average Sewer Use as Gallons Per Customer Per Day (GPCD)

Year	Residential Flow (GPCD)*	Commercial Flow (GPCD)	Industrial Flow (GPCD)	Public Flow (GPCD)
2017	109	701	1,555	712
2018	111	796	1,531	611
2019	116	614	1,472	260
2020	116	718	1,225	554
Average	117	707	1,446	535

*Residential sewer use was calculated using the listed customers for the given year.

Recorded wastewater flows at the WWTF are provided by year in Appendix G and summarized in Table 3-7.

Table 3-7 Influent Wastewater Flows

Year	WWTF Influent Flows (MGD)			
	Annual Average	Max Month	Max Week	Max Day
2017	1.159	1.559	1.452	1.779
2018	1.274	1.650	1.753	2.260
2019	1.357	1.703	1.726	2.281
2020	1.249	1.285	1.636	2.055
2021	1.096	1.264	1.355	1.583
Average	1.227	1.492	1.584	1.992

Influent flows to the WWTF included in Table 3-7 are annual averages, maximum monthly, weekly, and daily flows. Annual average influent flow is defined as the average of the daily influent to the WWTF over the course of the year, from January 1 through December 31. Maximum Monthly flow values are determined by taking the average of the influent flow over the course of a calendar month and then selecting the highest monthly average of the given year. Maximum week values are determined similarly, although they are the averages of influent flow over the course of a week, from Sunday through Saturday, with the highest week of the given year selected. The maximum daily flow values are, as the name implies, the peak daily flows on record for each year. The annual average influent flow to the WWTF has not exceeded the existing WWTF design capacity flow of 1.69 MGD for the past 5 years.

3.5.2 Infiltration and Inflow

Infiltration and Inflow (I/I) are two sources of clear water that can enter the collection system and greatly impact influent wastewater flows. After separating I/I as a quantified component in the overall influent flow value, future flow increases can be better determined for actual wastewater flows from the residential, commercial, public and general industrial sectors of a community.

According to the EPA's *Quick Guide for Estimating Infiltration and Inflow*⁵, Infiltration is defined as "groundwater that infiltrates a sewer system through defective pipes, pipe joints, connections, or manholes. Infiltration does not include and, is distinguished from, inflow". Infiltration measurements are conducted during periods of "seasonally high ground water conditions" specifically during a dry period.

Inflow is defined as "water other than sanitary flow that enters a sewer system from sources which include, but are not limited to, roof leaders, cellar drains, yard drains, area drains, drains from wet areas, cross connections between storm sewers and sanitary sewers, catch basins, cooling towers, stormwater, surface runoff (including leaking manhole covers), street wash-water, or drainage". Inflow is distinguished from infiltration and is measured during periods of wet weather.

WWTF influent records were evaluated to differentiate between actual wastewater flow and I/I. The dry weather, annual average, maximum month wet weather and maximum daily I/I was calculated by subtracting the Utility billed sewer maximum month, maximum week, and maximum day flow from the various WWTF flows in Table 3-7. In calculation of wet weather maximum day and maximum monthly I/I, the average of the three highest values from 2017 to 2021 was used. The calculations are provided in Appendix H and the results are summarized below in Table 3-8:

Table 3-8 Existing I/I Flows 2017-2021

	I/I Flow (MGD)
Dry Weather Infiltration (Minimum One Week Average)	0.415
Wet Weather Infiltration and Inflow	
Maximum Daily	3.170
Maximum Weekly	2.087
Maximum Monthly	1.013
Annual Average	0.711

The EPA defines excessive infiltration as average dry weather flow greater than 120 gallons per capita per day. The average dry weather flow was calculated by averaging the two minimum weeks per year from 2017 through 2021. Using this average, the minimum 1-week flow of 0.948 MGD was used to represent dry weather flows. Based on the current estimated population of 7,185 (Section 2.10), the dry weather flows are approximately 132 gallons per capita per day. This number exceeds the EPA guideline for excessive infiltration and indicates that infiltration may be a significant contributor to flows in the Village.

The EPA further defines excessive inflow as average wet weather flows that exceed 275 gallons per capita per day, excluding significant commercial and industrial flow. This is calculated by adding the average Village base daily flow (0.517 MGD) to the maximum daily I/I (3.170 MGD), which results in a flow of 3.687 MGD and 513 gallons per capita per day. This value does exceed the guideline for excessive inflow, indicating that inflow may be a significant contributor to flows in the Village.

⁵ U.S. Environmental Protection Agency, Water Infrastructure Outreach (2014). *Quick Guide for Estimating Infiltration and Inflow*. Retrieved from <https://www3.epa.gov/region1/sso/pdfs/QuickGuide4EstimatingInfiltrationInflow.pdf>

When compared to the EPA guidelines, the Village appears to have both excessive infiltration and excessive inflow in its collection system. The Village is currently undertaking a program to reduce the I/I in the collection system. The current efforts to date have included an extensive television program to identify sources and solutions for I/I in the Village's main interceptors through low lying areas.

3.5.3 Organic, Suspended Solids, Ammonia/Nitrogen, and Phosphorus Loadings

Averages of the annual BOD, total suspended solids, and phosphorus loadings to the WWTF from 2017 through 2021 are provided in Table 3-9 below, along with the average of the 3 highest months for the period. The existing base loading to the WWTF is calculated by averaging the highest months because the facility may have to process increased influent loads for months at a time. Appendix G, WWTF Flow and Loading Data, contains historical loading tables for 2017-2021.

Table 3-9 2017-2021 Influent Loadings to WWTF

2017-2021 Averages	Annual Averages	Maximum Month Averages
BOD	2,555	2,685
TSS	3,233	3,699
Phosphorus	64	73
Ammonia	213	216

4. FUTURE DESIGN CONDITIONS

4.1 Community Growth

Future population growth for the Village of Jackson was projected using the Wisconsin Department of Administration (WisDOA) population census and estimates and the 2019 Comprehensive Plan completed by SEWRPC for the Village of Jackson. A graph of the projected population for the Village of Jackson is provided in Appendix I. Three methods were evaluated to estimate the 2045 projected population for the Village. In the Village's Comprehensive Plan, linear growth scenarios were presented using recent trends, as well as intermediate and high growth projections. A summary of the population projections is included in Table 4-1.

Table 4-1 Village of Jackson Population Projections

2025 DOA Projection ⁶	2040 DOA Projection	Comp Plan Recent Trends Projection	Comp Plan Intermediate Growth Projection	Comp Plan High-Growth Projection
8,465	9,710	10,031	11,570	15,160

The Comprehensive Plan provided three projections for the Village's future population. The High-Growth projection estimated a population of 15,160 in 2050, while the Intermediate-Growth projection estimated a population of 11,570 in 2050. The Recent Trends projection estimated the population at 10,031. These projections were interpolated to project the Village's population in 2045 for comparison and use in this document. Based on current knowledge of the Village's developments, the Village feels that the SEWRPC Intermediate Growth Projection is the most reasonable and should be used for future planning. This represents a population increase of 3,654 over the 2020 Census population of 7,185.

Growth in the commercial, industrial, and public authority sectors was projected based on the Comprehensive Plan for the Village of Jackson and input from the Village. Land demand for local commercial uses was projected to increase by 393 acres over the planning period. Growth in the public authority sector is estimated to be about 1% per year. Land demand for local industrial uses was projected to increase by an estimated 150 acres over the planning period.

The projections are summarized in Table 4-2 and the calculations are provided in Appendix I.

Table 4-2 Year 2045 Growth Projections

Sector	Increase
Residential	3,654 capita
Commercial	393 acres
Public Authority	25%
General Industrial	150 acres ⁷

⁶ Wisconsin Department of Administration, Municipal Population Projections, 2010-2040

⁷ The Village's Comprehensive Plan: Vision 2050 lists this as 310 acres, but as the DNR will require the industrial growth to be less than 10% of the overall flow the acreage was reduced to 150 acres.

4.2 Wastewater Flows

The projected annual average and maximum month flow rates for the Jackson WWTF will include the main components listed below:

- Village Base Loadings
- Future Village Increases
- Additional Contributors
- Future Major Industry Requests
- Clear Water Infiltration and Inflow

The Village base flow is the sum of the residential, commercial, general industrial, and public authority billed sewer flow, as presented in Section 3.5.1 and excludes major industries, additional contributors, and I/I.

Future Village increases, including residential, commercial, general industrial, and public authority are based on current conditions, typical values, clear water I/I, and the expected increases shown in Table 4-2. The future residential increase is based on the population growth shown in Table 4-2 multiplied by the same calculated per capita factors from existing annual average and maximum month flows. The future commercial expansion annual average flow is based on the commercial growth projection shown in Table 4-2 multiplied by the calculated flow per acre per day used by current commercial customers. For maximum month flows, commercial expansion projections utilize a typical value of 750 gallons per acre per day to account for uncertainty in the commercial customers the Village may serve in the future. The future public sector growth is based on the percent per year growth shown in Table 4-2 multiplied by the calculated flow used by current public authority customers, on both an annual and maximum month basis. The general industrial expansion annual average flow is based on the general industrial projection shown in Table 4-2 multiplied by the calculated flow per acre per day used by the current general industrial customers. For maximum month flows, general industrial expansion projections utilize a typical value of 1,500 gallons per acre per day to account for uncertainty in the industrial customers the Village may serve in the future. See Appendix I for the complete future loading projections for the Village.

Additional contributions come from acceptance of septic and/or holding tank wastewater from outside sources. Based on the volumes accepted previously and summarized in Section 3.5.1, and the level of hauler interest to utilize the Jackson WWTF, there is a demand for this. An additional contribution of 9,000 gallons per day of septic and 49,000 gallons per day of holding tank waste are included in the projected contributions.

To account for growth of the one significant industrial contributor to the Village's WWTF, the Village has worked with Kerry Ingredients to develop a plan for their future growth and wastewater needs. Kerry Ingredients has signed an Agreement with the Village to limit flow to 60,000 gpd and 5,000 gph. The Agreement also included limitations to the discharge to the sanitary sewer as summarized below in Table 4-3.

Table 4-3 Kerry Ingredients Agreed Upon Loading Discharge

Substance (mg/L)	Ave. Monthly Concentration	Daily Max Concentration
Biochemical Oxygen Demand	238	600
Suspended Solids	233	700
Phosphorus	10	30
Ammonia	30	50
pH (s.u.)	6.5 – 8.0	6.0 – 9.0

In accordance with NR 110, an allocation for a future unidentified major industry can be provided for up to 10% of the total average design flow to allow for some unforeseeable industrial growth. The Village has elected to include provisions for 0% unallocated industrial sources.

Infiltration and inflow quantities are taken from those values previously established in Table 3-12. Maximum weekly infiltration is used to determine the maximum month flow because this clear water flow can be maximum month for long periods of time, which must be accommodated at the treatment facility with regards to system capacity.

Using the existing Village base flows, projected future increases, allocations for hauled waste, future major industrial requests, and I/I calculations, annual average and maximum month flows were established for the evaluation period. Annual average flow for the WWTF is calculated by summing the current annual average Village base flow, future annual average Village increases, septic and holding tank contributions, annual average flow from major industrial contributor requests, existing annual average I/I, and projected increased I/I. The maximum month flow is calculated by summing the current maximum month Village base flow, future maximum month Village increases, additional contributor loading, requested major industrial projections, and the existing and future additional I/I values. Both annual average and maximum month flows are calculated, but it is intended that maximum month values will be used for design.

The maximum daily flow value is determined by summing the Village base and future Village increase maximum month flows, multiplying this sum by a peaking factor of 1.75; and adding this value to the major industrial maximum month flows, future maximum month I/I, daily wet weather I/I, and flow from the additional contributors. The peak hourly flow value is similar to the maximum day flow with the exception that a peaking factor of 2.50 is used along with the instantaneous inflow factor (daily wet weather I/I multiplied by 1.50). The peaking factors were selected to approximate the peak flows based on what has been experienced at the WWTF. The peak flow values will be reviewed during the design phase, along with historical peak flow data, to ensure that the influent headworks and pumping will adequately handle peak flows.

The future flow projection calculations are provided in Appendix I and summarized in Tables 4-4 and 4-5.

Table 4-4 Future Annual Average Flow Projections – Year 2045

Contributor	Quantity	Rate	Design Flow MGD
1. Village Base - Annual Average			
Residential	7,185 capita	49 gpcd	0.349
Commercial	91 customers	707 gpcd	0.064
Public	15 customers	535 gpcd	0.008
Industrial	43 customers	1,446 gpcd	0.062
Multi-Family	52 customers	643 gpcd	0.033
2. Future Village Increases- Annual Average			
Residential	3,654 capita	49 gpcd	0.179
Commercial	393 acres	750 gpad	0.295
Public	25%	%	0.002
Industrial	150 acres	1,500 gpad	0.225
3. Additional Contributors			
Septage Hauling			0.009
Holding Tank Waste			0.049
4. Future Major Industry Requests- Annual Average			
Kerry Ingredients			0.060
Unallocated Industrial			0.000
5. Clear Water Infiltration/Inflow			
Future Maximum Month	3,654 capita x 0 gpcd		0.000
Future Reduction	No reductions assumed		0.000
Annual Average			0.711
Annual Average Flow (MGD)			2.046

Table 4-5 Future Maximum Month Flow Projections – Year 2045

Contributor	Quantity	Rate	Design Flow MGD
1. Village Base - Maximum Month			
Residential	7,185 capita	70 gpcd	0.503
Commercial	91 customers	1,043 gpcd	0.095
Public	15 customers	1,386 gpcd	0.021
Industrial	43 customers	2,748 gpcd	0.118
Multi-Family	52 customers	897 gpcd	0.047
2. Future Village Increases			
Residential	3,654 capita	49 gpcd	0.179
Commercial	393 acres	750 gpad	0.295
Public	25%	%	0.002
Industrial	150 acres	1,500 gpad	0.225
3. Additional Contributors			
Septage Hauling			0.009
Holding Tank Waste			0.049
4. Future Major Industry Requests - Maximum Month			
Kerry Ingredients			0.060
Unallocated Industrial			0.000
5. Clear Water Infiltration/Inflow			
Existing Maximum Month			1.013
Future Maximum Month	3,654 capita x 0 gpcd		0.000
Future Reduction	No reductions assumed		0.000
Maximum Day			3.170
Peak Hour	(Max Day Inflow x 1.50)		4.755
Maximum Month Flow (MGD)			2.619
Maximum Daily Flow (MGD)			5.418
Peak Hourly Flow (MGD)			7.916 (5,497 gpm)

4.3 Organic and Suspended Solids Loadings

Historical loading data from 2017 through 2021, as summarized in Table 3-9 were used to establish the current annual average and maximum month loadings for BOD and TSS being processed at the WWTF.

The future residential increase is based on the population growth shown in Table 4-2 multiplied by the calculated per capita load from current residential customers for both BOD and TSS. Typical concentrations of 250 mg/l for both BOD and TSS were used to determine the commercial expansion, public sector growth, and general industrial expansion. See Appendix I for the calculations.

The additional contributions from septic waste was multiplied by typical concentrations of 1,500 mg/L BOD and 4,000 mg/L TSS. The additional contribution from holding tank waste was multiplied by typical concentrations of 600 mg/L BOD and 1,800 mg/L TSS.

The loads for Kerry Ingredients were calculated using the agreed upon average concentrations in Table 4-3. A summary of these projected annual average and maximum month loadings is given in Tables 4-6 and 4-7 and detailed calculations are provided in Appendix I.

Table 4-6 BOD and TSS Annual Average Loading Projections – Year 2045

	BOD (lbs/day)	TSS (lbs/day)
1. Village Base Loading Annual Average	2,220	2,435
2. Future Village Increases – Annual Average		
Residential	621	731
Commercial	615	615
Public	4	4
General Industrial	469	469
3. Additional Contributors		
Septage Hauling	107	285
Holding Tank Waste	244	733
4. Future Major Industry Requests – Annual Average		
Kerry Ingredients	119	117
Unallocated Industrial	0	0
Annual Average Loading (lbs/day)	4,399	5,388

Table 4-7 BOD and TSS Maximum Month Loading Projections – Year 2045

	BOD (lbs/day)	TSS (lbs/day)
1. Village Base Loading Maximum Month	3,056	3,988
2. Future Village Increases - Maximum Month		
Residential	621	731
Commercial	615	615
Public	4	4
General Industrial	469	469
3. Additional Contributors		
Septage Hauling	107	285
Holding Tank Waste	244	733
4. Future Major Industry Requests - Maximum Month		
Kerry Ingredients	119	117
Unallocated Industrial	0	0
Maximum Month Loading (lbs/day)	5,235	6,941

4.4 Nutrient Loadings

A combination of WWTF influent data and typical values were used to project nutrient loadings for TKN and phosphorus. For Village base TKN loading, a typical value of 40 mg/L was used. The Village base phosphorus loading was calculated using an average concentration of 7 mg/L. Future

Village increases used typical concentration values of 40 mg/L TKN and 7 mg/L total phosphorus. For the additional contributors, concentrations of 300 mg/L and 300 mg/L are assumed for TKN and phosphorus respectively for septic and 100 mg/L and 30 mg/L for holding tank waste. As none of the major industrial contributors monitor effluent TKN, a typical concentration of 40 mg/L was used with the annual and maximum month flows established in Table 4-2. A summary of these annual average and maximum month loading calculations is given below in Table 4-8 and Table 4-9.

Table 4-8 Future Annual Average Nutrient Loadings – Year 2045

	TKN (lbs/day)	P (lbs/day)
1. Village Base Loading Annual Average	172	30
2. Future Village Increases- Annual Average		
Residential	60	10
Commercial	96	17
Public	1	0
General Industrial	75	13
3. Additional Contributors		
Septage Hauling	21	21
Holding Tank Waste	41	12
4. Future Major Industry Requests- Annual Kerry Ingredients	15	5
Annual Average Loading (lbs/day)	483	110

Table 4-9 Future Maximum Month Nutrient Loadings – Year 2045

	TKN (lbs/day)	P (lbs/day)
1. Village Base Loading Maximum Month	237	80
2. Future Village Increases - Maximum Month		
Residential	60	10
Commercial	96	17
Public	1	0
General Industrial	75	13
3. Additional Contributors		
Septage Hauling	21	21
Holding Tank Waste	41	12
4. Future Major Industry Requests – Maximum Month Kerry Ingredients	15	5
Maximum Month Loading (lbs/day)	548	160

4.5 Future Effluent Limitations

The existing outfall is the only location being considered for future discharge from the Jackson WWTF. As part of the facilities planning process, an effluent limit request for the current outfall

location was made to the Water Resources Section of the WDNR. Copies of correspondence regarding this request are included in Appendix J and a summary of the preliminary effluent limits as calculated by the WDNR is given below in Table 4-10.

Table 4-10 Projected WPDES Permit Limits at Existing Outfall

Parameter	Limits
BOD (weekly avg)	12 mg/L (May - October) 17 mg/L (November - April)
BOD (monthly avg)	12 mg/L (May - October) 17 mg/L (November - April)
TSS (weekly avg)	12 mg/L (Year round)
TSS (monthly avg)	12 mg/L (Year round)
pH Field (daily maximum)	9.0 su
pH Field (daily minimum)	6.0 su
Dissolved Oxygen (daily min)	7.0 mg/L
Fecal Coliform (mean- weekly)	780 # / 100 mL
Fecal Coliform (mean- monthly)	400 # / 100 mL
Nitrogen, Ammonia (NH ₃ -N) (daily max)	14 mg/L
Nitrogen, Ammonia (NH ₃ -N) (weekly average)	8.5 mg/L (April) 7.4 mg/L (May) 5.0 mg/L (June - September) 8.4 mg/L (October) 14 mg/L (November – March)
Nitrogen, Ammonia (NH ₃ -N) (monthly average)	4.3 mg/L (April) 5.7 mg/L (May) 3.9 mg/L (June - September) 4.3 mg/L (October) 7.0 mg/L (November – March)
Phosphorus, Total (Monthly Average)	0.85 mg/L
Phosphorus, Total	3.03 #/day (January) 3.12 #/day (February) 2.11 #/day (March) 2.02 #/day (April) 3.65 #/day (May) 2.85 #/day (June) 2.51 #/day (July) 2.79 #/day (August) 3.78 #/day (September) 2.72 #/day (October) 3.49 #/day (November) 2.86 #/day (December)
Chlorine, Total Residual (daily max)	38 ug/L (May – September)
Chlorine, Total Residual (weekly & monthly average)	7.7 ug/L (May - September)

Under the current Milwaukee River TMDL, the Jackson WWTF will maintain the existing TSS and phosphorus allocations that were previously calculated for the facility. To understand the impacts of the TMDL and the increased flow projections for the facility, the design maximum month flow

projection from Section 4.2 was used to calculate the most stringent month's equivalent concentration for each pollutant. Table 4-11 summarizes the pollutant concentration the WWTF should target to ensure compliance with TMDL limits.

Table 4-11 Design Maximum Month Flow TMDL Equivalent Concentrations

Pollutant	Month	Monthly Average Limit (lbs/day)	Equivalent Concentration (mg/L)
TSS ⁸	All	N/A	N/A
Phosphorus	April	2.02	0.087

4.6 Design Summary

A summary of the projected design parameters established in the preceding sections are given in Table 4-12.

Table 4-12 Design Loading Summary

Design Parameter	2045 Design Year
Projected Population	10,839
Flow Rates (MGD)	
Annual Average	2.046
Design Maximum Month	2.619
Maximum Daily	5.418
Peak Hourly	7.916
Pollutant Loadings (lbs/day)	
BOD	5,235
Suspended Solids	6,941
TKN	548
Phosphorus	160

⁸ The TMDL values are so high that the concentration-based limitations control.

5. PROJECT ALTERNATIVES

5.1 Overview and Need for Project

As noted in previous sections, facilities planning was undertaken for Jackson to address aging infrastructure, meet existing and future permit requirements, and to plan for meeting the needs of sewer users in the community for the next 20 years and beyond. The purpose of this Facilities Planning Document is to evaluate alternatives for upgrading the existing Jackson WWTF, and for meeting current and future permit requirements, in particular the new Milwaukee Rivers TMDLs for total phosphorus and that may require upgrades to the WWTF. The specific needs for the WWTF are described in the following sections.

5.1.1 Aging Infrastructure

Chapter 3 illustrates the existing conditions of the Jackson WWTF and outlines the needs for upgrades based on the condition of existing infrastructure.

The WWTF was constructed in 1978 and has had major upgrade in 1994 and 2001. Since then, repairs and replacements have occurred as needed for the tertiary filters, aeration blowers, and anaerobic digesters. The facility is now at a point where many of the mechanical processes are reaching the end of their useful life and are in need of replacement or upgrading. In particular, all of the pumps, aeration equipment, digester equipment, and disinfection equipment are in need or replacement. A summary of needed upgrades and modifications is provided in Section 3.3.

This Facilities Planning Document does not evaluate the construction of a new facility because the existing tanks and structures are in good condition and there is sufficient room for expansion with the recommended repairs and modifications. The Village wishes to maximize the use of existing structures/tankage to the greatest extent possible.

5.1.2 Health, Sanitation, and Security

In addition to the deficiencies in infrastructure there is a need to address deficiencies in health, sanitation, and security concerns at the facility. As equipment and processes reach and surpass the end of their useful lives, there is a greater risk of bypass and biological upsets are more likely to occur, particularly due to the lack of operational flexibility and reliability. A decrease in treatment reliability poses a sanitation health risk to recreational users in the receiving stream and operations staff. Proposed upgrades/equipment replacement will improve health and sanitation conditions by providing increased treatment reliability and efficiency. Proposed upgrades also take into account improvements associated with minimizing confined space entry occurrences, ventilation enhancements in classified and unclassified spaces, and overall worker environment improvements.

The plant is often meeting current permit requirements, as documented in the Compliance Maintenance Annual Reports (CMARs) in Appendix K, however there are numerous incidents when influent flow or loading has exceeded the rated design capacity of the WWTF.

A large component of the proposed WWTF upgrades involves compliance with stringent mass-based effluent total phosphorus limits associated with the Milwaukee River / Cedar Creek TMDL. The mass load allocation that has been given to the Facility which causes increasingly stringent effluent phosphorus concentration requirements as wastewater flows increase. Therefore, provisions are included in this plan for new tertiary filtration equipment, likely utilizing cloth media

disc filtration with flocculation basins in front of them, in order to comply with the limits that take effect starting in 2024.

5.1.3 Permit Requirements

Current and future permit requirements are discussed in Sections 3.4 and 4.5. The Village of Jackson's WPDES permit was renewed in October 2020. The new permit includes TMDL compliance requirements for phosphorus discharge into the Milwaukee River Basin. As discussed in Section 4.5, a daily average effluent concentration of 0.087 mg/L could be necessary during the month of April, depending on flow. Upgrades to the existing filtration system are required in order to achieve compliance with these phosphorus limitations.

5.1.4 Reasonable Growth

The projections discussed in Chapter 4 describe expected future growth for the Village based on US Census data, DOA estimates, and the SEWRPC Comprehensive Plan for the next 20 years. The Village is expecting and planning for reasonable growth in the residential, commercial, public, and industrial sectors. Due to the projected growth in the Village, the WWTF does have various processes that require upgrades to accommodate increased flow and loading. Section 5.2 addresses the specific upgrades needed to meet current and projected flows and loads.

5.2 Summary of Upgrade Requirements

Any upgrade of the existing Jackson WWTF must meet the acknowledged reasons for undertaking facilities planning, including the following:

- Maintain compliance with the existing and future effluent limits.
- Replace process equipment coming to the end of their effective life.
- Address the issues of deteriorating process structures, HVAC system effectiveness, and shortcomings in the electrical distribution and controls system.
- Implement changes which will make the working conditions a safe environment for staff.

The majority of components of the WWTF require upgrades, replacement or modifications due to age-related issues described in Chapter 3 and to provide treatment of the future flows and loads described in Chapter 4. A capacity evaluation of the treatment components and piping was performed to identify these issues and can be found in Appendix F. The following sections summarize age and capacity-related issues for site piping and major processes.

5.2.1 Site Piping

The majority of main process piping was installed in 1977 and 2001 for the design flows at that time. Deficiencies in hydraulics are noticeable within the aeration basin, final clarifiers, and filter effluent channel during peak flow events. Site piping deficiencies are as follows:

- The existing 24" and 30" piping between the grit tank (Structure 20) and the aeration basins (Structure 30) is undersized for the new design flows. The proposed upgrade will eliminate the grease removal tank after the grit tank and allow for the addition of selector basin (Structure 31) between the processes for biological phosphorus removal. New 36" diameter piping will be added between these processes to allow capacity for the new peak hour flow of 7.92 MGD.
- The RAS piping is currently routed to the RAS pump station that is to be eliminated as part of the upgrade. New RAS piping will be routed to the new pumps in Structure 55, and the RAS discharge piping will be upsized and routed to the new selector basins.
- New piping will be added for the new Final Clarifier, including the mixed liquor suspended solids (MLSS) feed piping, RAS piping, drain piping, and scum piping.

- New drain piping is required for the new Final Clarifier and Selector Basins.
- New sludge processing piping is required to direct sludge to and from the proposed Sludge Processing Building, as well as to and from the proposed and existing digesters.

5.2.2 Base Scope

In addition to the alternatives discussed in the following sections, a Base Scope of improvements are identified that will require attention regardless of other process specific alternatives selected. The Base Scope is described below:

- **Site Work** – Replace existing asphalt, install a new standby generator, improve existing water system, increase hydraulic capacity of main process piping, increase utility service capacity, update security, provide landscaping and other general site features. Stormwater management upgrades will be incorporated as necessary based on area of disturbance and increased impervious surface area.
- **Service Building** – Renovate entire building, update HVAC and plumbing, add space for offices, meeting room, storage, locker room, and employee services. The existing vehicle storage will be relocated to the storage garage, and the wetwell / drywell areas will be expanded to allow for the installation of additional raw sewage pumps. The building will also require architectural upgrades that include a new roof, replacement of rusted doors, and repainting much of the interior.
- **Influent Screening Building** – Renovate the existing building with upgrades to the HVAC, plumbing, and lighting in the building, as well as replacement of the mechanical screening and washer/compactor equipment to meet the new flows. Minor architectural upgrades include the replacement of the entry and overhead doors.
- **Pretreatment Building** – Renovate the existing building with upgrades to the HVAC, plumbing, and lighting in the building, as well as replacement of the grit removal and pumping equipment. Upgrades will also include the addition of a 2nd grit separator and grit pump, as well as the elimination of the grease removal and channel aeration facilities for more effective handling of these materials in the treatment process.
- **Aeration Basins** – Upgrades to the existing aeration tanks include the replacement of the existing rotating aeration equipment with new fine bubble aeration across the entire tanks, as well as the addition of new internal baffles to prevent short circuiting. The existing piping to and from the aeration basins will also need to be upsized to allow for larger flows and this piping will also be configured to allow for these tanks to operate in series to promote more effective phosphorus removal.
- **RBC Tanks** – Demolish the existing RBC tanks that have not been utilized at the WWTF in over 20 years to make room for new Selector Basins.
- **New Selector Basins** – Add new selector basins to allow the WWTF to perform biological phosphorus removal. The improvements include four new concrete tanks fitted with flow control gates, submersible mixers, and aeration as needed. The basins will allow for operation in a combination of anaerobic, anoxic, and aerobic conditions prior to the aeration basins.
- **Aeration Control Building** – Renovate the existing building by raising the floor to convert the space for more effective storage space.

- Secondary Clarifiers #1 & #2 – Demolish the two existing small, undersized clarifiers as they are only 8 feet deep and not of an effective depth for continued use for this application.
- Secondary Clarifiers #3 & #4 – Renovate the two existing clarifiers by raising the walls, weirs, and launders by approximately 2–3 feet to fit the plant hydraulics. Upgrades to these clarifiers also includes the rebuild or replacement of the existing clarifier equipment, as well as the addition of algae covers over the weirs and baffles.
- New Secondary Clarifier #5 – Add a new 65-foot clarifier to provide additional capacity for the increased flows to the WWTF. The secondary clarifier addition includes new MLSS, RAS, scum, and drain piping for this structure as well.
- Secondary Sludge Building – Renovate the existing building with upgrades to the HVAC, plumbing, and lighting in the building, as well as a new wall to separate the rated and non-rated spaces. Upgrades also include the replacement of the pumps and piping in the basement, and the addition of new RAS/WAS pumps and flow meters to convert this space for RAS pumping.
- RAS Pumping Station – Demolish the existing tank and associated equipment as the RAS pumping will be relocated to the Secondary Sludge Building.
- Tertiary Filter Building – Renovate the existing building with upgrades to the HVAC, plumbing, and lighting in the building, as well as conversion of the existing chemical storage rooms for new chemical and equipment storage. The building will be expanded to create room for two new disk style tertiary filters, and a series of flocculation tanks with mixers will be added upstream of the building for more effective phosphorus removal.
- Blower Building – Renovate the existing building with upgrades to the HVAC, plumbing, and lighting in the building, as well as replacement of the two post aeration blowers and one aeration blower.
- Disinfection Tank – Upgrades to this structure include the removal of the chlorination and de-chlorination equipment, and the addition of a new UV disinfection system in its place. Upgrades will also include various channel modifications to fit the new equipment, and the addition of a 2nd pipe to the structure from the tertiary filters. A standby pump will also need to be added to allow the WWTF to discharge to the river during peak flows at the 100-year flood condition through the existing discharge pipe.
- Gravity Thickener – Convert the existing gravity filter tank to be used with primary sludge as applicable, or to be used for side-stream treatment of the filtrate and/or decant from the sludge processes.
- Sludge Drying Beds – Demolish a portion of the existing sludge drying beds to make room for the new sludge processing building.
- New Sludge Processing Building – Add a new building to accommodate sludge thickening and transfer equipment to allow the WWTF to thicken sludge prior to digestion, as well as to thicken digested sludge from approximately 1-2% to 4-5% prior to storage.

- Sludge Storage Tank – Add stairs to the existing glass lined steel storage tank to allow for safer access by the operators for maintenance.
- Sludge Processing Building – Renovate the existing building with upgrades to the HVAC, plumbing, and lighting in the building, as well as the addition of a finished ceiling in this room with insulation added. Upgrades also include the replacement of the existing sludge transfer pumps and check valves, as well as the likely relocation of the power distribution equipment due to the current room rating.
- Storage Garage – Renovate the existing building with upgrades to the HVAC, plumbing, and lighting in the building, as well as an approximate 40-foot by 60-foot building addition for vehicle storage, a restroom, and locker room facilities. Additional parts and equipment storage spaces will also be created.

5.3 Description of Facility Upgrade Alternatives

Since the last major treatment plant upgrade in 2001, a holistic approach to an upgrade has not occurred. Though several individual systems have undergone upgrades, there is a need to address deficiencies identified in Chapter 3 and Section 5.2 on a plant wide basis.

Much of the scope of work detailed in Chapter 3 will be required to maintain the existing facility regardless of which alternatives are selected. This work is referred to the Base Scope, as described in Section 5.2.2. Unit processes for which more than one alternative were evaluated include: waste receiving station, septage tanks, primary clarifiers, anaerobic digesters / building, and new aerobic digesters, as described in Sections 5.3.1 through 5.3.5. The unit process alternatives are organized such that three alternatives are presented for each process to be organized into three main Project Alternatives in Section 5.4.

Each Project Alternative is a unique combination of the unit process alternatives based on conversations with facility staff and engineer recommendations.

5.3.1 Waste Receiving Station

The existing waste receiving station is located above grade and is an insulated mechanical screen designed for winter operation. The screen removes much of the unwanted materials prior to it entering the collection system. Based on the evaluation of the existing waste receiving facility presented in Chapter 3, the equipment is outdated and should be replaced and a building added to protect the equipment from odors and freezing. The following alternatives were evaluated:

Alternative No. 1

- Construct a new 20-foot by 30-foot building at the existing waste receiving station location to house a new mechanical screen and related equipment. The new building will help contain the odors associated with this process, as well as prevent the equipment from freezing during winter use.

Alternative No. 2

- Demolish the existing hauled waste receiving station and relocate this entire unit process to the northeast corner of the WWTF site. This alternative includes the construction of a new building similar to Alternate No. 1, as well as the construction of new waste receiving tanks to store the materials received. A significant amount of site improvements are also associated

with this alternative as additional paving, piping, and utilities are required to relocate this process to that area of the WWTF.

Alternative No. 3

- This alternative is similar to No. 1 as listed above where the process is improved and continues in the current location.

5.3.2 Existing Septage Tanks

The WWTF currently utilizes two 32-foot diameter tanks to store hauled waste prior to slowly releasing this material into the process stream. These tanks were originally constructed as primary clarifiers in the 1970's but were converted to their current use in 1994. The tanks are in good condition, but the space would be required for new primary clarifiers if they are added as discussed below.

Alternative No. 1

- The existing tanks are to be refurbished with the existing blowers and diffusers to be replaced with new equipment. The existing bridge structures and process piping are also to be blasted and recoated for continued use.

Alternative No. 2

- The existing tanks are to be demolished to create space for the new primary clarifiers.

Alternative No. 3

- This alternative is similar to No. 1 as listed above where the process is improved and continues in the current location.

5.3.3 Primary Clarifiers

Primary clarifiers are to be used only with the continued use of anaerobic digestion at the WWTF and are not required if the sludge processing is converted to an aerobic digestion process. Primary clarifiers are intended to reduce the biological loading on the aeration process, as well as provide the anaerobic digesters with a larger amount of proteins and carbohydrates for more effective digestion. The following alternatives have been considered:

Alternative No. 1

- No new primary clarifiers to be added.

Alternative No. 2

- Two new primary clarifiers that are 50-feet diameter and 12-feet deep are to be added in place of the existing septage tanks. A new splitter box is required at the grit tank to split flow to the new tanks, and primary sludge draw-off piping is needed to be routed to the lower level of the grit building with new pumps added for sludge removal. The removed sludge is to be pumped to the gravity thickener prior to digestion.

- The new clarifiers will require the addition of new clarifier drive assemblies for sludge and scum removal, as well as associated weirs and baffles for flow control. New sludge pumps are also required in the lower level of the grit building to remove the primary sludge to send it to digestion. The surface overflow rate at design and peak hour flows with two (2) 50-foot primary clarifiers in service would be 487 gpd/sf and 1,832 gpd/sf respectively.

Alternative No. 3

- No new primary clarifiers to be added.

5.3.4 Anaerobic Digesters / Building

Anaerobic digesters are used to convert the removed biological materials to methane and water, and to stabilize the volatile solids prior to storage and land application. The Village currently uses two 35-foot diameter digesters at the WWTF for this process but needs to expand or convert this process to account for the larger loading at the facility.

In addition to the anaerobic digester tanks, the adjacent building houses a combination boiler/heat exchanger to heat the sludge to the required temperature, as well as a series of pumps and piping to recirculate sludge at each tank, transfer to/from the unit process, and to mix each digester to maintain a more homogeneous mixture within each tank to optimize the digestion process. As part of the evaluation to maintain anaerobic digestion and expand it to meet the current needs, the following alternatives have been considered:

Alternative No. 1 / Alternative No. 2

- Renovate the two existing digesters by replacing the existing floating covers with new steel covers, as well as replace the existing boiler/heat exchanger, the sludge recirculation pumps, the transfer pumps, and the gas handling equipment. The renovation would also include upgrades to the existing building that would include replacement of the doors, HVAC, plumbing, and electrical equipment.
- A new 55-foot diameter, 24-foot-deep digester would be added south of the existing tanks and an approximate 700 sq. ft. expansion of the building to house the new equipment to be added. The new digester and equipment would include: two new boiler/heat exchangers to allocate one unit per digester, a new floating steel cover, new sludge recirculation pumps, new sludge transfer pumps, a digester mixing system, process piping, and a new flare to burn off the excess biogas.

Alternative No. 3

- No new anaerobic digester is to be added and the existing tanks and building are to be converted for use as aerobic digesters. See Section 5.3.5 for a description of this Alternative.

5.3.5 New Aerobic Digesters

Aerobic digestion is an alternative to the anaerobic digestion process currently utilized at the WWTF to digest the biological material removed in the treatment process. The existing tanks would require conversion for this process change as outlined below. No building expansion is

required for this process change as the existing boiler/heat exchanger is no longer required for this application and blowers can be added either in the converted space or in the existing blower building.

The conversion of the digestion process at the WWTF would allow the Village to eliminate the gas handling and safety equipment associated with the anaerobic process and would both simplify the overall process and improve the operator safety by eliminating the production of biogas.

Alternative No. 1 & No. 2

- Anaerobic digestion to continue at the WWTF, no aerobic digesters required.

Alternate No. 3

- Renovate the two existing digesters by removing the existing floating covers, the boiler/heat exchanger, the sludge recirculation pumps, the mixing pumps and nozzles, and the gas handling equipment. The tanks would be retrofitted with new fixed dome covers, new fine membrane diffusers, and blowers added to support the aerobic process. The renovation would also include upgrades to the existing building that would include replacement of the doors, various processing piping changes, as well as the replacement of the outdated HVAC, plumbing, and electrical equipment.
- A new 40-foot diameter, 24-foot-deep digester would be added south of the existing tanks. The new digester and equipment would include a new fixed dome cover, new fine membrane diffusers, and an additional blower added to support the aerobic process.

5.4 Alternatives Summary

To evaluate feasible alternatives for a complete project, three combinations of unit process alternatives described in Sections 5.3.1 through 5.3.5 have been selected as overall Project Alternatives based on owner preferences and the engineer's recommendation. As stated in Section 5.2.2, the Base Scope items would be included with any Project Alternative selected. The following subsections describe each Project Alternative with an abbreviated description of the proposed unit process alternatives.

5.4.1 Project Alternative 1

Waste Receiving Station – Alternative No. 1

- Construct a new approximate 600 sq. ft. waste receiving building to house the septage receiving equipment at or near the existing location.

Existing Septage Tank – Alternative No. 1

- Renovate the existing septage tanks, including the replacement of the existing blowers and diffusers. The renovations will also include minor piping changes as well as painting of the existing bridge structure and piping.

Primary Clarifiers – Alternative No. 1

- Not applicable for this Project Alternative. No new tanks will be added.

Anaerobic Digesters / Building – Alternative No. 1

- The existing digesters and building will be renovated, and all the existing equipment will be upgraded with new except for the digester mixers and nozzles. A new 55-foot digester will be added, and an approximate 700 sq. ft. building addition will be made adjacent to the existing structure.

Aerobic Digester – Alternative No. 1

- Not applicable for this Project Alternative.

5.4.2 Project Alternative 2

Waste Receiving Station – Alternative No. 2

- Construct a new approximate 600 sq. ft. waste receiving building and two new storage tanks near the northeast corner of the existing WWTF site to make room for the new primary clarifiers.

Existing Septage Tank – Alternative No. 2

- Remove the existing septage tanks to make room for the new primary clarifiers.

Primary Clarifiers – Alternative No. 2

- Construct two new 50-foot-diameter primary clarifiers to replace the existing septage tanks. The improvements will also include the addition of new primary sludge pumps and piping, as well as reconfiguration of the process piping in this area.

Anaerobic Digesters / Building – Alternative No. 2

- The existing digesters and building will be renovated, and all the existing equipment will be upgraded with new except for the digester mixers and nozzles. A new 55-foot digester will be added, and an approximate 700 sq. ft. building addition will be made adjacent to the existing structure.

Aerobic Digester – Alternative No. 2

- Not applicable for this Project Alternative.

5.4.3 Project Alternative 3

Waste Receiving Station – Alternative No. 3

- Construct a new approximate 600 sq. ft. waste receiving building to house the septage receiving equipment at or near the existing location.

Existing Septage Tank – Alternative No. 3

- Renovate the existing septage tanks, including the replacement of the existing blowers and diffusers. The renovations will also include minor piping changes as well as painting of the existing bridge structure and piping.

Primary Clarifiers – Alternative No. 3

- Not applicable for this Project Alternative. No new tanks will be added.

Anaerobic Digesters / Building – Alternative No. 3

- The existing digesters and building will be renovated for use as aerobic digesters. This will generally include the removal of most of the existing equipment and process piping, and the installation of new pumps, fine bubble diffusers, and blowers to support this process change.

Aerobic Digester – Alternative No. 3

- A new 40-foot diameter aerobic digester will be added near the existing facilities to meet the increased loading at the WWTF. The tank will be fitted with fine bubble diffusers, and the sludge pumping and digester blowers located in the nearby building.

6. ALTERNATIVES COMPARISON

6.1 General

In this chapter financial and non-economic analyses are presented for the general recommended upgrades (Base) and the unit process alternatives described in the previous chapter. In order to simplify the economic analysis of all the possible unit process combinations, a selection of Three “Project Alternatives” were established based on engineer recommendations and treatment plant staff, as described in Section 5.4. The oval project costs include the Base and Project Alternatives, but the economic and non-economic analyses in this chapter are intended to guide the selection of a Project Alternative.

The financial analyses include capital, operation and maintenance, replacement fund, and salvage values to complete 20-year net present worth cost evaluations for each alternative. Operation and maintenance costs are based on the current utility budget for the facility with changes made as appropriate to account for each proposed upgrade. Additions and savings to the budget will be allocated as appropriate to account for changes in energy requirements and materials associated with the process changes described. The present worth cost analysis is intended to provide an evaluation of the cost effectiveness of the alternatives and is used in conjunction with consideration of other factors to select a recommended alternative. Non-economic evaluations include a qualitative analysis of factors such as ease of operation, future growth potential, and environmental impacts

6.2 Capital Costs

The capital cost estimate for this Facilities Planning Document includes the base improvements for general deficiencies as described in Chapter 3, which are common to all alternatives, and individual capital estimates for each Project Alternative identified in Section 5.4. Base facility improvement costs are summarized in Table 6-1. Summarized capital costs for each of the Project Alternatives are presented in Table 6-2. The combined project costs are then compiled in Table 6-3. Detailed costs for each Project Alternative, as well as detailed costs for each unit process alternative, are provided in Appendix L. Design models used for preliminary sizing of tankage and equipment for each Alternative are included in Appendix M.

The capital costs in the referenced tables include costs for the eventual general contractor's scope of services; a contingency of 10% of the construction cost; and costs for engineering, administrative and legal work that will be necessary to plan, design, finance, and manage the project. It must be kept in mind that construction and operations costs could change between the date of this facility planning document and the time when the eventual project is bid.

Table 6-1 Base Cost Summary

Base	
05-Site Work	\$2,352,500
STR. 10 - Service Building	\$1,523,100
STR. 15 - Influent Screening Building	\$410,900
STR. 20 - Pretreatment Building	\$761,200
STR. 30 - Aeration Basins	\$780,500
STR. 31 - RBC Tanks	\$50,000
STR. 32 - Selector Basins	\$961,600
STR. 35 - Aeration Control Building	\$26,700
STR. 40 - Secondary Clarifiers #1 & #2	\$109,000
STR. 45 - Secondary Clarifiers #3 & #4	\$1,215,800
STR. 46 - Secondary Clarifier #5	\$868,100
STR. 50 - Secondary Sludge Building	\$1,002,500
STR. 55 - RAS Pumping Station	\$48,000
STR. 60 - Tertiary Filter Building	\$2,094,100
STR. 65 - Blower Building	\$330,400
STR. 70 - Disinfection Tank	\$579,500
STR. 75 - Gravity Thickener	\$30,000
STR. 81 - Sludge Drying Beds	\$40,000
STR. 82 - Sludge Processing Building	\$1,787,200
STR. 85 - Sludge Storage Tank	\$80,000
STR. 90 - Sludge Pumping Building	\$317,700
STR. 95 - Storage Garage	\$698,500
Contractor Costs	\$2,410,000
Electrical Costs	\$4,016,900
Contingency	\$2,490,500
Design and Management Costs	\$3,374,200
Total Capital Costs	\$28,118,000

Table 6-2 Process Alternative Capital Cost Summary

	Alt. 1	Alt. 2	Alt. 3
05 - Site Work	\$24,800	\$339,500	\$36,800
STR. 20 - Existing Waste Station	\$326,600	\$20,000	\$326,600
STR. 22 - Waste Receiving Station	\$0	\$495,700	\$0
STR. 25 - Existing Septage Tanks	\$124,000	\$70,000	\$124,000
STR. 25 - New Primary Clarifiers	\$0	\$1,190,500	\$0
STR. 80 - Anaerobic Digesters / Building	\$4,110,600	\$4,110,600	\$0
STR. 80 - New Aerobic Digesters	\$0	\$0	\$1,651,800
Contractor Costs	\$1,146,500	\$1,556,600	\$534,800
Electrical Costs	\$687,900	\$934,000	\$320,900
Contingency	\$642,100	\$871,700	\$299,500
Design and Management Costs	\$963,200	\$1,307,600	\$449,300
Total Capital Costs	\$8,025,700	\$10,896,200	\$3,743,700

Table 6-3 Project Alternative Capital Cost Summary

	Alt. 1	Alt. 2	Alt. 3
Base Scope	\$28,118,000	\$28,118,000	\$28,118,000
Alternative Scope	\$8,025,700	\$10,896,200	\$3,743,700
Total Capital Cost	\$36,143,700	\$39,014,200	\$31,861,700

6.3 Operations and Maintenance Costs

Annual operations and maintenance (O&M) costs were developed for each of the three proposed Project Alternatives at both start-up and design year conditions. The existing Village budget was used as the base cost for each Project Alternative. The most significant operating costs differences between the Project Alternatives are associated with the process alternatives for waste receiving, primary clarification, and anaerobic vs. aerobic digestion. In these alternatives, the cost of chemical consumption, sludge production, and energy requirements are the driving factors in O&M cost difference.

All three Alternatives have similar operating costs with a slight variation based on the power costs associated with the digestion process. A cost of 0.098 \$/kWh was assumed for power costs.

As each of the alternatives includes a combination of biological phosphorus removal with alum addition prior to tertiary filtration to meet the stringent phosphorus limits, the assumed chemical costs for all alternatives are very similar. The sludge hauling costs are lower at design for all alternatives due to the thickening of the digested sludge prior to hauling.

For this analysis, additional staffing needs are assumed to be the same for all alternatives with one additional full-time operator at design conditions. All other costs for general maintenance, operations, and administration were assumed to be the same for all alternatives and are based on current costs.

A summary of start-up and design O&M costs is presented in Table 6-4. These costs include the Base O&M costs plus the costs for each Project Alternative.

Table 6-4 Project Alternative Operations and Maintenance Cost Summary

	Start-up	Design
Alternative 1	\$1,140,161	\$1,343,958
Alternative 2	\$1,181,256	\$1,412,145
Alternative 3	\$1,164,353	\$1,401,590

A detailed breakout of O&M costs for each of the alternatives is given in the appropriate section of Appendix L, along with other supporting information. Note that O&M costs are only based on increased costs from higher flows and loads expected over the design life. The unit costs are not modified to account for other economic factors such as inflation.

6.4 Replacement Costs

Annual replacement costs are summarized for each alternative in Table 6-5. Individual replacement costs are calculated by considering the present day installed cost of the equipment and determining the annual contribution necessary to replace the item after an assumed equipment life. The annual cost is calculated assuming the same interest rate as is assumed for the present worth analysis provided later in this chapter. Projected inflation values have not been factored into the equipment costs because it would disproportionately increase the higher replacement costs at a greater net amount than the lower replacement costs. Detailed spreadsheets showing the replacement cost values for each of the equipment items for each alternative are presented along with the other cost information in Appendix L of this report.

Table 6-5 Project Alternative Replacement Cost Summary

	Alt. 1	Alt. 2	Alt. 3
Base	\$181,358	\$181,358	\$181,358
Waste Receiving	\$4,409	\$4,409	\$4,409
Primary Clarifiers	\$0	\$14,992	\$0
Anaerobic Digesters	\$22,857	\$22,857	\$0
Aerobic Digesters	\$0	\$0	\$7,055
Total Annual Replacement	\$208,624	\$223,616	\$192,823

Project Alternatives 1, 2, & 3 vary slightly in annual replacement cost mainly due to equipment associated with the solids handling at the facility.

6.5 Present Worth Analysis

A net present-worth value analysis is performed for each Project Alternative by taking the capital cost and adding to it the uniform series of annual O&M and replacement costs over the evaluation period of twenty years. The capital, O&M, and replacement fund costs are as outlined in the previous paragraphs of this chapter. Due to the negligible effect on the present worth analysis, salvage costs are assumed to be the same for all alternatives and have not been included in the present worth calculations. The discount rate used for this analysis is 3.125%, the rate for the Federal Fiscal year 2021, which applies to facilities plans after October 1, 2020. A summary of the present-worth values is presented below in Table 6-6.

Table 6-6 Project Alternative Present Worth Cost Summary

	Alt. 1	Alt. 2	Alt. 3
Capital Cost	\$35,857,100	\$38,625,200	\$31,728,100
Average O&M	\$1,246,700	\$1,321,400	\$1,288,400
Replacement	\$208,700	\$223,700	\$192,900
Total Present Worth	\$56,266,000	\$61,148,000	\$53,331,000
% Greater than Min.	5.50%	14.66%	0.00%

The purpose of the present worth analysis is to provide a direct monetary comparison of the alternatives and ensure that the recommended alternative is cost-effective. According to WDNR guidance, alternative present worth cost within 10 percent of each other are considered essentially equal due to the inherent uncertainty in estimating large capital improvements projects. In this case, Project Alternative 3 has the lowest total present worth costs and Project Alternative 1 is within 10% of Alternative 2; therefore, only these two Alternatives are considered cost-effective and viable options to pursue for implementation. The final determination on cost-effectiveness is made with consideration of monetary costs, fiscal impacts, environmental impact and possibly other non-monetary considerations.

6.6 Non-Economic Considerations

In this section, an attempt is made to evaluate the three Project Alternatives based on qualitative factors which have been identified as being important by Village staff and Public Works Committee members.

Table 6-7 provides a summary of the subjective rating for these qualitative factors. The maximum value used for each category is shown and each alternative is scored against this value, which the highest value being the best score and lower being the worst. The benefit of performing a qualitative evaluation such as this should be to identify the strengths of certain alternatives that may not necessarily impact a quantitative cost analysis. Additional environmental impacts related to the facility construction are evaluated in Chapter 7 and are not included in this section.

Table 6-7 Qualitative Evaluation Summary

Category	Max Value	Alt. 1	Alt. 2	Alt. 3
Site				
Utilization of Existing Structures	3	3	3	3
Future Expansion Capabilities	5	4	4	4
Operations				
Flexibility	10	8	8	9
Ease	10	6	6	9
Safety	10	7	7	10
Energy Efficiency	10	8	8	8
Sludge Production	5	5	5	4
Noise	5	5	5	5
Air Quality	5	4	4	4
Environmental Impacts	5	4	4	4
Land Requirements	5	5	5	5
Potential Construction Problems	5	4	4	4
Sustainability Considerations	5	4	4	4
Effluent Limitations				
Phosphorus	15	13	13	13
Ultra-Low Phosphorus	5	4	4	4
Future Nitrogen	10	8	8	8
Total	113	92	92	96

Given the condition of the existing tanks and structures on the site, each Project Alternative is intended to capitalize on utilization of existing structures. There are no significant differences in structure utilization and therefore each alternative receives the maximum score in this category.

Future expansion relates to the alternative's flexibility to add structures and technology for future upgrades. Future facility expansion will be relatively equal for each of the alternatives, but due to site constraints additional space is limited on the current site.

Operational concerns include flexibility, ease of operation, and safety. There are no distinguishable differentiators for safety between the alternatives analyzed.

The energy efficiency category compares both direct and indirect energy uses with each Project Alternative. Most notable is the power consumption required to run mechanical equipment; however, consideration for indirect energy use provided by third parties, such as for increased chemical deliveries and sludge hauling associated with chemical phosphorus removal, are also considered.

All Project Alternatives assume a combination of biological and chemical sludge production. Chemical phosphorus removal can produce 5-10 times the amount of sludge per pound of phosphorus removed. The ratio of sludge produced to phosphorus removed in a chemical system is inversely proportional to the final effluent limit. That is, as the phosphorus limit becomes more stringent, the amount of sludge produced, and chemical required, increases. This greatly

increases the total amount of sludge produced. Phosphorus removed biologically produces approximately 2 times the amount of sludge per pound of phosphorus removed.

Each of the alternatives will likely reduce the overall noise at the facility over the current operation. This is due to the operation of the sludge dewatering press to reduce the number of hauling trucks that must visit the plant.

Air quality is expected to be approximately equal across all scenarios.

The environmental impacts of all three alternative are essentially equal as the sludge production for each is very similar.

There is no difference in land use between the Project Alternatives. No new easements or land acquisitions are required. This comparison does not favor any Project Alternative.

Potential construction problems for a project could include subsurface impacts such as rock or groundwater, site access, and construction sequencing, among others. Based on previous soils borings at the WWTF site, it is not anticipated that bedrock or subsurface rock should create construction problems. Staging and sequencing construction will need to be coordinated closely between the contractor, operators, and engineers to avoid process issues and avoid delays during construction.

Sustainability Considerations are considered equal as they all include effluent reuse and will incorporate appropriate stormwater management for additional impervious surfaces created and utilize green infrastructure as applicable.

The Project Alternative are equal in their ability to meet low-level phosphorus limits as they each include the tertiary filtration upgrades in the Base project. Alternate 3 has the overall highest score based on the non-economic considerations.

6.7 Project Phasing

Due to the overall cost of the project and the varying timelines for when the improvements are needed, the Village is looking to phase these improvements in three Phases. The phases are intended to address the immediate as Phase 1 for the Administration, Storage & Tertiary Treatment needs of the WWTF, followed by Phase 2A for Process Upgrades and Phase 2B for Solids Handling Upgrades. Due to the Phosphorus Compliance Schedule in the Village's WPDES permit, Phase 1 will need to be constructed in the next 3-4 years.

Phase 2A and Phase 2B are tentatively slated for construction in 2026 and 2028 respectively, but the exact start of these Phases is not known at this time as they are driven by the need for additional treatment capacity and the projected increase in solids loading at the WWTF.

The following is a summary of each phase.

Table 6-8 Phase 1 – Administration, Storage, & Tertiary Treatment

05-Site Work	\$2,352,500
STR. 10 - Service Building	\$1,523,100
STR. 15 - Influent Screening Building	\$410,900
STR. 60 - Tertiary Filter Building	\$2,094,100
STR. 70 - Disinfection Tank	\$579,500
STR. 95 - Storage Garage	\$698,500
Contractor Costs	\$840,200
Electrical Costs	\$1,400,300
Contingency	\$784,200
Design and Management Costs	\$1,176,300
Total Capital Costs	\$9,802,000

Table 6-9 Process Upgrades

05-Site Work	\$1,213,050
STR. 15 - Influent Screening Building	\$410,900
STR. 20 - Pretreatment Building	\$761,200
STR. 20 – Waste Station	\$326,600
STR. 25 – Septage Tanks	\$124,000
STR. 30 - Aeration Basins	\$780,500
STR. 31 - RBC Tanks	\$50,000
STR. 32 - Selector Basins	\$961,600
STR. 35 - Aeration Control Building	\$26,700
STR. 40 - Secondary Clarifiers #1 & #2	\$109,000
STR. 45 - Secondary Clarifiers #3 & #4	\$1,215,800
STR. 46 - Secondary Clarifier #5	\$868,100
STR. 50 - Secondary Sludge Building	\$1,002,500
STR. 55 - RAS Pumping Station	\$48,000
STR. 65 - Blower Building	\$330,400
Contractor Costs	\$1,234,300
Electrical Costs	\$2,057,100
Contingency	\$1,152,000
Design and Management Costs	\$1,728,000
Total Capital Costs	\$14,399,800

Table 6-110 Solids Handling Upgrades

05-Site Work	\$470,500
STR. 75 - Gravity Thickener	\$30,000
STR. 80 – Aerobic Digesters	\$1,651,800
STR. 81 - Sludge Drying Beds	\$40,000
STR. 82 - Sludge Processing Building	\$1,787,200
STR. 85 - Sludge Storage Tank	\$80,000
STR. 90 - Sludge Pumping Building	\$317,700
Contractor Costs	\$656,600
Electrical Costs	\$1,094,300
Contingency	\$612,900
Design and Management Costs	\$919,300
Total Capital Costs	\$7,660,300

6.8 Recommendations

The present worth analysis that was prepared in accordance with WDNR guidance and presented in Table 6-6 shows that Alternatives 1, 2, and 3 are each within 15% of the low present worth cost alternative. Alternative 3 is the lowest present worth cost at \$53.3M, Alternative 1 is the second lowest present worth cost at \$56.3M (5.5% greater than Alternative 3), Alternative 2 is the third lowest present worth cost at \$61.1M (14.7% greater than Alternative 3).

The difference in present worth cost between Alternatives 1 and 3 is less than 10 percent and they are considered equal according to WDNR facility planning guidance. Alternative 1 has a capital cost greater than Alternatives 3, but a lower O&M cost. The replacement cost of Alternative 3 is slightly lower than Alternatives 1 and 2.

Of the three alternatives, Alternative 3 achieves the highest qualitative score in the evaluation of the non-economic factors, as presented in Table 6-7. There are substantial advantages with Alternative 3 in terms of expected operational flexibility, ease of operation, and operational safety.

The Village has made the decision to pursue Alternative 3 based upon the present-worth evaluation and significant advantages noted above. The estimated capital cost for Alternative 3 is approximately \$31.7M.

Due to the size of the improvements required and the anticipated staggered need for improvements, the work is anticipated to be constructed in 3 Phases. A summary of the recommendations proposed for construction are as follows:

Phase 1: Administration, Storage, and Tertiary Treatment

- Replace existing asphalt, install a new standby generator, improve existing water system, increase hydraulic capacity of main process piping, increase utility service capacity, update security, provide landscaping and other general site features.
- Update the HVAC, plumbing, lighting, and electrical at the existing buildings.
- Renovate the service building by converting space for offices, meeting room, storage, locker room, and employee services. The existing vehicle storage will be relocated to the storage garage, and the wetwell / drywell areas will be expanded to allow for the installation of additional raw sewage pumps.

- Renovate the existing tertiary filter building with upgrades to the conversion of the chemical storage rooms for new chemical and equipment storage. The building will be expanded to create room for two new disk style tertiary filters, and a series of flocculation tanks with mixers will be added upstream of the building for more effective phosphorus removal.
- Upgrades to the disinfection to include the removal of the chlorination and de-chlorination equipment, and the addition of a new UV disinfection system in its place.
- Renovate the existing storage garage with an approximate 40-foot by 60-foot building addition for vehicle storage, a restroom, and locker room facilities.

Phase 2A: Process Upgrades

- Replace existing asphalt, improve existing water system, increase hydraulic capacity of main process piping, provide landscaping and other general site features.
- Update the HVAC, plumbing, lighting, and electrical at the existing buildings.
- Construct a new approximate 600 sq. ft. waste receiving building to house the septage receiving equipment at or near the existing location.
- Renovate the existing septage tanks, including the replacement of the existing blowers and diffusers. The renovations will also include minor piping changes as well as painting of the existing bridge structure and piping.
- Renovate the existing screening building with the replacement of the mechanical screening and washer/compactor equipment to meet the new flows.
- Renovate the existing pretreatment building with the replacement of the grit removal and pumping equipment. Upgrades will also include the addition of a 2nd grit separator and grit pump, as well as the elimination of the grease removal and channel aeration facilities.
- Upgrades to the existing aeration tanks include the replacement of the existing rotating aeration equipment with new fine bubble aeration across the entire tanks, as well as the addition of new internal baffles to prevent short circuiting.
- Demolish the existing RBC tanks that have not been utilized at the WWTF in over 20 years to make room for new Selector Basins.
- Add new selector basins to allow the WWTF to perform biological phosphorus removal.
- Renovate the existing aeration control building by raising the floor to convert the space for more effective storage space.
- Demolish the two existing small, undersized clarifiers as they are only 8 feet deep and not of an effective depth for continued use for this application.
- Renovate the two existing larger clarifiers by raising the walls, weirs, and launders by approximately 2–3 feet to fit the plant hydraulics.
- Add a new 65-foot clarifier to provide additional capacity for the increased flows to the WWTF. The secondary clarifier addition includes new MLSS, RAS, scum, and drain piping for this structure as well.
- Renovate the existing secondary sludge building with the replacement of the pumps and piping in the basement, and the addition of new RAS/WAS pumps and flow meters.
- Demolish the existing RAS pumping station and associated equipment as the RAS pumping will be relocated to the Secondary Sludge Building.
- Renovate the existing blower building with the replacement of the two post aeration blowers and one aeration blower.

Phase 2B: Solids Handling Upgrades

- Convert the existing gravity filter tank to be used with primary sludge as applicable, or to be used for side-stream treatment of the filtrate and/or decant from the sludge processes.

- Demolish a portion of the existing sludge drying beds to make room for the new sludge processing building.
- Add a new sludge processing building to accommodate sludge thickening and transfer equipment to allow the WWTF to thicken sludge prior to digestion and storage.
- Renovate the existing sludge pumping building with the replacement of the existing sludge transfer pumps and check valves, as well as the likely relocation of the power distribution equipment due to the current room rating.
- The existing digesters and building will be renovated for use as aerobic digesters. This will generally include the removal of most of the existing equipment and process piping, and the installation of new pumps, fine bubble diffusers, and blowers to support this process change.
- A new 40-foot diameter aerobic digester will be added near the existing facilities to meet the increased loading at the WWTF. The tank will be fitted with fine bubble diffusers, and the sludge pumping and digester blowers located in the nearby building.

7. ENVIRONMENTAL IMPACTS

7.1 Project Identification

This chapter provides an analysis of the environmental impacts for the recommended upgrades to the Jackson WWTF.

7.2 Affected Environment

7.2.1 Land Use

No new land will be required for the proposed upgrades at the existing WWTF and this project will have minimal impact to surrounding homes. There are no new processes that could cause nuisance odors and the visual impact on the community will be minor because of the location away from any main corridors.

7.2.2 Soils

The soils at the existing WWTF site were examined by consulting the United States Department of Agriculture Natural Resources Conservation Service (NRCS) soil maps. The NRCS soils report indicates that the soils on the WWTF site are primarily characterized as Casco-Hochheim-Sisson Association and Ozaukee-Martinton-Saylesville Association. Refer to the NRCS soils report provided in Appendix C.

7.2.3 Important Farmland, Prime Forest Land, and Prime Rangeland

The Farmland Protection Policy Act (FPPA), the USDA regulation implementing the FPPA (7 CFR Part 658), and USDA Departmental Regulation No. 9500-3, "Land Use Policy", provide protection for important farmland and prime rangeland and forest land. As the proposed modifications to the WWTF will take place on the existing site, they will not result in the conversion of prime farmland areas.

The Department of Agriculture, Trade and Consumer Protection (DATCP) must be notified of any project which may involve the acquisition of an interest in land from a farm operation through the use of eminent domain procedures (condemnation). DATCP should be notified of such a project regardless of whether the proposing agency intends to use these powers in the acquisition of rights to proposed project lands. If a proposed project involves the actual or potential exercise of the powers of eminent domain in the acquisition of an interest in more than five acres of land from any one farm operation, the DATCP is required to prepare an agricultural impact statement (AIS) which describes and analyzes the potential effects of the project on farm operations and agricultural resources. If a proposed project involves five acres or less from any one farm operation, an AIS may be prepared at the DATCP's discretion. According to these guidelines from DATCP, an AIS will not be required for this project since no land will be acquired for the WWTF upgrades.

7.2.4 Formally Classified Lands

There are certain properties that are either administered by Federal, State, or local agencies or have been accorded special protection through formal legislative designations. For the purposes of this report, these properties have been designated "formally classified lands." Examples include wild and scenic rivers, forestlands, scenic trails, national and state parks, and wildlife refuges. Visual impacts to formally classified land from proposed projects need to be considered as appropriate.

There are no known formally classified lands that will be affected by this project.

7.2.5 Floodplains

The existing WWTF structures lie within an area of minimal flood hazard and at elevations above the 100-year flood plain delineation. A small area in the northeast corner and the south side of the site is shown within the Base Flood Elevation (100-year flood), Zone AE. No improvements are planned for this area.

Any new construction, at a minimum, would be constructed above the 100-year floodplain.

7.2.6 Wetlands

Based on a review of available resources, including the WDNR Surface Water Data Viewer and wetland inventory, there are wetland indicators present at the existing WWTF site. Refer to the wetland inventory figure in Appendix D.

A wetland delineation will be performed during the design phase for new structures, and if wetlands are determined to be present during the design phase, appropriate permits will be obtained from the relevant regulating agencies. Strict adherence to the conditions of any permit will be required during construction. Any disturbed wetlands will be restored to pre-existing conditions, and therefore the long-term impacts to any wetlands are expected to be minimal.

7.2.7 Cultural Resources

The National Historic Preservation Act (NHPA) of 1966, as amended, and the Advisory Council on Historic Preservation's (ACHP) implementing regulations, 36 CFR Part 800 (Section 106 regulations), requires Federal agencies to take into account the effect their actions may have on historic properties that are within the proposed project's area of potential effect. To avoid harm to both known historic properties and archeological sites, and to undiscovered sites present in a project area, historic and archaeological sites within or near the project area must be identified, and the effects of the project on these sites must be assessed. A listing of all Wisconsin properties on the National and State Registers of Historic Places contains no entry within the immediate vicinity of the Jackson WWTF site. Since construction will take place only in previously disturbed locations and within the existing WWTF site, no impact to historic properties and archeological sites is anticipated.

7.2.8 Biological Resources

Throughout the United States there are many plant and animal species that are threatened with extinction or exist in greatly reduced numbers partly as a result of human activities. The Endangered Species Act (ESA) of 1973 establishes a national program for the conservation and protection of threatened and endangered species of plants and animals and the preservation of habitats upon which they depend. Under Section 7 of the ESA, Federal agencies are required to consult with the United States Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service for all threatened and endangered species. The consultation is to ensure that the proposed project does not jeopardize the continued existence of any federally listed threatened or endangered species or result in the destruction or adverse modification of a critical habitat.

State agencies should also be contacted for information on State-listed species and concerns. In some instances, the State may have more detailed information on federally listed or proposed

species and/or critical habitat than the USFWS. Other biological resources which may be impacted by the project include fish and wildlife and vegetation.

Pursuant to these requirements, an Endangered Resources Preliminary Assessment (ERPA) was performed for the project site using the WDNR Natural Heritage Inventory (NHI) Public Portal. According to this assessment, endangered resources have been recorded for this area and further action would be required or recommended for construction. The Preliminary Assessment is provided in Appendix N.

7.2.9 Miscellaneous Impacts

7.2.9.1 Operational Impacts

Operational impacts for the upgraded WWTF are expected to be similar to current impacts. During operation the impact to traffic will be minimal. Section 6.6 addresses other health and environmental impacts related to operation of the plant.

7.2.9.2 Construction Impacts

Modifications to the WWTF will have temporary impacts due to construction. These temporary impacts will include the increase of traffic and noise around the construction site and disturbance of dust and dirt during construction. Traffic along routes to the site will increase during construction.

Although the location of the site is within the Village limits, there are few residential neighbors. The site is bordered mainly by Village parks and green spaces. This location will minimize the impacts of construction. Construction impacts will be mitigated as described in Section 7.3.

The proposed modifications to WWTF will not have significant negative impacts on land use in the area and will improve the quality of effluent discharged to the receiving stream. Any improvement in effluent quality will have a positive influence on fishery resources.

If high groundwater conditions necessitate the use of high-capacity wells (in excess of 70 gpm) for the dewatering, then the environmental impact will be evaluated by the WDNR's Bureau of Water Supply prior to installation of the wells.

7.2.9.3 Secondary Impacts

The construction or upgrade of any WWTF may potentially encourage urbanization by making increased wastewater collection and treatment capacity available. By using foresight and careful planning, the Village can successfully defend against unwanted urbanization. This facilities plan is consistent with the Village's Comprehensive Plan and SEWRPC's Vision 2050 regional land use plan and *A Regional Water Quality Plan for Southeastern Wisconsin*.

7.3 Mitigative Measures

Primary impacts regarding operational and agricultural concerns will be minimal and do not require mitigative measures; likewise, secondary impacts regarding urbanization concerns will be minimal as well. Mitigative measures for temporary impacts during construction are described in the following sections.

7.3.1 Construction, Temporary Controls

Temporary impacts during construction will be mitigated. Temporary traffic control barricades, signs, flagmen and detours will be implemented as necessary and in accordance with WisDOT standards. If conditions warrant control of dust, then a combination of water, calcium chloride suppressant and other dust control measures in compliance with industry standards will be applied.

Erosion control and shoreline stabilization during and following construction are other important considerations during construction. The WDNR has stressed the importance of implementing and maintaining proper erosion control measures. If necessary, any disturbed riverbanks will be ripped, seeded and mulched within 24 hours of completion. Any steep areas that will be disturbed and that would affect downstream riverbanks or wetlands will be stabilized with erosion control matting in accordance with WDNR guidelines. Erosion control requirements will be defined during design and in coordination with WDNR Chapter 30, Notice of Intent and Corp of Engineers CFR 404 permitting.

7.3.2 Archaeological

No impacts to historic properties or archeological sites are expected, as construction will take place only on the existing WWTF site where there are no recorded archaeological resources and the site previously disturbed.

If any undiscovered archeological sites or human remains are encountered in the course of investigations at the project area or during construction, the work will have to stop immediately, and the State Historic Preservation Office consulted.

7.3.3 Endangered Species

No impacts to endangered species are expected, as construction will take place only on the existing WWTF site.

The netting of erosion control matting can easily entrap snakes which are anticipated to be prevalent on the site. To mitigate this impact erosion mat with biodegradable netting and with independently moveable strands meeting WDNR guidelines will be used.

7.3.4 Wetlands

There are known wetlands at the existing WWTF site, however no impacts to existing wetlands are expected. If wetlands are identified during the design phase, appropriate permits will be applied for and obtained from the relevant regulating agencies (in particular Corps of Engineers CFR 404 permit and WDNR Chapter 30 permit), and strict adherence to the conditions of any permit will be required. Any disturbed wetlands will be restored to pre-existing conditions, and therefore the long-term impacts to any wetlands are expected to be minimal.

7.4 Alternatives to the Proposed Action

The alternatives for modifications to the WWTF are presented in Section 5.3. Each of these alternatives require construction at the existing plant site and are considered equal in terms of environmental impacts. Cost comparisons of the alternatives are provided in Chapter 6 and in Appendix L. For other health and environmental comparisons refer to Section 6.6.

8. FINANCES AND FUNDING

As described in Section 1.2, the project funding would be undertaken by the Village of Jackson as the municipality with the authority for issuing bonds and borrowing money. The following sections describe possible financing methods and funding sources available to the Village.

The Village is looking to phase these improvements in three Phases. The phases are intended to address the immediate as Phase 1 for the Administration, Storage & Tertiary Treatment needs of the WWTF (\$9.8M), followed by Phase 2A for Process Upgrades (\$14.4M) and Phase 2B for Solids Handling Upgrades (\$7.7M). Due to the Phosphorus Compliance Schedule in the Village's WPDES permit, Phase 1 will need to be constructed in the next 3-4 years.

Phase 2A and Phase 2B are tentatively slated for construction in 2026 and 2028 respectively, but the exact start of these Phases is not known at this time as they are driven by the need for additional treatment capacity and the projected increase in solids loading at the WWTF.

8.1 Financing Methods

There are six possible methods of financing the proposed improvements. These include general obligation bonds, revenue bonds, special assessment bonds, direct loans from private institutions, financing through government programs, and immediate payment. Given the size and scope of the proposed project, immediate payment is not possible due to lack of available funds. Assessment bonds are eliminated because of the financial impact to the customers. That leaves four major financing methods for the Village, as described in the following sections.

8.1.1 General Obligation Bonds

General obligation bonds are readily saleable, and the interest rate is relatively low. These bonds are not dependent on service charges, although service charges can be used to provide the needed revenue. The total amount of general obligation bonds which can be issued by a municipality is limited by Wisconsin Statutes to 5% of the equalized valuation of the municipality. There are many serious disadvantages to this method of financing for projects such as this. First, it is possible that not all users of the new facilities would contribute to the support of the facilities. This would depend upon the method used to recover the payments for these bonds. Secondly, the use made of the wastewater treatment facilities will not necessarily be directly related to the value of a property utilizing the facilities. Third, the sale of general obligation bonds for a utility purpose can affect the credit rating issued to the municipality at the time of the sale of future bonds issues covering other general expenditures.

8.1.2 Revenue Bonds

The advantages of revenue bonds are that their sales do not affect the credit rating or bonding power of the municipality, and they are equitable in that the users of the system pay the capital cost of the facilities. Mortgage revenue bonds are very saleable in Wisconsin if the service charge is such that the net revenues of the utility, after expenses and depreciation, are approximately 1.25 times the debt retirement and operation and maintenance costs. The interest rate for these bonds generally is 1 to 2 percent greater than for general obligation bonds.

8.1.3 Direct Loans

The estimated cost of the proposed project is quite large, lessening the chance of direct loans from financial institutions or government agencies. Moreover, if available, the interest rates on direct loans may well be less than for either general obligation or mortgage revenue bonds. There

are fewer restrictions on the method of revenue generation, and there is less effect on the bonding powers and credit rating of the community than with general obligation bonds.

8.1.4 Financing Through Government Programs

Past demand for improved wastewater treatment resulted in the establishment of state and federal programs for financial assistance to communities undertaking the construction of wastewater treatment facilities improvements. The following sections summarize the government funding programs which may be available.

8.2 Funding Sources

8.2.1 Wisconsin Environmental Improvement Fund (CWFP)

The State of Wisconsin Environmental Improvement Fund (EIF) is managed and administered jointly by WDNR Environmental Loans (EL) and Department of Administration (DOA). EIF encompasses two environmental financing programs for local governments: the Clean Water Fund Program (CWFP), for wastewater and storm water infrastructure projects; and the Safe Drinking Water Loan Program (SDWLP), for drinking water infrastructure projects. The CWFP and SDWLP are revolving loan programs that combine federal grants and state funding to provide financial assistance to municipalities in the form of subsidized loans. Some municipalities may also be eligible for funding in the form of principal forgiveness (PF), which reduces their overall loan amount.

For eligible projects of municipalities with population of less than 10,000 population; and MHI less than or equal to 80% of the Wisconsin MHI, the interest rate is 33% of the market rate, 1.287% based on the current market rate of 3.900% as of October 1, 2022. For eligible projects of municipalities not meeting the financial need criteria, the interest rate is 55% of the market rate, or 2.145% currently. Only those communities whose treatment facilities are in basic compliance with effluent standards are eligible. For treatment plants in violation of effluent standards full financing is available, but at the full market rate. Additionally, the portion of projects for receiving and storing septage and capacity for treating septage can be financed at 0% interest through the CWFP. The standard loan term is 20 years, but terms up to 30 years are possible for pipeline projects and assets that have a demonstrated useful life greater than 20 years.

Based on the current MHI estimates for State Fiscal Year 2023, it is expected that the Village would receive an interest rate that is 55% of the market rate. The Village intends to apply for funding from the CWFP and it is possible that they may qualify for principal forgiveness. For the user charge impacts described in subsequent paragraphs it will be assumed that the project may be funded by CWFP as one alternative for financial considerations.

8.2.2 Rural Development (RD)

The Rural Development (RD) branch of the U.S. Department of Agriculture (USDA) provides financial assistance to small rural communities, those with populations of 10,000 or less. RD has a program in which it provides financial assistance in the form of grants and low-interest loans for construction of wastewater collection and treatment systems. The loans have a 40-year payback period and are classified as revenue bond type loans secured only by sewer and water use charges. The current interest rates range from 2.125% to 2.750% (for a Market Rate of 3.250% as of October 1, 2022) and are based on income levels and identified health and sanitary conditions that will be addressed by the project.

If funds are available, an RD grant may be combined with a loan to keep user rates reasonable for residential users. To receive a grant, the user charge rates for the average residential customer are compared to a percentage of the median household income (MHI) and the rates for other comparable communities and grant funds may be offered to reduce the rate impacts. Grants may be available for up to 45% of eligible project costs and are intended to benefit residential users and small commercial users. Grants may exceed 45% for communities that qualify for the lowest (poverty) interest rate based on the MHI.

For the user charge impacts described in subsequent paragraphs it will be assumed that the project will not be funded by RD as the Village is unlikely to qualify for grant funding.

8.2.3 Community Development Block Grant (CDBG)

The Community Development Block Grant (CDBG) program is a federal formula-allocated grant program under the U.S. Department of Housing and Urban Development (HUD). The State of Wisconsin, Department of Administration administers the state Community Development Block Grant program for public facilities (CDBG-PF), which provides grant money to expand and improve public infrastructure and facility projects critical to community vitality and sustainability. A municipality can qualify for this grant under several conditions, i.e., low and moderate income, urgent need, or economic development. These grants are highly competitive and may require multiple attempts before successful award. The Village of Jackson may qualify for a CDBG grant, but this possible funding source has not been included in the projected user charge impacts.

8.2.4 Other Programs

Focus on Energy incentive programs are available to municipal customers of participating Wisconsin utilities to implement energy efficiency projects. Prescriptive incentives are offered for standard energy efficient technologies that have predictable and predetermined savings, including lighting, many HVAC measures, motors and drives, and others. Custom incentives are available for technologies such as energy efficient aeration and heat recovery and are calculated on a case-by-case basis based on the estimated first year energy savings associated with a project/technology. Custom incentives may pay up to 50 percent of a project's cost, for a maximum of \$200,000 and are available for projects that have a payback between 1.5 and 10 years. There may be opportunities to apply for Focus on Energy incentives for the proposed construction, but these incentives are not included in the user charge impact calculations.

8.3 Summary of Probable Financing

Any of the four practical financing methods may be used, i.e., general obligations bonds, revenue bonds, direct loans from private sources, or government program financing. It is likely that the best interest rates will be achieved through a Wisconsin CWFP Loan for a 20-year loan. For the purposes of this Facilities Plan, it was assumed that the project would be funded by CWFP. The following sections describe the parallel cost percentage, septage percentage, and phosphorus percentage that must be calculated for CWFP loans.

8.4 Parallel Cost Percentage

The parallel cost percentage (PC) is calculated to determine that portion of the proposed total project cost eligible for below-market rate financing through the CWFP. Reference is made to NR 162 of the Wisconsin Administrative Code and the WDNR web page guidance for the basis of calculating parallel cost percentages.

In order to calculate the value for PC, revised loading conditions are determined which reduce the total design loadings by those amounts associated with unsewered areas that are not currently connected to the sanitary system; the reserve capacity for loadings which will be realized beyond ten years from the project completion date; and for current and future flows from industrial wastewater users.

An estimate has been made of those projected contributions from residential, commercial, and additional contributions (including septage treatment capacity) which will not be realized until beyond ten years after the completion of the project. The future loadings described in Chapter 4 have been assumed to be added in a straight-line projection over the course of the design period of twenty years. One-half of these future loads will not be included in the revised loading conditions. Loadings from the current industrial customers, and their respective projected growth, have also been removed.

A summary of the revised loadings for WWTF flows and loads is presented in Table 8-1. The column heading “DC” is used by the WDNR to indicate total design capacity, and “RC” is used for reduced capacity. The Design Capacity (DC) used for the PC calculations is the projected design load presented in Table 4-12. The DC was the basis for the project costs developed in Chapter 6.

The RC loading for the Village represents a reduction in loading as described above. For a more detailed information on the RC loading projections, refer to Appendix O.

Table 8-1 Reduced Loading Conditions for PC Calculation

Parameter	Units	DC	RC
Design Flow	MGD	2.619	1.825
BOD	lbs/day	5,235	4,086
TS	lbs/day	6,941	5,290
TKN	lbs/day	548	385
Phosphorus	lbs/day	160	138

Although the RC flow and loadings are less than the DC conditions, there are few components of the proposed upgrades that are dependent on the increased loadings. As most of the existing WWTF components date back to 1994, age is the driving factor for upgrades at the Jackson WWTF. As shown in Table 8-3, the cost for the reduced loading condition is near the cost of the design conditions because the costs for the upgrade are not driven by hydraulic or organic capacity. As only Phase 1 of the project is being considered at this time, the calculations were completed for Phase 1 only.

Table 8-2 Project Costs for PC Calculation – Phase 1

Item	DC Cost	RC Cost
Phase 1 – Administrative, Storage, and Tertiary Treatment	\$9,802,000	\$8,878,000
Total Project Cost	\$9,802,000	\$8,878,000

The parallel cost percentage is calculated by dividing the reduced capacity cost by the total design cost. Since the DC and RC costs are nearly the same, the parallel cost percentage is 90.6%:

$$PC = RC/DC = \$8,878,000 / \$9,802,000 = 90.6\%$$

8.5 Septage Percentage

If the project includes costs for septage receiving facilities and/or septage treatment capacity, those costs may be eligible for a 0% loan rate from the CWFP. The septage percentage (SP) is calculated to determine what portion of the below market rate financing through the CWFP will be eligible for zero rate financing. Reference is made to the resource paper entitled “Wisconsin DNR Program for Septage Considerations in Municipal Wastewater Facility Planning and for Application of Zero Percent Clean Water Fund Loans” dated June 2006 and revised August 2012.

The reduced capacity conditions without market rate items and without septage capacity is denoted as RC2 in Table 8-3 below. The RC2 condition, in addition to the DC and RC, are used to determine the septage percentage and project costs eligible for a 0% interest loan.

Table 8-3 Reduced Loading Conditions for SP Calculation – Phase 1

Parameter	Units	DC	RC	RC2
Design Flow	MGD	2.619	1.825	1.758
BOD	lbs/day	5,235	4,086	3,735
TS	lbs/day	6,941	5,290	4,272
TKN	lbs/day	548	385	323
Phosphorus	lbs/day	160	138	104

The facility upgrade includes provisions for septage receiving facilities and septage treatment capacity, but not until Phase 2A. Table 8-4 summarizes the project costs for reduced capacity conditions used for the septage percentage calculation based only on Phase 1 of the project.

Table 8-4 Project Costs for SP Calculation – Phase 1

Item	DC Cost	RC Cost	RC2 Cost
Phase 1 – Administrative, Storage, and Tertiary Treatment	\$9,802,000	\$8,878,000	\$8,878,000
Total Project Cost	\$9,802,000	\$8,878,000	\$8,878,000

The septage percentage is calculated by dividing the difference from RC and RC2 by the total design costs.

$$SP = (RC - RC2)/DC = (\$8,878,000 - \$8,878,000) / \$9,802,000 = 0.0\%$$

The septage percentage is 0.0% of the costs will be eligible for zero percent financing through the CWFP. Additional information and detailed cost estimates for the septage percentage are included in Appendix O. Subsequent phases will likely include additional septage costs and will be evaluated at that time.

8.6 Phosphorus Percentage

The CWFP program also offers priority principal forgiveness (PF) for phosphorus reduction costs. Eligible municipalities must meet the eligibility requirements for Regular PF, discharge less than 150 pounds of phosphorus per month, have an alternate phosphorus limit, or serve a population of less than 10,000. The WWTF must discharge to surface water and have a final water quality-based effluent limit for phosphorus less than or equal to 0.3 mg/L as a monthly average limit (or 0.1 mg/L as a 6-month average limit) or be located in an implemented TMDL area for phosphorus.

The Phosphorus Reduction PF is only calculated on the phosphorus reduction related WWTF upgrade costs and the phosphorus cost percentage should be calculated as $PP = PC/DC$ where PP is the phosphorus percentage expressed as a decimal; PC is the construction costs associated with the phosphorus components of the project; and DC is the construction costs associated with the total design capacity of Phase 1.

Jackson's WWTF upgrade includes costs that are specific to phosphorus treatment capacity and achieving compliance with limits established as a part of the Milwaukee River TMDL. The costs in the selected Alternative 3 associated with construction of phosphorus components include all work associated with chemical flocculation and tertiary filtration of phosphorus. Table 8-5 summarizes the costs associated with the phosphorus components and the total design capacity.

Table 8-5 Project Costs for PP Calculation – Phase 1

Item	RC2 Cost
Phase 1 Phosphorus Cost	\$3,664,800
Phase 1 Total Project Cost	\$9,802,000
Phosphorus Percentage	37.4%

The phosphorus percentage is calculated by dividing the phosphorus costs by the total design costs.

$$PP = PC/DC = \$3,664,800 / \$9,802,000 = 37.4\%$$

Additional information and detailed cost estimates for the phosphorus percentage are included in Appendix O.

8.7 Revenue Sources

Wisconsin Statutes empowers a municipality to construct, maintain, and expand a wastewater system, and further, to collect the revenues to support such a system. There are five potential sources of revenue available to municipalities for support of wastewater treatment facilities. They are as follows: (1) special assessments, (2) general fund revenues, (3) impact fees, (4) TIF fees and (5) service charges.

8.7.1 Special Assessments

The levy of special assessments is provided for by Section 66.07 of the Wisconsin Statutes. Generally, the special assessment principle is used primarily to recover the costs of services and facilities provided immediately adjacent to the property assessed. One additional use of the special assessment provision employed elsewhere from time to time is that of directly assessing the cost of major capital improvements. This is generally utilized in cases where no service charges are made but the governing body wishes to recover the cost of the improvements. It is more applicable to the financing of a collection system than to the treatment plant itself.

If a municipality were to provide the proposed wastewater treatment facilities as a general service, it would be possible to assess the costs of the improvement to the benefited parties. However, the municipality would not be able to do so unless the proper legal procedures were followed, and the assessment did not exceed the benefit received by the property assessed. Because of the difficulty in determining the differences in benefits between users and user classes and because of the magnitude of this assessment to present property owners, only, special assessments are not recommended for this project.

8.7.2 General Fund Allocations

General Fund monies from general taxation sources and other routine sources of municipal income can be used to pay for the subject project. A direct tax levy to recover the project costs project which are not funded by grants-in-aids is possible. The use of general fund monies on a debt service basis is a potential method of financing. This would be accomplished through issuance of general obligation bonds as described in Section 8.2.1. Generally, this method of financing is reserved for street improvements, administration improvements and not for wastewater treatment facilities. This method of financing will not be used for the proposed project.

8.7.3 Impact Fees

Wisconsin Statute 66.0617 allows cities, villages, towns and counties to assess impact fees on developers to offset the capital costs for public facilities needed as a result of the new development. The law requires municipalities that wish to utilize the connection fee or connection charge concepts to base these fees on sound concepts. A municipality has the option to implement an impact fee to assist in paying for improvements that are a result of development. These fees cannot be used to finance deficiencies of any system but for replacement of systems that will not have adequate capacity to meet new user demands. Any implementation of impact fees will require a needs report (this document will meet that requirement), breakout of costs to present and future users, an ordinance regulating the fees, development of an accounting system to segregate the fees and a public hearing on the ordinance.

The Village can utilize this system and may want to consider impact or connection fees for future users. This method will not be used at this time for calculating the user charge impacts. It should be noted that the same bond types can be used in conjunction with this system.

8.7.4 Tax Increment Finance District (TIF)

Municipalities can develop tax increment finance districts to assist in financing this wastewater improvements. To utilize this approach, the municipality would have to identify some specific boundaries of land that is mostly undeveloped but is anticipated to be developed in the near future. The percentage of cost of the proposed project that is related to the potential development of this area included in the TIF district can be paid by the increment of the TIF district. The tax increment is the amount of tax money collected between the value of the district at the time of formation to value of the property after development. This tax increment can be used to pay off projects that have been included in the TIF Plan.

This method of financing is a viable alternative and can be considered in the future but will not be used for calculating user charge impacts.

8.7.5 Service Charges

Wisconsin Statute 66.0821(3) empowers a municipality to establish service charges in such amount as to meet all the financial requirements for the construction, reconstruction, improvement, extension, operation, maintenance, repair, and depreciation of a wastewater system. Further, such service charges may be adjusted to cover the payment of all principal and interest of any indebtedness incurred thereof, including the replacement of funds advanced by or paid for the general fund of the municipality. These charges may include a reasonable excess and the actual basis of the charges is at the discretion of the appointed/elected governing members. To date, the Village has used service charges to generate revenue for construction, maintenance and operation of wastewater treatment facilities and this is the anticipated revenue source for future improvements.

8.8 Financial Status and Considerations

8.8.1 Revenue Sources and Current User Rates

Through the Utility, the Village collects revenues through user service charges and currently serves approximately 3,667 customers with its collection and wastewater treatment system. Table 8-6 presents a summary of the total number of customers, as of the end of 2021. The calculations are based on the Village's customer and sewage usage information that is provided in their 2021 Audit. The recent sewer usage information, and customer counts are provided in Appendix P.

Table 8-6 Customer Accounts and Equivalent Dwelling Units

	Customer Count	Equivalent Dwelling Units*
Residential	3,468	3,471
Multi-Family	52	110
Commercial	91	145
Industrial	41	64
Public Authority	15	33
Totals	3,667	3,823

The existing user charge system has a fixed charge of \$15.91 per month for the smallest meter size and a flow charge of \$5.04 per 1,000 gallons, which equals about \$32.33 per month for approximately 3,250 gallons per month for the average residential user. The current rates have been in effect since April 2017. User charges will need to be increased further to cover the cost of the proposed project, as described in Section 8.10.

8.8.2 Operating Expenses

The Village's current sewer fund annual operating budget and financial information from past years is provided in Appendix P. The total current annual operating budget is approximately \$1,930,000 for recent years. After removing depreciation, debt payments, and other miscellaneous expenses not factored into the estimated O&M costs, the budget for operating and maintaining the WWTF is approximately \$1,125,000. This is the base value used in projecting future O&M costs for this analysis. The projected operating costs for the first full year (2028) of operations with the recommended wastewater improvements are approximately \$1,250,000 per year and are expected to continue to increase annually. A detailed estimate of these future costs is provided in Appendix L.

8.8.3 Replacement Fund

A municipality receiving a loan from the CWFP is required to establish an equipment replacement fund to be used only for expenses incurred for equipment related to the municipality's wastewater treatment works. The Utility had a replacement fund balance of \$1,254,231 at the end of 2021. As detailed in Section 6.4, the replacement fund deposit for the planned improvements could increase up to approximately \$193,000 annually, but would include an initial payment of approximately \$71,000 for Phase 1.

8.8.4 Debt Repayments and Debt Reserves

The Village has no existing loans being paid by the sewer utility. The Village has paid off the previous CWF loans and has been placing the revenue from the existing rates in an account in

anticipation of the proposed upgrades. Future debt and impacts to user charges for the proposed project are addressed in Section 8.9.

8.8.5 Other Capital Improvements and Planned Expenses

It is anticipated that the Village will continue to perform sewer improvements and other projects as described in Section 3.1, but these improvements were not factored into the User Charge calculations as the Village intends to fund these separately through a TIF program in conjunction with street and other utility upgrades.

8.9 Projected Annual Operating Budget and User Charge Rates

The projected annual operating budget and user charge rates for the Utility need to take several components into consideration and can be best analyzed using a cash flow schedule.

The expense components of the cash flow include future debt of the wastewater facility improvements, debt or costs for future capital/improvements public works projects, collection system depreciation, equipment replacement funds, and total annual operation costs as described in the previous sections. The revenue components of the cash flow are revenue from current rates and equivalent users as described in Section 8.9.1 and projected revenue from rate increases, connection fees, and interest income. Improvements can also be financed through use of cash on hand or replacement fund reserves.

The project costs provided in Table 8-1 were used to determine potential loan payments using CWF loans and resulting impacts to user charges. As stated in Section 8.4, it is expected that CWF funding will be used for the project and the rate impacts will be refined as the funding package is developed. User rates were calculated for a conservative scenario of 20-year financing for CWFP with no Principal Forgiveness. User rates were conservatively calculated with a minimal increase in users or usage assumed (25 additional customers per year), and an average equivalent meter usage of approximately 3,250 gallons per month, which would be a typical residential water use rate.

The cash flow projections in Appendix Q are examples of possible methodology and rate implementation schedule, but the actual rates and schedule for rate increases will depend on the funding method, schedule, and required debt reserve and debt coverage. If possible, stepped rate increases are recommended to lessen the immediate impacts to users. It should be noted that other revenue generating sources can be utilized such as impact fees, grants, energy grants and other funding mechanisms. If these methodologies are implemented, the rates presented would be reduced accordingly.

User charges for an average residential customer are expected to increase from the current average residential charge of approximately \$32.33 per month to between \$56 and \$59 per month in the next 7 years depending on the methodology of the user charge system and the start of construction for Phases 2A and 2B. No rate increase is anticipated for Phase 1 construction.

8.10 Implementation Steps and Schedule

The Village of Jackson intends to apply for funding through the Wisconsin CWFP to finance construction. The following implementation schedule is based on the timelines for this loan programs, as well as requirements for agency review, approval, and permitting. Plan review will be performed by the WDNR. Division of Safety and Professional Services (DSPS) plan review is required for public buildings 25,000 cubic feet or larger. Permits that may be required include

WDNR Chapter 30 permit, Water Resources Application for Project Permits (WRAPP) and Corp of Engineers CFR 404 permitting.

A preliminary project schedule is presented in Table 8-8. It includes design beginning in early 2023 with a September 2023 submittal to WDNR for plan and specification approval. Final construction documents are to be complete for an early 2024 bid date. Construction may begin once Notice to Proceed is issued in mid to late spring of 2024.

The actual schedule will depend on the availability of financing and possible interim financing costs.

Table 8-8 Proposed Implementation Schedule

Action	Completion Date
Public Hearing on Facilities Plan	December 2022
Incorporate Public Hearing comments into the Final Facilities Plan.	December 2022
Submit Facilities Plan to WDNR	December 2022
Proceed with Preliminary Design	January 2023
WDNR Approval of Facilities Plan	March 2023
Proceed with Final Design	April 2023
Submit Plans and Specifications to WDNR	September 2023
Submit CWF Loan Application	September 2023
Apply for Required Construction Permits	October 2023
Approval of Plans and Specifications	December 2023
Advertise for Bids	January 2024
Open Bids	February 2024
Award Bids	March 2024
Start Construction	March 2024
Submit User Charge Rates/Ordinances	March 2024
Complete Construction	March 2026
Close on CWF Loan to Fund Construction	Summer 2024
Complete O&M Manual and Loan Closeout	July 2026
Phase 2A: Process Upgrades Design	2025
Phase 2A: Process Upgrades Construction	2026
Phase 2B: Solids Handling Upgrades Design	2027
Phase 2B: Solids Handling Upgrades Construction	2028

Appendix A

Current WPDES Permit



WPDES PERMIT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES
**PERMIT TO DISCHARGE UNDER THE WISCONSIN POLLUTANT DISCHARGE
ELIMINATION SYSTEM**

Jackson (Village) Wastewater Treatment Plant

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

W194N16658 Eagle Drive, Jackson, WI
to

**Cedar Creek (Cedar Creek Watershed, Milwaukee River Basin)
in Washington County**

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

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

State of Wisconsin Department of Natural Resources
For the Secretary

By _____
Bryan Hartsook
Wastewater Field Supervisor

Date Permit Signed/Issued

PERMIT TERM: EFFECTIVE DATE - October 01, 2017

EXPIRATION DATE - September 30, 2022

PERMIT MODIFICATION: EFFECTIVE DATE – October 01, 2020

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1 Influent Requirements

1.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)
701	Influent: 24-hour flow proportional composite sampler intake located after screening and grit removal, just before the aeration system; this sample point includes septage/holding tanks and plant sidestreams.

1.2 Monitoring Requirements

The permittee shall comply with the following monitoring requirements.

1.2.1 Sampling Point 701 - INFLUENT TO PLANT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD ₅ , Total		mg/L	4/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	4/Week	24-Hr Flow Prop Comp	
Copper, Total Recoverable		µg/L	Quarterly	24-Hr Flow Prop Comp	See subsection 1.2.1.1
Mercury, Total Recoverable		ng/L	Quarterly	24-Hr Flow Prop Comp	See subsection 1.2.1.2

1.2.1.1 Total Metals Analyses

Measurements of total metals and total recoverable metals shall be considered as equivalent. Samples shall be analyzed using a method which provides adequate sensitivity so that results can be quantified, unless not possible using the most sensitive approved method.

1.2.1.2 Mercury Monitoring

The permittee shall collect and analyze all mercury samples according to the data quality requirements of ss. NR 106.145(9) and (10), Wisconsin Administrative Code. The limit of quantitation (LOQ) used for the effluent and field blank shall be less than 1.3 ng/L, unless the samples are quantified at levels above 1.3 ng/L. The permittee shall collect at least one mercury field blank for each set of mercury samples (a set of samples may include combinations of intake, influent, effluent or other samples all collected on the same day). The permittee shall report results of samples and field blanks to the Department on Discharge Monitoring Reports.

2 In-Plant Requirements

2.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)
105	Collect a Mercury field blank using low level sample handling procedures

2.2 Monitoring Requirements and Limitations

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

2.2.1 Sampling Point 105 - Mercury Field Blank

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Mercury, Total Recoverable		ng/L	Quarterly	Blank	See subsection 2.2.1.1

2.2.1.1 Mercury Monitoring

The permittee shall collect and analyze all mercury samples according to the data quality requirements of ss. NR 106.145(9) and (10), Wisconsin Administrative Code. The limit of quantitation (LOQ) used for the effluent and field blank shall be less than 1.3 ng/L, unless the samples are quantified at levels above 1.3 ng/L. The permittee shall collect at least one mercury field blank for each set of mercury samples (a set of samples may include combinations of intake, influent, effluent or other samples all collected on the same day). The permittee shall report results of samples and field blanks to the Department on Discharge Monitoring Reports.

3 Surface Water Requirements

3.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)
001	Effluent: 24-hour flow proportional composite sampler intake located in the effluent channel, after chlorination and dechlorination. Grab samples are also collected after chlorination/dechlorination.

3.2 Monitoring Requirements and Effluent Limitations

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

3.2.1 Sampling Point (Outfall) 001 - EFFLUENT

Monitoring Requirements and Effluent Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD ₅ , Total	Weekly Avg	12 mg/L	4/Week	24-Hr Flow Prop Comp	Effective May - October
BOD ₅ , Total	Weekly Avg	17 mg/L	4/Week	24-Hr Flow Prop Comp	Effective November - April
BOD ₅ , Total	Monthly Avg	12 mg/L	4/Week	24-Hr Flow Prop Comp	Effective May - October
BOD ₅ , Total	Monthly Avg	17 mg/L	4/Week	24-Hr Flow Prop Comp	Effective November - April
Suspended Solids, Total	Weekly Avg	12 mg/L	4/Week	24-Hr Flow Prop Comp	Year round
Suspended Solids, Total	Monthly Avg	12 mg/L	4/Week	24-Hr Flow Prop Comp	Year round
pH Field	Daily Max	9.0 su	Daily	Grab	Year round
pH Field	Daily Min	6.0 su	Daily	Grab	Year round
Dissolved Oxygen	Daily Min	7.0 mg/L	Daily	Grab	Year round
Fecal Coliform	Geometric Mean - Wkly	780 #/100 ml	2/Week	Grab	Effective May - September
Fecal Coliform	Geometric Mean - Monthly	400 #/100 ml	2/Week	Grab	Effective May - September
Nitrogen, Ammonia (NH ₃ -N) Total	Daily Max	14 mg/L	4/Week	24-Hr Flow Prop Comp	Year round
Nitrogen, Ammonia (NH ₃ -N) Total	Weekly Avg	8.5 mg/L	4/Week	24-Hr Flow Prop Comp	Effective April
Nitrogen, Ammonia (NH ₃ -N) Total	Weekly Avg	7.4 mg/L	4/Week	24-Hr Flow Prop Comp	Effective May

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Jackson (Village) Wastewater Treatment Plant

Monitoring Requirements and Effluent Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Nitrogen, Ammonia (NH ₃ -N) Total	Weekly Avg	5.0 mg/L	4/Week	24-Hr Flow Prop Comp	Effective June - September
Nitrogen, Ammonia (NH ₃ -N) Total	Weekly Avg	8.4 mg/L	4/Week	24-Hr Flow Prop Comp	Effective October
Nitrogen, Ammonia (NH ₃ -N) Total	Weekly Avg	14 mg/L	4/Week	24-Hr Flow Prop Comp	Effective November - March
Nitrogen, Ammonia (NH ₃ -N) Total	Monthly Avg	4.3 mg/L	4/Week	24-Hr Flow Prop Comp	Effective April and October
Nitrogen, Ammonia (NH ₃ -N) Total	Monthly Avg	5.7 mg/L	4/Week	24-Hr Flow Prop Comp	Effective May
Nitrogen, Ammonia (NH ₃ -N) Total	Monthly Avg	3.9 mg/L	4/Week	24-Hr Flow Prop Comp	Effective June - September
Nitrogen, Ammonia (NH ₃ -N) Total	Monthly Avg	7.0 mg/L	4/Week	24-Hr Flow Prop Comp	Effective November - March
Phosphorus, Total	Monthly Avg	0.85 mg/L	4/Week	24-Hr Flow Prop Comp	This is an interim limit. The final TMDL-derived water quality based effluent limits are listed in section 3.2.1.4 below, and take effect per the schedule in section 5.1. See Phosphorus sections 3.2.1.4 - 3.2.1.6.
Phosphorus, Total		lbs/day	4/Week	Calculated	The final TMDL-derived water quality based effluent limits take effect in accordance with the schedule in section 5.1. See section 3.2.1.4 below for final limits. See Phosphorus sections 3.2.1.4 - 3.2.1.6.
Chlorine, Total Residual	Daily Max	38 µg/L	Daily	Grab	Effective May - September and whenever chlorinating.
Chlorine, Total Residual	Weekly Avg	7.7 µg/L	Daily	Grab	Effective May - September and whenever chlorinating.
Chlorine, Total Residual	Monthly Avg	7.7 µg/L	Daily	Grab	Effective May - September and whenever chlorinating.
Chloride		mg/L	Monthly	24-Hr Flow Prop Comp	Year round
Copper, Total Recoverable		µg/L	Quarterly	24-Hr Flow Prop Comp	See subsection 3.2.1.2 below.
Mercury, Total Recoverable		ng/L	Quarterly	Grab	See subsections 3.2.1.2 and 3.2.1.3 below.
Acute WET		TU _a	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET subsection 3.2.1.8 below.
Chronic WET		TU _c	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET subsection 3.2.1.8 below.

Monitoring Requirements and Effluent Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Temperature Maximum		deg F	3/Week	Continuous	Monitoring in calendar year 2021 (January - December). See subsection 3.2.1.9 below.

3.2.1.1 Average Annual Design Flow

The average annual design flow of the permittee's wastewater treatment facility is 1.69 MGD.

3.2.1.2 Total Metals Analyses

Measurements of total metals and total recoverable metals shall be considered as equivalent. Samples shall be analyzed using a method which provides adequate sensitivity so that results can be quantified, unless not possible using the most sensitive approved method.

3.2.1.3 Mercury Monitoring

The permittee shall collect and analyze all mercury samples according to the data quality requirements of ss. NR 106.145(9) and (10), Wisconsin Administrative Code. The limit of quantitation (LOQ) used for the effluent and field blank shall be less than 1.3 ng/L, unless the samples are quantified at levels above 1.3 ng/L. The permittee shall collect at least one mercury field blank for each set of mercury samples (a set of samples may include combinations of intake, influent, effluent or other samples all collected on the same day). The permittee shall report results of samples and field blanks to the Department on Discharge Monitoring Reports.

3.2.1.4 Total Maximum Daily Load (TMDL) Limitations

Approved TMDL: The Milwaukee River TMDL Waste Load Allocation (WLA) for Total Phosphorus was approved by the U.S. Environmental Protection Agency in March 2018. The approved TMDL WLA limits for Jackson are:

- **Total Phosphorus:** The final TMDL-derived water quality-based effluent limits for phosphorus are shown in the table below. Refer to the schedule in permit section 5.1 for the date of compliance with these total phosphorus WQBEL and TMDL limits as applicable.

Month	Monthly Avg Total P Effluent Limit (lbs/day)
January	3.03
February	3.12
March	2.11
April	2.02
May	3.65
June	2.85
July	2.51
August	2.79
September	3.78

October	2.72
November	3.49
December	2.86

3.2.1.5 Phosphorus Water Quality Based Effluent Limitation(s)

The final TMDL-derived water quality-based effluent limits for phosphorus as described in section 3.2.1.4 above, will take effect per the Schedule in section 5.1 unless:

- (A) As part of the application for the next reissuance, or prior to filing the application, the permittee submits either: 1.) a watershed adaptive management plan and a completed Watershed Adaptive Management Request Form 3200-139; or 2.) an application for water quality trading; or 3.) an application for a variance; or 4.) new information or additional data that supports a recalculation of the numeric limitation; and
- (B) The Department modifies, revokes and reissues, or reissues the permit to incorporate a revised limitation before the expiration of the compliance schedule*.

Note: The permittee may also submit an application for a variance within 60 days of this permit reissuance, as noted in the permit cover letter, in accordance with s. 283.15, Stats.

If Adaptive Management or Water Quality Trading is approved as part of the permit application for the next reissuance or as part of an application for a modification or revocation and reissuance, the plan and specifications submittal, construction, and final effective dates for compliance with the total phosphorus WQBEL may change in the reissued or modified permit. In addition, the numeric value of the water quality based effluent limit may change based on new information or additional data. If a variance is approved for the next reissuance, interim limits and conditions will be imposed in the reissued permit in accordance with s. 283.15, Stats., and applicable regulations. A permittee may apply for a variance to the phosphorus WQBEL at the next reissuance even if the permittee did not apply for a phosphorus variance as part of this permit reissuance.

Additional Requirements: If a water quality based effluent limit has taken effect in a permit, any increase in the limit is subject to s. NR 102.05(1) and ch. NR 207, Wis. Adm. Code. When a six-month average effluent limit is specified for Total Phosphorus the applicable averaging periods are May through October and November through April.

*Note: The Department will prioritize reissuances and revocations, modifications, and reissuances of permits to allow permittees the opportunity to implement adaptive management or nutrient trading in a timely and effective manner.

3.2.1.6 Alternative Approaches to Phosphorus WQBEL Compliance

Rather than upgrading its wastewater treatment facility to comply with WQBELs for total phosphorus, the permittee may use Water Quality Trading or the Watershed Adaptive Management Option, to achieve compliance under ch. NR 217, Wis. Adm. Code, provided that the permit is modified, revoked and reissued, or reissued to incorporate any such alternative approach. The permittee may also implement an upgrade to its wastewater treatment facility in combination with Water Quality Trading or the Watershed Adaptive Management Option to achieve compliance, provided that the permit is modified, revoked and reissued, or reissued to incorporate any such alternative approach. If the Final Compliance Alternatives Plan concludes that a variance will be pursued, the Plan shall provide information regarding the basis for the variance.

3.2.1.7 Submittal of Permit Application for Next Reissuance and Adaptive Management or Pollutant Trading Plan or Variance Application

The permittee shall submit the permit application for the next reissuance at least 6 months prior to expiration of this permit. If the permittee intends to pursue adaptive management to achieve compliance with the phosphorus water quality based effluent limitation, the permittee shall submit with the application for the next reissuance: a completed

Watershed Adaptive Management Request Form 3200-139, the completed Adaptive Management Plan and final plans for any system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code. If the permittee intends to pursue pollutant trading to achieve compliance, the permittee shall submit an application for water quality trading with the application for the next reissuance. If system upgrades will be used in combination with pollutant trading to achieve compliance with the final water quality-based limit, the reissued permit will specify a schedule for the necessary upgrades. If the permittee intends to seek a variance, the permittee shall submit an application for a variance with the application for the next reissuance.

3.2.1.8 Whole Effluent Toxicity (WET) Testing

Primary Control Water: Cedar Creek upstream and out of the influence of the mixing zone of Outfall 001 and any other known discharges.

Instream Waste Concentration (IWC): 73%

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

- **Acute:** 100, 50, 25, 12.5, 6.25% and any additional selected by the permittee.
- **Chronic:** 100, 75, 50, 25, 12.5% and any additional selected by the permittee.

WET Testing Frequency:

Acute tests shall be conducted once each year, in rotating quarters in order to collect seasonal information about the discharge. Tests are required during the following quarters.

- **Acute:** January – March 2018; July – September 2019; October – December 2020; April – June 2021 and January – March 2022

Acute WET testing shall continue after the permit expiration date (until the permit is reissued) in accordance with the WET requirements specified for the last full calendar year of this permit. For example, the next test would be required in April – June 2023.

Chronic tests shall be conducted once each year, in rotating quarters in order to collect seasonal information about the discharge. Tests are required during the following quarters.

- **Chronic:** January – March 2018; July – September 2019; October – December 2020; April – June 2021 and January – March 2022

Chronic WET testing shall continue after the permit expiration date (until the permit is reissued) in accordance with the WET requirements specified for the last full calendar year of this permit. For example, the next test would be required in April – June 2023.

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

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

Determination of Positive Results: An acute toxicity test shall be considered positive if the Toxic Unit - Acute (TU_a) is greater than 1.0 for either species. The TU_a shall be calculated as follows: $TU_a = 100 \div LC_{50}$. A chronic toxicity test shall be considered positive if the Toxic Unit - Chronic (TU_c) is greater than 1.37 for either species. The TU_c shall be calculated as follows: $TU_c = 100 \div IC_{25}$.

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

3.2.1.9 Effluent Temperature Monitoring

For monitoring temperature continuously, collect measurements in accordance with s. NR 218.04(13), Wis. Adm. Code. This means that discrete measurements shall be recorded at intervals of not more than 15 minutes during the 24-hour period. In either case, report the maximum temperature measured during the day on the DMR.

4 Land Application Requirements

4.1 Sampling Point(s)

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

Sampling Point Designation	
Sampling Point Number	Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)
002	Class B, Liquid Sludge, Anaerobically digested. Representative samples shall be collected from the onsite storage tank after it is well mixed and prior to land application.

4.2 Monitoring Requirements and Limitations

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

4.2.1 Sampling Point (Outfall) 002 - ANAEROBIC LIQUID

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Quarterly	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Quarterly	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Quarterly	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH ₄ -N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Potassium, Total Recoverable		Percent	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2018. See subsection 4.2.1.5.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2018. See subsection 4.2.1.5.

Other Sludge Requirements	
Sludge Requirements	Sample Frequency
List 3 Requirements – Pathogen Control: The requirements in List 3 shall be met prior to land application of sludge.	Annual
List 4 Requirements – Vector Attraction Reduction: The vector attraction reduction shall be satisfied prior to, or at the time of land application as specified in List 4.	Annual

4.2.1.1 List 2 Analysis

If the monitoring frequency for List 2 parameters is more frequent than "Annual" then the sludge may be analyzed for the List 2 parameters just prior to each land application season rather than at the more frequent interval specified.

4.2.1.2 Changes in Feed Sludge Characteristics

If a change in feed sludge characteristics, treatment process, or operational procedures occurs which may result in a significant shift in sludge characteristics, the permittee shall reanalyze the sludge for List 1, 2, 3 and 4 parameters each time such change occurs.

4.2.1.3 Multiple Sludge Sample Points (Outfalls)

If there are multiple sludge sample points (outfalls), but the sludges are not subject to different sludge treatment processes, then a separate List 2 analysis shall be conducted for each sludge type which is land applied, just prior to land application, and the application rate shall be calculated for each sludge type. In this case, List 1, 3, and 4 and PCBs need only be analyzed on a single sludge type, at the specified frequency. If there are multiple sludge sample points (outfalls), due to multiple treatment processes, List 1, 2, 3 and 4 and PCBs shall be analyzed for each sludge type at the specified frequency.

4.2.1.4 Sludge Which Exceeds the High Quality Limit

Cumulative pollutant loading records shall be kept for all bulk land application of sludge which does not meet the high quality limit for any parameter. This requirement applies for the entire calendar year in which any exceedance of Table 3 of s. NR 204.07(5)(c), is experienced. Such loading records shall be kept for all List 1 parameters for each site land applied in that calendar year. The formula to be used for calculating cumulative loading is as follows:

$$[(\text{Pollutant concentration (mg/kg)} \times \text{dry tons applied/ac}) \div 500] + \text{previous loading (lbs/acre)} = \text{cumulative lbs pollutant per acre}$$

When a site reaches 90% of the allowable cumulative loading for any metal established in Table 2 of s. NR 204.07(5)(b), the Department shall be so notified through letter or in the comment section of the annual land application report (3400-55).

4.2.1.5 Sludge Analysis for PCBs

The permittee shall analyze the sludge for Total PCBs one time during **2018**. The results shall be reported as "PCB Total Dry Wt". Either congener-specific analysis or Aroclor analysis shall be used to determine the PCB concentration. The permittee may determine whether Aroclor or congener specific analysis is performed. Analyses shall be performed in accordance with Table EM in s. NR 219.04, Wis. Adm. Code and the conditions specified in Standard Requirements of this permit. PCB results shall be submitted by January 31, following the specified year of analysis.

4.2.1.6 Municipal Land Application Management Plan

If the permittee is to land apply sludge, a management plan shall be submitted for approval by the Department. The management plan shall be consistent with the requirements of this permit, and ss. NR 204.07 and NR 204.11, Wis. Adm. Code. At a minimum, the plan shall include adequate documentation to support proposed sites and land spreading rates. A description of how the sludge will be land applied and incorporated shall be included. Record keeping and tracking of site loadings shall also be described. Applicable Department forms and requests for land spreading site approvals shall be included. Contact the Department staff for a plan outline. The plan is due by **February 28, 2018**.

4.2.1.7 Lists 1, 2, 3, and 4

List 1 TOTAL SOLIDS AND METALS
See the Monitoring Requirements and Limitations table above for monitoring frequency and limitations for the List 1 parameters
Solids, Total (percent)
Arsenic, mg/kg (dry weight)
Cadmium, mg/kg (dry weight)
Copper, mg/kg (dry weight)
Lead, mg/kg (dry weight)
Mercury, mg/kg (dry weight)
Molybdenum, mg/kg (dry weight)
Nickel, mg/kg (dry weight)
Selenium, mg/kg (dry weight)
Zinc, mg/kg (dry weight)

List 2 NUTRIENTS
See the Monitoring Requirements and Limitations table above for monitoring frequency for the List 2 parameters
Solids, Total (percent)
Nitrogen Total Kjeldahl (percent)
Nitrogen Ammonium (NH ₄ -N) Total (percent)
Phosphorus Total as P (percent)
Phosphorus, Water Extractable (as percent of Total P)
Potassium Total Recoverable (percent)

List 3

PATHOGEN CONTROL FOR CLASS B SLUDGE

The permittee shall implement pathogen control as listed in List 3. The Department shall be notified of the pathogen control utilized and shall be notified when the permittee decides to utilize alternative pathogen control.

The following requirements shall be met prior to land application of sludge.

Parameter	Unit	Limit
Fecal Coliform*	MPN/gTS or CFU/gTS	2,000,000
OR, ONE OF THE FOLLOWING PROCESS OPTIONS		
Aerobic Digestion	Air Drying	
Anaerobic Digestion	Composting	
Alkaline Stabilization	PSRP Equivalent Process	
* The Fecal Coliform limit shall be reported as the geometric mean of 7 discrete samples on a dry weight basis.		

List 4

VECTOR ATTRACTION REDUCTION

The permittee shall implement any one of the vector attraction reduction options specified in List 4. The Department shall be notified of the option utilized and shall be notified when the permittee decides to utilize an alternative option.

One of the following shall be satisfied prior to, or at the time of land application as specified in List 4.

Option	Limit	Where/When it Shall be Met
Volatile Solids Reduction	≥38%	Across the process
Specific Oxygen Uptake Rate	≤1.5 mg O ₂ /hr/g TS	On aerobic stabilized sludge
Anaerobic bench-scale test	<17 % VS reduction	On anaerobic digested sludge
Aerobic bench-scale test	<15 % VS reduction	On aerobic digested sludge
Aerobic Process	>14 days, Temp >40°C and Avg. Temp > 45°C	On composted sludge
pH adjustment	>12 S.U. (for 2 hours) and >11.5 (for an additional 22 hours)	During the process
Drying without primary solids	>75 % TS	When applied or bagged
Drying with primary solids	>90 % TS	When applied or bagged
Equivalent Process	Approved by the Department	Varies with process
Injection	-	When applied
Incorporation	-	Within 6 hours of application

4.2.1.8 Daily Land Application Log

Daily Land Application Log		
Discharge Monitoring Requirements and Limitations The permittee shall maintain a daily land application log for biosolids land applied each day when land application occurs. The following minimum records must be kept, in addition to all analytical results for the biosolids land applied. The log book records shall form the basis for the annual land application report requirements.		
Parameters	Units	Sample Frequency
DNR Site Number(s)	Number	Daily as used
Outfall number applied	Number	Daily as used
Acres applied	Acres	Daily as used
Amount applied	As appropriate * /day	Daily as used
Application rate per acre	unit */acre	Daily as used
Nitrogen applied per acre	lb/acre	Daily as used
Method of Application	Injection, Incorporation, or surface applied	Daily as used

*gallons, cubic yards, dry US Tons or dry Metric Tons

5 Schedules

5.1 Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

The permittee shall comply with the WQBELs for Phosphorus as specified. No later than 14 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance. If a submittal is required, a timely submittal fulfills the notification requirement.

Required Action	Due Date
Operational Evaluation Report: The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by September 30, 2020. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than September 30, 2020 and state whether the measures, improvements, and modifications will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report. If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by September 30, 2020 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance'). STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than September 30, 2026.	09/30/2018
Compliance Alternatives, Source Reduction, Improvements and Modifications Status: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.	09/30/2019
Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design	09/30/2020

report. If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan. If water quality trading will be undertaken, the plan must state that trading will be pursued.	
Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code. If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code. If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2021
Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2022
Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2023
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41, Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2023
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2024
Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2025
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface	08/31/2026

Water section of this permit.	
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	09/30/2026

5.2 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
Land Application Management Plan Submittal: Submit a management plan to optimize the land application system performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code, by the Due Date. This management plan shall 1) specify information on pretreatment processes (if any); 2) identify land application sites; 3) describe site limitations; 4) address vegetative cover management and removal; 5) specify availability of storage; 6) describe the type of transporting and spreading vehicle(s); 7) specify monitoring procedures; 8) track site loading; 9) address contingency plans for adverse weather and odor/nuisance abatement; and 10) include any other pertinent information. Once approved, all landspreading activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes.	02/28/2018

6 Standard Requirements

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

6.1 Reporting and Monitoring Requirements

6.1.1 Monitoring Results

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

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

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

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

6.1.2 Sampling and Testing Procedures

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

6.1.3 Recording of Results

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

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

6.1.4 Reporting of Monitoring Results

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

- Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 0.1 mg/L, report the pollutant concentration as < 0.1 mg/L.
- Pollutant concentrations equal to or greater than the limit of detection, but less than the limit of quantitation, shall be reported and the limit of quantitation shall be specified.
- For purposes of calculating NR 101 fees, the 2 mg/l lower reporting limits for BOD₅ and Total Suspended Solids shall be considered to be limits of quantitation
- For the purposes of reporting a calculated result, average or a mass discharge value, the permittee may substitute a 0 (zero) for any pollutant concentration that is less than the limit of detection. However, if the effluent limitation is less than the limit of detection, the department may substitute a value other than zero for results less than the limit of detection, after considering the number of monitoring results that are greater than the limit of detection and if warranted when applying appropriate statistical techniques.

6.1.5 Compliance Maintenance Annual Reports

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

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

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

6.1.6 Records Retention

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

6.1.7 Other Information

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

6.1.8 Reporting Requirements – Alterations or Additions

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

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

6.2 System Operating Requirements

6.2.1 Noncompliance Reporting

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

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

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

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

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

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

6.2.2 Flow Meters

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

6.2.3 Raw Grit and Screenings

All raw grit and screenings shall be disposed of at a properly licensed solid waste facility or picked up by a licensed waste hauler. If the facility or hauler are located in Wisconsin, then they shall be licensed under chs. NR 500-536, Wis. Adm. Code.

6.2.4 Sludge Management

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

6.2.5 Prohibited Wastes

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

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

6.2.6 Bypass

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

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

6.2.7 Scheduled Bypass

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

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

6.2.8 Controlled Diversions

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

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

6.2.9 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. The wastewater treatment facility shall be under the direct supervision of a state certified operator as required in s. NR 108.06(2), Wis. Adm. Code. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training as required in ch. NR 114, Wis. Adm. Code, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

6.3 Sewage Collection Systems

6.3.1 Sanitary Sewage Overflows and Sewage Treatment Facility Overflows

6.3.1.1 Overflows Prohibited

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

- The sanitary sewer overflow or sewage treatment facility overflow was unavoidable to prevent loss of life, personal injury or severe property damage;
- There were no feasible alternatives to the sanitary sewer overflow or sewage treatment facility overflow such as the use of auxiliary treatment facilities or adequate back-up equipment, retention of untreated wastes, reduction of inflow and infiltration, or preventative maintenance activities;
- The sanitary sewer overflow or the sewage treatment facility overflow was caused by unusual or severe weather related conditions such as large or successive precipitation events, snowmelt,

saturated soil conditions, or severe weather occurring in the area served by the sewage collection system or sewage treatment facility; and

- The sanitary sewer overflow or the sewage treatment facility overflow was unintentional, temporary, and caused by an accident or other factors beyond the reasonable control of the permittee.

6.3.1.2 Permittee Response to Overflows

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

6.3.1.3 Permittee Reporting

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

- The permittee shall notify the department by telephone, fax or email as soon as practicable, but no later than 24 hours from the time the permittee becomes aware of the overflow;
- The permittee shall, no later than five days from the time the permittee becomes aware of the overflow, provide to the department the information identified in this paragraph using department form number 3400-184. If an overflow lasts for more than five days, an initial report shall be submitted within 5 days as required in this paragraph and an updated report submitted following cessation of the overflow. At a minimum, the following information shall be included in the report:
 - The date and location of the overflow;
 - The surface water to which the discharge occurred, if any;
 - The duration of the overflow and an estimate of the volume of the overflow;
 - A description of the sewer system or treatment facility component from which the discharge occurred such as manhole, lift station, constructed overflow pipe, or crack or other opening in a pipe;
 - The estimated date and time when the overflow began and stopped or will be stopped;
 - The cause or suspected cause of the overflow including, if appropriate, precipitation, runoff conditions, areas of flooding, soil moisture and other relevant information;
 - Steps taken or planned to reduce, eliminate and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
 - A description of the actual or potential for human exposure and contact with the wastewater from the overflow;
 - Steps taken or planned to mitigate the impacts of the overflow and a schedule of major milestones for those steps;
 - To the extent known at the time of reporting, the number and location of building backups caused by excessive flow or other hydraulic constraints in the sewage collection system that occurred concurrently with the sanitary sewer overflow and that were within the same area of the sewage collection system as the sanitary sewer overflow; and
 - The reason the overflow occurred or explanation of other contributing circumstances that resulted in the overflow event. This includes any information available including whether the overflow was unavoidable to prevent loss of life, personal injury, or severe property damage and whether there were feasible alternatives to the overflow.

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

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

6.3.1.4 Public Notification

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

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

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

6.3.3 Sewer Cleaning Debris and Materials

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

- Debris and solid waste shall be dewatered, dried and then disposed of at a licensed solid waste facility.
- Liquid waste from the cleaning and dewatering operations shall be collected and disposed of at a permitted wastewater treatment facility.
- Combination waste including liquid waste along with debris and solid waste may be disposed of at a licensed solid waste facility or wastewater treatment facility willing to accept the waste.

6.4 Surface Water Requirements

6.4.1 Permittee-Determined Limit of Quantitation Incorporated into this Permit

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

6.4.2 Appropriate Formulas for Effluent Calculations

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

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

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

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

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

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

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

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

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

6.4.3 Effluent Temperature Requirements

Weekly Average Temperature – The permittee shall use the following formula for calculating effluent results to determine compliance with the weekly average temperature limit (as applicable): Weekly Average Temperature = the sum of all daily maximum results for that week divided by the number of daily maximum results during that time period.

Cold Shock Standard – Water temperatures of the discharge shall be controlled in a manner as to protect fish and aquatic life uses from the deleterious effects of cold shock. ‘Cold Shock’ means exposure of aquatic organisms to a rapid decrease in temperature and a sustained exposure to low temperature that induces abnormal behavior or physiological performance and may lead to death.

Rate of Temperature Change Standard – Temperature of a water of the state or discharge to a water of the state may not be artificially raised or lowered at such a rate that it causes detrimental health or reproductive effects to fish or aquatic life of the water of the state.

6.4.4 Visible Foam or Floating Solids

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

6.4.5 Surface Water Uses and Criteria

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

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

- b) Floating or submerged debris, oil, scum or other material shall not be present in such amounts as to interfere with public rights in waters of the state.
- c) Materials producing color, odor, taste or unsightliness shall not be present in such amounts as to interfere with public rights in waters of the state.
- d) Substances in concentrations or in combinations which are toxic or harmful to humans shall not be present in amounts found to be of public health significance, nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life.

6.4.6 Percent Removal

During any 30 consecutive days, the average effluent concentrations of BOD₅ and of total suspended solids shall not exceed 15% of the average influent concentrations, respectively. This requirement does not apply to removal of total suspended solids if the permittee operates a lagoon system and has received a variance for suspended solids granted under NR 210.07(2), Wis. Adm. Code.

6.4.7 Fecal Coliforms

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

6.4.8 Seasonal Disinfection

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

6.4.9 Total Residual Chlorine Requirements (When De-Chlorinating Effluent)

Test methods for total residual chlorine, approved in ch. NR 219 - Table B, Wis. Adm. Code, normally achieve a limit of detection of about 20 to 50 micrograms per liter and a limit of quantitation of about 100 micrograms per liter. Reporting of test results and compliance with effluent limitations for chlorine residual and total residual halogens shall be as follows:

- Sample results which show no detectable levels are in compliance with the limit. These test results shall be reported on Wastewater Discharge Monitoring Report Forms as "< 100 µg/L". (Note: 0.1 mg/L converts to 100 µg/L)
- Samples showing detectable traces of chlorine are in compliance if measured at less than 100 µg/L, unless there is a consistent pattern of detectable values in this range. These values shall also be reported on Wastewater Discharge Monitoring Report Forms as "<100 µg/L." The facility operating staff shall record actual readings on logs maintained at the plant, shall take action to determine the reliability of detected results (such as re-sampling and/or calculating dosages), and shall adjust the chemical feed system if necessary to reduce the chances of detects.
- Samples showing detectable levels greater than 100 µg/L shall be considered as exceedances, and shall be reported as measured.
- To calculate average or mass discharge values, a "0" (zero) may be substituted for any test result less than 100 µg/L. Calculated values shall then be compared directly to the average or mass limitations to determine compliance.

6.4.10 Whole Effluent Toxicity (WET) Monitoring Requirements

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

6.4.11 Whole Effluent Toxicity (WET) Identification and Reduction

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

- A description of actions the permittee has taken or will take to remove toxicity and to prevent the recurrence of toxicity;
- A description of toxicity reduction evaluation (TRE) investigations that have been or will be done to identify potential sources of toxicity, including some or all of the following actions:
 - (a) Evaluate the performance of the treatment system to identify deficiencies contributing to effluent toxicity (e.g., operational problems, chemical additives, incomplete treatment)
 - (b) Identify the compound(s) causing toxicity
 - (c) Trace the compound(s) causing toxicity to their sources (e.g., industrial, commercial, domestic)
 - (d) Evaluate, select, and implement methods or technologies to control effluent toxicity (e.g., in-plant or pretreatment controls, source reduction or removal)
- Where corrective actions including a TRE have not been completed, an expeditious schedule under which corrective actions will be implemented;
- If no actions have been taken, the reason for not taking action.

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

6.5 Land Application Requirements

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

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

6.5.2 General Sludge Management Information

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

6.5.3 Sludge Samples

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

6.5.4 Land Application Characteristic Report

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

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

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

All results shall be reported on a dry weight basis.

6.5.5 Calculation of Water Extractable Phosphorus

When sludge analysis for Water Extractable Phosphorus is required by this permit, the permittee shall use the following formula to calculate and report Water Extractable Phosphorus:

Water Extractable Phosphorus (% of Total P) =

$$[\text{Water Extractable Phosphorus (mg/kg, dry wt)} \div \text{Total Phosphorus (mg/kg, dry wt)}] \times 100$$

6.5.6 Monitoring and Calculating PCB Concentrations in Sludge

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

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

- EPA Method 1668 may be used to test for all PCB congeners. If this method is employed, all PCB congeners shall be delineated. Non-detects shall be treated as zero. The values that are between the limit of detection and the limit of quantitation shall be used when calculating the total value of all congeners. All results shall be added together and the total PCB concentration by dry weight reported. **Note:** It is recognized that a number of the congeners will co-elute with others, so there will not be 209 results to sum.
- EPA Method 8082A shall be used for PCB-Aroclor analysis and may be used for congener specific analysis as well. If congener specific analysis is performed using Method 8082A, the list of congeners tested shall include at least congener numbers 5, 18, 31, 44, 52, 66, 87, 101, 110, 138, 141, 151, 153, 170, 180, 183, 187, and 206 plus any other additional congeners which might be reasonably expected to occur in the particular sample. For either type of analysis, the sample shall be extracted using the Soxhlet extraction (EPA Method 3540C) (or the Soxhlet Dean-Stark modification) or the pressurized fluid extraction (EPA Method 3545A). If Aroclor analysis is performed using Method 8082A, clean up steps of the extract shall be performed as necessary to remove interference and to achieve as close to a limit of detection of 0.11 mg/kg as possible. Reporting protocol, consistent with s. NR 106.07(6)(e), should be as

follows: If all Aroclors are less than the LOD, then the Total PCB Dry Wt result should be reported as less than the highest LOD. If a single Aroclor is detected then that is what should be reported for the Total PCB result. If multiple Aroclors are detected, they should be summed and reported as Total PCBs. If congener specific analysis is done using Method 8082A, clean up steps of the extract shall be performed as necessary to remove interference and to achieve as close to a limit of detection of 0.003 mg/kg as possible for each congener. If the aforementioned limits of detection cannot be achieved after using the appropriate clean up techniques, a reporting limit that is achievable for the Aroclors or each congener for the sample shall be determined. This reporting limit shall be reported and qualified indicating the presence of an interference. The lab conducting the analysis shall perform as many of the following methods as necessary to remove interference:

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

6.5.7 Annual Land Application Report

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

6.5.8 Other Methods of Disposal or Distribution Report

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

6.5.9 Approval to Land Apply

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

6.5.10 Soil Analysis Requirements

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

6.5.11 Land Application Site Evaluation

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

6.5.12 Class B Sludge: Fecal Coliform Limitation

Compliance with the fecal coliform limitation for Class B sludge shall be demonstrated by calculating the geometric mean of at least 7 separate samples. (Note that a Total Solids analysis must be done on each sample). The geometric mean shall be less than 2,000,000 MPN or CFU/g TS. Calculation of the geometric mean can be done using one of the following 2 methods.

Method 1:

$$\text{Geometric Mean} = (X_1 \times X_2 \times X_3 \dots \times X_n)^{1/n}$$

Where X = Coliform Density value of the sludge sample, and where n = number of samples (at least 7)

Method 2:

$$\text{Geometric Mean} = \text{antilog}[(X_1 + X_2 + X_3 \dots + X_n) \div n]$$

Where X = $\log_{10}$ of Coliform Density value of the sludge sample, and where n = number of samples (at least 7)

Example for Method 2

Sample Number	Coliform Density of Sludge Sample	$\log_{10}$
1	6.0×10^5	5.78
2	4.2×10^6	6.62
3	1.6×10^6	6.20
4	9.0×10^5	5.95
5	4.0×10^5	5.60
6	1.0×10^6	6.00
7	5.1×10^5	5.71

The geometric mean for the seven samples is determined by averaging the $\log_{10}$ values of the coliform density and taking the antilog of that value.

$$(5.78 + 6.62 + 6.20 + 5.95 + 5.60 + 6.00 + 5.71) \div 7 = 5.98$$

The antilog of 5.98 = 9.5×10^5

6.5.13 Class B Sludge: Anaerobic Digestion

Treat the sludge in the absence of air for a specific mean cell residence time at a specific temperature. Values for the mean cell residence time and temperature shall be between 15 days at 35° C to 55° C and 60 days at 20° C. Straight-line interpolation to calculate mean cell residence time is allowable when the temperature falls between 35° C and 20° C.

6.5.14 Vector Control: Volatile Solids Reduction

The mass of volatile solids in the sludge shall be reduced by a minimum of 38% between the time the sludge enters the digestion process and the time it either exits the digester or a storage facility. For calculation of volatile solids reduction, the permittee shall use the Van Kleeck equation or one of the other methods described in "Determination of Volatile Solids Reduction in Digestion" by J.B. Farrell, which is Appendix C of EPA's *Control of Pathogens in Municipal Wastewater Sludge* (EPA/625/R-92/013). The Van Kleeck equation is:

$$\text{VSR}\% = \frac{\text{VS}_{\text{IN}} - \text{VS}_{\text{OUT}}}{\text{VS}_{\text{IN}} - (\text{VS}_{\text{OUT}} \times \text{VS}_{\text{IN}})} \times 100$$

Where: VS_{IN} = Volatile Solids in Feed Sludge (g VS/g TS)

VS_{OUT} = Volatile Solids in Final Sludge (g VS/g TS)

$VSR\%$ = Volatile Solids Reduction, (Percent)

6.5.15 Class B Sludge - Vector Control: Injection

No significant amount of the sewage sludge shall be present on the land surface within one hour after the sludge is injected.

7 Summary of Reports Due

FOR INFORMATIONAL PURPOSES ONLY

Description	Date	Page
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Operational Evaluation Report	September 30, 2018	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Compliance Alternatives, Source Reduction, Improvements and Modifications Status	September 30, 2019	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Preliminary Compliance Alternatives Plan	September 30, 2020	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Final Compliance Alternatives Plan	September 30, 2021	15
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Progress Report on Plans & Specifications	September 30, 2022	15
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Final Plans and Specifications	September 30, 2023	15
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Treatment Plant Upgrade to Meet WQBELs	December 31, 2023	15
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Construction Upgrade Progress Report #1	December 31, 2024	15
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Construction Upgrade Progress Report #2	December 31, 2025	15
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Complete Construction	August 31, 2026	16
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Achieve Compliance	September 30, 2026	16
Land Application Management Plan -Land Application Management Plan Submittal	February 28, 2018	16
Compliance Maintenance Annual Reports (CMAR)	by June 30, each year	18
General Sludge Management Form 3400-48	prior to any significant sludge management changes	26
Characteristic Form 3400-49 and Lab Report	by January 31 following each year of analysis	27
Land Application Report Form 3400-55	by January 31, each year whether or not non-exceptional quality sludge is land applied	28

WPDES Permit No. WI-0021806-07-1
Jackson (Village) Wastewater Treatment Plant

Report Form 3400-52	by January 31, each year whether or not sludge is hauled, landfilled, incinerated, or exceptional quality sludge is distributed or land applied	28
Wastewater Discharge Monitoring Report	no later than the date indicated on the form	17

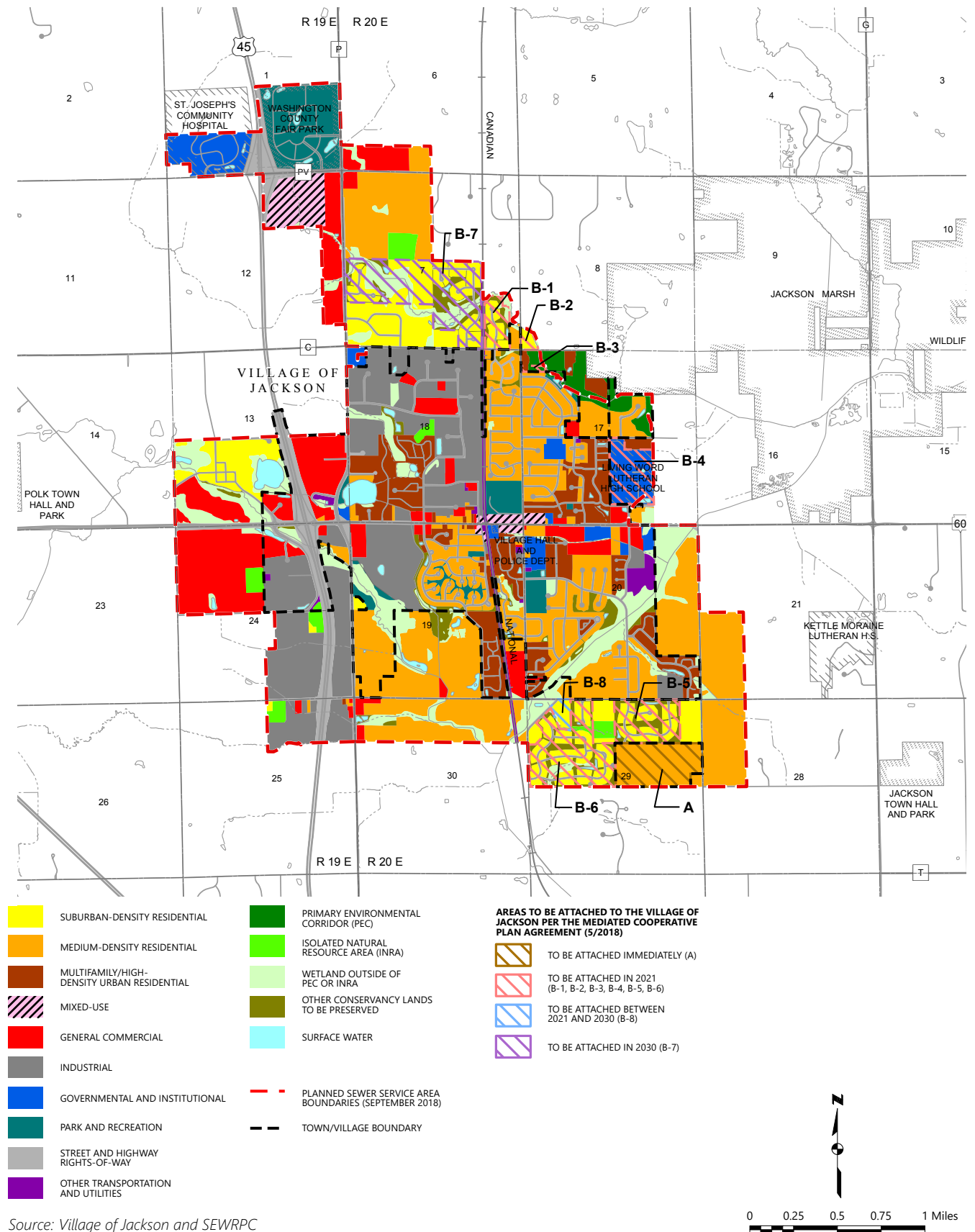
Report forms shall be submitted electronically in accordance with the reporting requirements herein. Any facility plans or plans and specifications for municipal, industrial, industrial pretreatment and non-industrial wastewater systems shall be submitted to the Bureau of Water Quality, P.O. Box 7921, Madison, WI 53707-7921. All other submittals required by this permit shall be submitted to:
Southeast Region, 2300 N Dr ML King Drive, Milwaukee, WI 53212

Appendix B

Planning Area Information

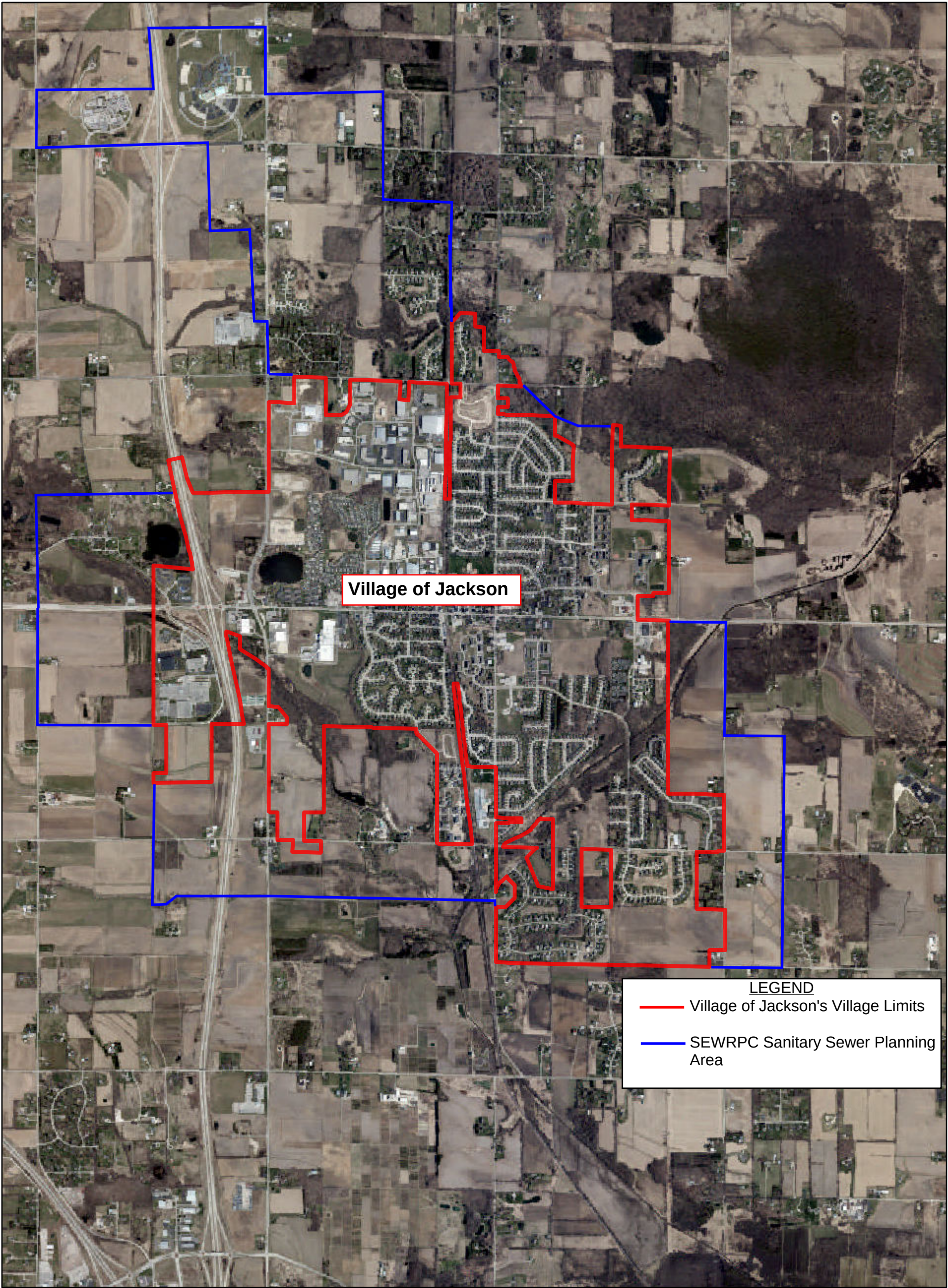
Map 1

Land Use Plan for the Village of Jackson: 2050



Source: Village of Jackson and SEWRPC

Village of Jackson



5/25/2022, 8:59:15 AM

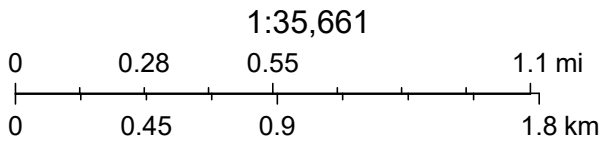
ORTHO2020

- Red: Band_1
- Green: Band_2
- Blue: Band_3

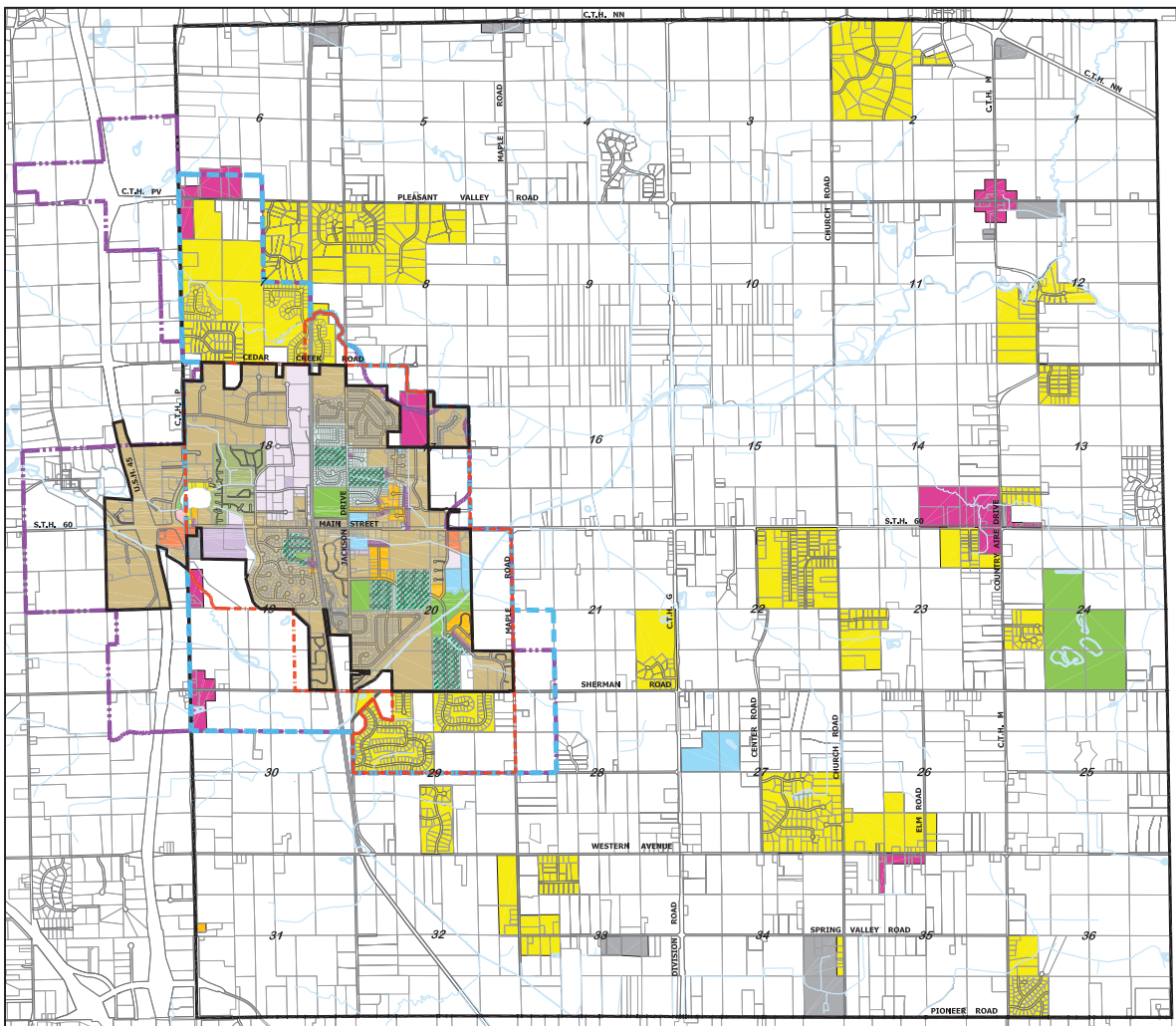
LEGEND

Village of Jackson's Village Limits

SEWRPC Sanitary Sewer Planning Area



Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community
Washington County
Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, ©



ZONING DISTRICTS (VILLAGE)

	PUD - PLANNED UNIT DEVELOPMENT		B1 - COMMUNITY BUSINESS
	R1 - SINGLE-FAMILY RESIDENTIAL		B2 - DOWNTOWN BUSINESS
	R2 - SINGLE-FAMILY RESIDENTIAL		M1 - LIMITED MANUFACTURING
	R3 - SINGLE-FAMILY RESIDENTIAL		M2 - GENERAL MANUFACTURING
	R4 - SINGLE-FAMILY RESIDENTIAL		I1 - INSTITUTIONAL & PUBLIC SERVICE
	R5 - SINGLE-FAMILY RESIDENTIAL		A1 - AGRICULTURAL
	R6 - TWO-FAMILY RESIDENTIAL		P1 - PARK & RECREATION
	R8 - MULTI-FAMILY RESIDENTIAL		
	R9 - MOBILE HOME RESIDENTIAL		

VILLAGE/TOWN LIMITS

- 2015 - MAXIMUM VILLAGE LIMITS WITHIN JACKSON TOWNSHIP
- 2030 - MAXIMUM VILLAGE LIMITS WITHIN JACKSON TOWNSHIP
- SANITARY SEWER SERVICE AREA

ZONING DISTRICTS (TOWN)

	A1- AGRICULTURE/RURAL RESIDENTIAL
	R1 - SINGLE-FAMILY RESIDENTIAL
	R3 - MULTI-FAMILY RESIDENTIAL
	B2 - HIGHWAY BUSINESS
	M1 - LIMITED MANUFACTURING
	I1 - INSTITUTIONAL
	P1 - PARK

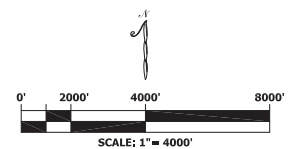


EXHIBIT 8.2

GENERALIZED ZONING

SOURCE: VILLAGE OF JACKSON, TOWN OF JACKSON, AND WASHINGTON COUNTY

7/1/2009

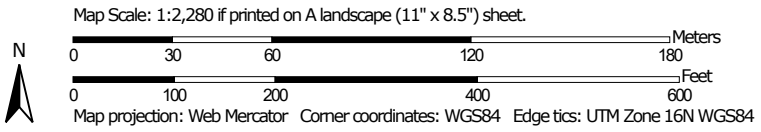
Appendix C

Soils Information

Soil Map—Washington County, Wisconsin (Jackson WWTF)



Soil Map may not be valid at this scale.



Soil Map—Washington County, Wisconsin
(Jackson WWTF)

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service

Web Soil Survey URL:

Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Washington County, Wisconsin

Survey Area Data: Version 22, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 20, 2020—Sep 15, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Cw	Colwood silt loam, 0 to 2 percent slopes	7.4	35.8%
M-W	Miscellaneous water	3.8	18.5%
MzfA	Mundelein silt loam, 0 to 3 percent slopes	0.7	3.3%
MzkA	Mussey loam, 0 to 3 percent slopes	0.6	2.7%
NnA	Nenno silt loam, 1 to 3 percent slopes	2.4	11.8%
Ph	Pella silt loam, 0 to 2 percent slopes	5.5	26.8%
W	Water	0.2	1.1%
Totals for Area of Interest		20.7	100.0%

Survey Area Data Summary

This report lists the generated soil interpretations included with the current official dataset for the selected soil survey area. It also shows various data version numbers, dates, and times for this dataset.

Report—Survey Area Data Summary

Washington County, Wisconsin

Survey area version: 22

Survey area version established date: 9/6/2022 6:31:40 PM

Survey area project scale: 1: 15,840

Tabular data version: 20

Tabular data NASIS export date: 9/4/2022 3:35:27 PM

Tabular data certification status: certified, major components

Tabular data certification status description: 9/6/2022: The HmB2t03x-Hochheim loam, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The Ph2t044-Pella silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The Pc2szdg-Palms mucky peat, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The MoB2szfv-Mayville silt loam, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The MoA2szfs-Mayville silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The LmA2t043-Lamartine silt loam, 0 to 3 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The KwC22wss0-Knowles silt loam, 6 to 12 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The Km2tjz0-Keowns silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The Hu2szfj-Houghton mucky peat, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The HmE2t72x-Hochheim loam, 20 to 30 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The HmD22t72w-Hochheim loam, 12 to 20 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The HmB22t03w-Hochheim loam, 2 to 6 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The FsB2tjx0-Fox silt loam, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The AzA2wspj-Aztalan loam, 0 to 2 percent slopes" mapunit was edited and

improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The Cw2tjx2-Colwood silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The CrD22tjwm-Casco-Rodman complex, 12 to 20 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The CrC22tjwk-Casco-Rodman complex, 6 to 12 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The CeD22tjwd-Casco loam, 12 to 20 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The CeC22tjwb-Casco loam, 6 to 12 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The CeA2tjw6-Casco loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The CcC22tjwh-Casco sandy loam, 6 to 12 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The BnB2szgn-Boyer sandy loam, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The BmC2szgr-Boyer loamy sand, 6 to 12 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The BmB2szgs-Boyer loamy sand, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The RaA2wpxr-Radford silt loam, 0 to 3 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The Ak2xyjt-Adrian mucky peat, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The DdB2szfp-Dodge silt loam, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The ScA2szdx-St. Charles silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The BsA2tjx5-Brookston silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The SrB2wsr8-Sisson fine sandy loam, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The FsA2tjyk-Fox silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The DsA2wsps-Dresden silt loam, 1 to 3 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The SeB2szf3-St. Charles silt loam, gravelly substratum, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The ZuA2wsqr-Zurich silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability

Group" indicates what was edited. The ZuB2wsqg-Zurich silt loam, 95B, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The SeA2szf2-St. Charles silt loam, gravelly substratum, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The MzfA2tjxg-Mundelein silt loam, 0 to 3 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The ZuB22wsrt-Zurich silt loam, 2 to 6 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The KwB2wsry-Knowles silt loam, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The HmC22t03r-Hochheim loam, 6 to 12 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The CeB22tjw8-Casco loam, 2 to 6 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The CcB22tjwg-Casco sandy loam, 2 to 6 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The ScB2szdy-St. Charles silt loam, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The ThB22szd7-Theresa silt loam, 2 to 6 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The SrD22wsrb-Sisson fine sandy loam, 12 to 20 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The SrC22wsr9-Sisson fine sandy loam, 6 to 12 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The ThA2szd6-Theresa silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The HnA2wsrk-Hochheim silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The ThC22szd8-Theresa silt loam, 6 to 12 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The VsA2wsqx-Virgil silt loam, gravelly substratum, 0 to 3 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The YrA2tjz2-Yahara silt loam, 0 to 3 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The ThB2szd9-Theresa silt loam, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The AzB2wspk-Aztalan loam, 2 to 6 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The DdA2szfn-Dodge silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was

edited. The CrE2tjwn-Casco-Rodman complex, 20 to 30 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The Sm2szfk-Sebewa silt loam, 0 to 2 percent slopes" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The ZuC22wsrv-Zurich silt loam, 6 to 12 percent slopes, eroded" mapunit was edited and improved. The name of the project "TABULAR - MLRA 95 - Forage Suitability Group" indicates what was edited. The tabular database was edited and populated according to guidance in Exhibits A and B of National Instruction (NI-305), and Part 610 of the National Soil Survey Handbook. Any spatial data edits were certified correct by the Soil Survey region GIS specialist, State Soil Scientist (SSS), and by the National Digitizing Center. The SSS certified the data population for all map units, and concurred with correlation of all projects mentioned, as they were documented in Soil Survey Area Legend(s), and in the Project Correlation tables. The SSS certified the data population for all map units, and concurred with correlation of all projects mentioned, as they were documented in Soil Survey Area Legend(s) and in the Project Correlation table. This dataset also contains the following changes: Recalculated all national, regional, and local interpretations for all components.

Included soil interpretations

Interpretation name	Design date	Generation date
AGR - Industrial Hemp for Fiber and Seed Production	1/19/2021 10:51:31 PM	9/4/2022 3:36:21 PM
AWM - Irrigation Disposal of Wastewater	5/6/2020 9:56:39 PM	9/4/2022 3:36:21 PM
AWM - Land Application of Municipal Sewage Sludge	5/6/2020 9:56:39 PM	9/4/2022 3:36:21 PM
AWM - Manure and Food Processing Waste	5/6/2020 9:56:39 PM	9/4/2022 3:36:21 PM
AWM - Overland Flow Process Treatment of Wastewater	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
AWM - Rapid Infiltration Disposal of Wastewater	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
AWM - Slow Rate Process Treatment of Wastewater	5/6/2020 9:56:39 PM	9/4/2022 3:36:21 PM
Commodity Crop Productivity Index (Corn) (WI)	8/15/2016 9:35:42 PM	9/4/2022 3:36:21 PM
DHS - Catastrophic Event, Large Animal Mortality, Burial	3/9/2022 5:39:46 PM	9/4/2022 3:36:21 PM
DHS - Catastrophic Event, Large Animal Mortality, Incinerate	5/6/2020 9:04:40 PM	9/4/2022 3:36:21 PM
DHS - Catastrophic Mortality, Large Animal Disposal, Pit	3/9/2022 5:39:46 PM	9/4/2022 3:36:21 PM
DHS - Catastrophic Mortality, Large Animal Disposal, Trench	3/9/2022 5:39:46 PM	9/4/2022 3:36:21 PM
DHS - Emergency Animal Mortality Disposal by Shallow Burial	6/4/2020 7:33:15 PM	9/4/2022 3:36:21 PM
DHS - Emergency Land Disposal of Milk	5/12/2020 6:41:17 PM	9/4/2022 3:36:21 PM

Interpretation name	Design date	Generation date
DHS - Potential for Radioactive Bioaccumulation	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
DHS - Potential for Radioactive Sequestration	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
DHS - Rubble and Debris Disposal, Large-Scale Event	3/9/2022 5:39:46 PM	9/4/2022 3:36:21 PM
DHS - Site for Composting Facility - Subsurface	3/9/2022 5:39:46 PM	9/4/2022 3:36:21 PM
DHS - Site for Composting Facility - Surface	3/12/2019 6:47:48 PM	9/4/2022 3:36:21 PM
DHS - Suitability for Clay Liner Material	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
DHS - Suitability for Composting Medium and Final Cover	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Construction Materials; Gravel Source	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Construction Materials; Reclamation	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Construction Materials; Roadfill	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Construction Materials; Sand Source	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Construction Materials; Topsoil	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Daily Cover for Landfill	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Deep Infiltration Systems	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Dwellings W/O Basements	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Dwellings With Basements	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Ground-based Solar Arrays, Ballast Anchor Systems	5/25/2021 3:00:37 PM	9/4/2022 3:36:21 PM
ENG - Ground-based Solar Arrays, Soil-based Anchor Systems	5/25/2021 3:00:37 PM	9/4/2022 3:36:21 PM
ENG - Lawn, Landscape, Golf Fairway	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Lined Retention Systems	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Local Roads and Streets	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Sanitary Landfill (Area)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Sanitary Landfill (Trench)	3/9/2022 5:39:46 PM	9/4/2022 3:36:21 PM
ENG - Septic Tank Absorption Fields	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Sewage Lagoons	6/4/2020 7:33:15 PM	9/4/2022 3:36:21 PM
ENG - Shallow Excavations	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Shallow Infiltration Systems	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Small Commercial Buildings	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Unlined Retention Systems	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
ENG - Unpaved Local Roads and Streets	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
Farm and Garden Composting Facility - Surface	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM

Interpretation name	Design date	Generation date
FOR (USFS) - Road Construction/ Maintenance (Natural Surface)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
FOR - Black Walnut Suitability (WI)	8/12/2022 9:27:03 PM	9/4/2022 3:36:21 PM
FOR - Construction Limitations for Haul Roads/Log Landings	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
FOR - Drought Vulnerable Soils	6/1/2021 6:17:25 PM	9/4/2022 3:36:21 PM
FOR - Hand Planting Suitability	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
FOR - Harvest Equipment Operability	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
FOR - Log Landing Suitability	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
FOR - Mechanical Planting Suitability	6/26/2019 4:43:44 PM	9/4/2022 3:36:21 PM
FOR - Mechanical Site Preparation (Deep)	3/12/2018 4:57:59 PM	9/4/2022 3:36:21 PM
FOR - Mechanical Site Preparation (Surface)	3/20/2019 10:04:52 PM	9/4/2022 3:36:21 PM
FOR - Potential Erosion Hazard (Off- Road/Off-Trail)	3/22/2019 7:31:08 PM	9/4/2022 3:36:21 PM
FOR - Potential Erosion Hazard (Road/ Trail)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
FOR - Potential Fire Damage Hazard	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
FOR - Potential Seedling Mortality	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
FOR - Road Suitability (Natural Surface)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
FOR - Soil Rutting Hazard	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
FOR - Windthrow Hazard	3/20/2019 10:04:52 PM	9/4/2022 3:36:21 PM
FOR-Biomass Harvest (WI)	8/12/2009 1:42:04 PM	9/4/2022 3:36:21 PM
Fragile Soil Index	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
GRL - Fencing, Post Depth =<24 inches	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
GRL - Fencing, Post Depth =<36 inches	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
Ground Penetrating Radar Penetration	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Bivouac Areas (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Excavations Crew-Served Weapon Fighting Position (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Excavations for Individual Fighting Position (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Excavations for Vehicle Fighting Position (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Helicopter Landing Zones (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 1 1-pass wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 1 50-passes wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 1 dry season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 2 1-pass wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM

Interpretation name	Design date	Generation date
MIL - Trafficability Veh. Type 2 50-passes wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 2 dry season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 3 1-pass wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 3 50-passes wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 3 dry season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 4 1-pass wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 4 50-passes wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 4 dry season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 5 1-pass wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 5 50-passes wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 5 dry season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 6 1-pass wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 6 50-passes wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 6 dry season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 7 1-pass wet season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 7 50-passes wet season (DOD)	2/9/2016 4:02:12 PM	9/4/2022 3:36:21 PM
MIL - Trafficability Veh. Type 7 dry season (DOD)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
NCCPI - National Commodity Crop Productivity Index (Ver 3.0)	10/22/2021 8:23:00 PM	9/4/2022 3:36:21 PM
SOH - Agricultural Organic Soil Subsidence	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
SOH - Concentration of Salts- Soil Surface	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
SOH - Dynamic Soil Properties Response to Biochar	9/13/2021 4:08:53 PM	9/4/2022 3:36:21 PM
SOH - Limitations for Aerobic Soil Organisms	5/24/2021 8:07:32 PM	9/4/2022 3:36:21 PM
SOH - Organic Matter Depletion	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
SOH - Soil Surface Sealing	8/28/2018 8:03:43 PM	9/4/2022 3:36:21 PM
SOH - Soil Susceptibility to Compaction	2/15/2019 5:39:53 PM	9/4/2022 3:36:21 PM

Interpretation name	Design date	Generation date
URB/REC - Camp Areas	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
URB/REC - Off-Road Motorcycle Trails	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
URB/REC - Paths and Trails	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
URB/REC - Picnic Areas	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
URB/REC - Playgrounds	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WLF-Soil Suitability - Karner Blue Butterfly (WI)	1/29/2018 7:19:05 PM	9/4/2022 3:36:21 PM
WMS - Embankments, Dikes, and Levees	3/12/2019 6:47:48 PM	9/4/2022 3:36:21 PM
WMS - Excavated Ponds (Aquifer-fed)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Irrigation, General	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Irrigation, Micro (above ground)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Irrigation, Micro (subsurface drip)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Irrigation, Sprinkler (close spaced outlet drops)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Irrigation, Sprinkler (general)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Irrigation, Surface (graded)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Irrigation, Surface (level)	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Pond Reservoir Area	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Subsurface Water Management, Outflow Quality	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Subsurface Water Management, System Installation	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Subsurface Water Management, System Performance	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM
WMS - Surface Water Management, System	7/19/2018 7:46:25 PM	9/4/2022 3:36:21 PM

Data Source Information

Soil Survey Area: Washington County, Wisconsin

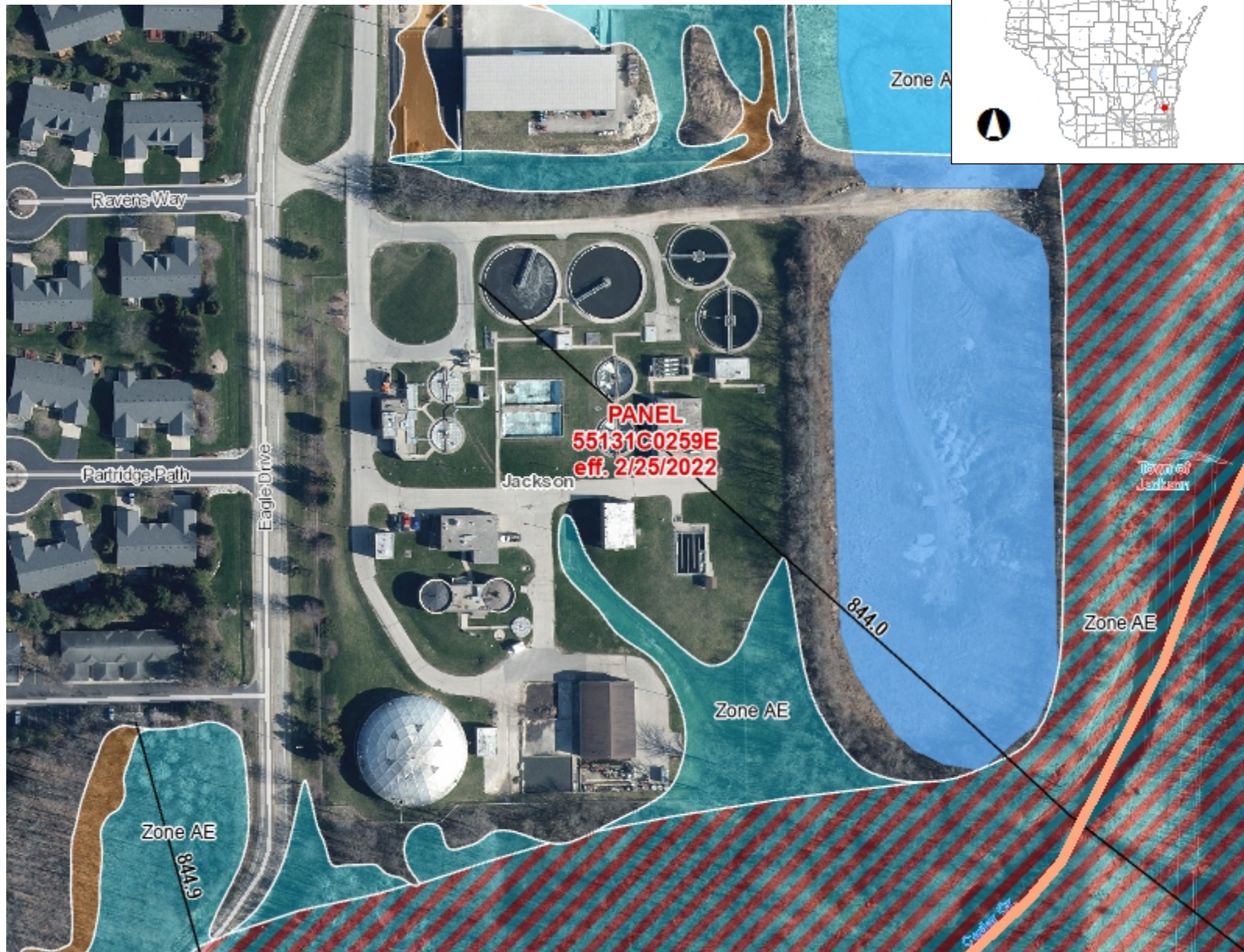
Survey Area Data: Version 22, Sep 6, 2022

Appendix D

Water Resource Information



Surface Water Data Viewer Map Floodplain Map - WWTF



Legend

2D Water Surface Elevation
Grid

High : 937.629

Low : 853.184

Dams

Dams with FERC License

Dams

Record Flood Levels

Analysis Lines

Other

Flood Insurance Study

Letter of Map Revision

Case By Case Analysis

Bridge

Analysis Points

Other

Flood Insurance Study

Letter of Map Revision

Case By Case Analysis

Bridge

Analysis Catchments

Floodplain Storage

Cross Sections

Floodplains

Flood Fringe

Floodway

FERC Project Area
Boundaries

DOT Bridges

FIRM Panels

Cross-Sections

Flood Hazard Boundaries

Limit Lines

SFHA / Flood Zone Boundary

0.1 0 0.03 0.1 Miles

NAD_1983_HARN_Wisconsin_TM

1: 1,980

DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

Notes



Jackson WWTP



Legend

- Wetland Class Areas
- Wetland Class Points
 - Dammed pond
 - Excavated pond
 - Filled/draind wetland
 - Wetland too small to delineate
 - Filled excavated pond
- Filled Points
- Wetland Class Areas
- Filled Areas
- Wetland Class Areas
- Wetland Class Points
 - Dammed pond
 - Excavated pond
 - Filled/draind wetland
 - Wetland too small to delineate
 - Filled excavated pond
- Filled Points
- Wetland Class Areas
- Filled Areas
- Wetland Identifications and Confirmations
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water
- Index to EN_Image_Basemap_Leaf Off

0.1 0 0.06 0.1 Miles

1: 3,960

NAD_1983_HARN_Wisconsin_TM

DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

Notes

PRESTO-Lite Watershed Delineation Report

Reach ID: 200035856

Watershed Name: Jackson Marsh State Wildlife Area-Cedar Creek

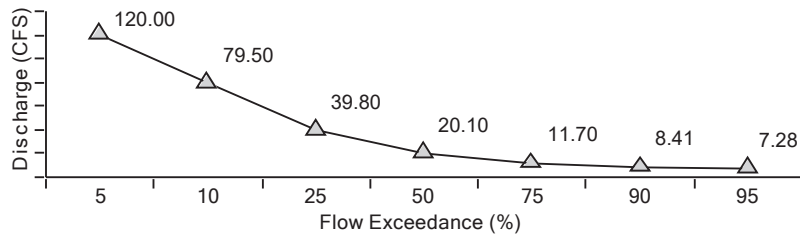
Waterbody Name: Cedar Creek

HUC08: Milwaukee

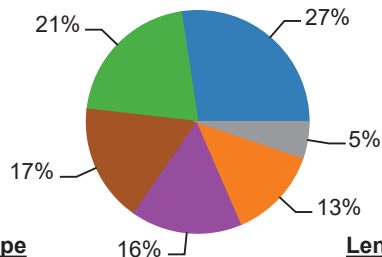
Watershed Area: 53.11 mi²

Average Annual Precipitation: 32.72in

Stream Flow

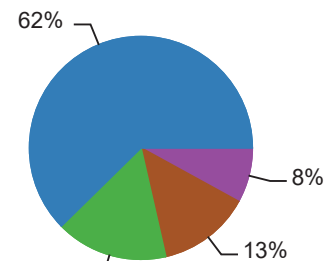


Tributary Stream Type



Type	Length
Cool-Cold Headwater	28068 ft
Macroinvertebrates	21272 ft
Cold Headwater	17543 ft
Coldwater	16560 ft
Warm Mainstem	13628 ft
Warm Headwater	5293 ft
Cool-Cold Mainstem	0 ft
Cold Mainstem	0 ft
Large River	0 ft

Landcover



Type	Area
Agriculture	31.13 mi ²
Urban	8.1 mi ²
Forest	6.72 mi ²
Wetland	3.99 mi ²
Barren	0.7 mi ²
Grassland	0.29 mi ²

PRESTO Phosphorus Load Estimate

Avg. Annual Nonpoint Phosphorous Load (80% Confidence Interval)	12,749 (5,480 - 29,662) lbs
Number of Facilities (Individual Facility Information below)	1
Avg. Annual Point-source Phosphorous Load (2010 - 2012 total of all facilities)	2,349lbs
Most Likely Point : Nonpoint Phosphorous Ratio	16% : 84%
Low Estimate Point : Nonpoint Phosphorous Ratio (Adaptive Management)	7% : 93%

Adaptive Management Results

Facilities Discharging to the Jackson Marsh State Wildlife Area-Cedar Creek Watershed:

Facility Name	Permit #	Outfall #	Waste Type	Receiving Water	Avg. Phosphorus Load (lbs.) (2010 - 2012)
JACKSON (VILLAGE) WASTEWATER TREATMENT PLANT	0021806	001	Municipal	Cedar Creek	2349

Watershed Analysis Limitations

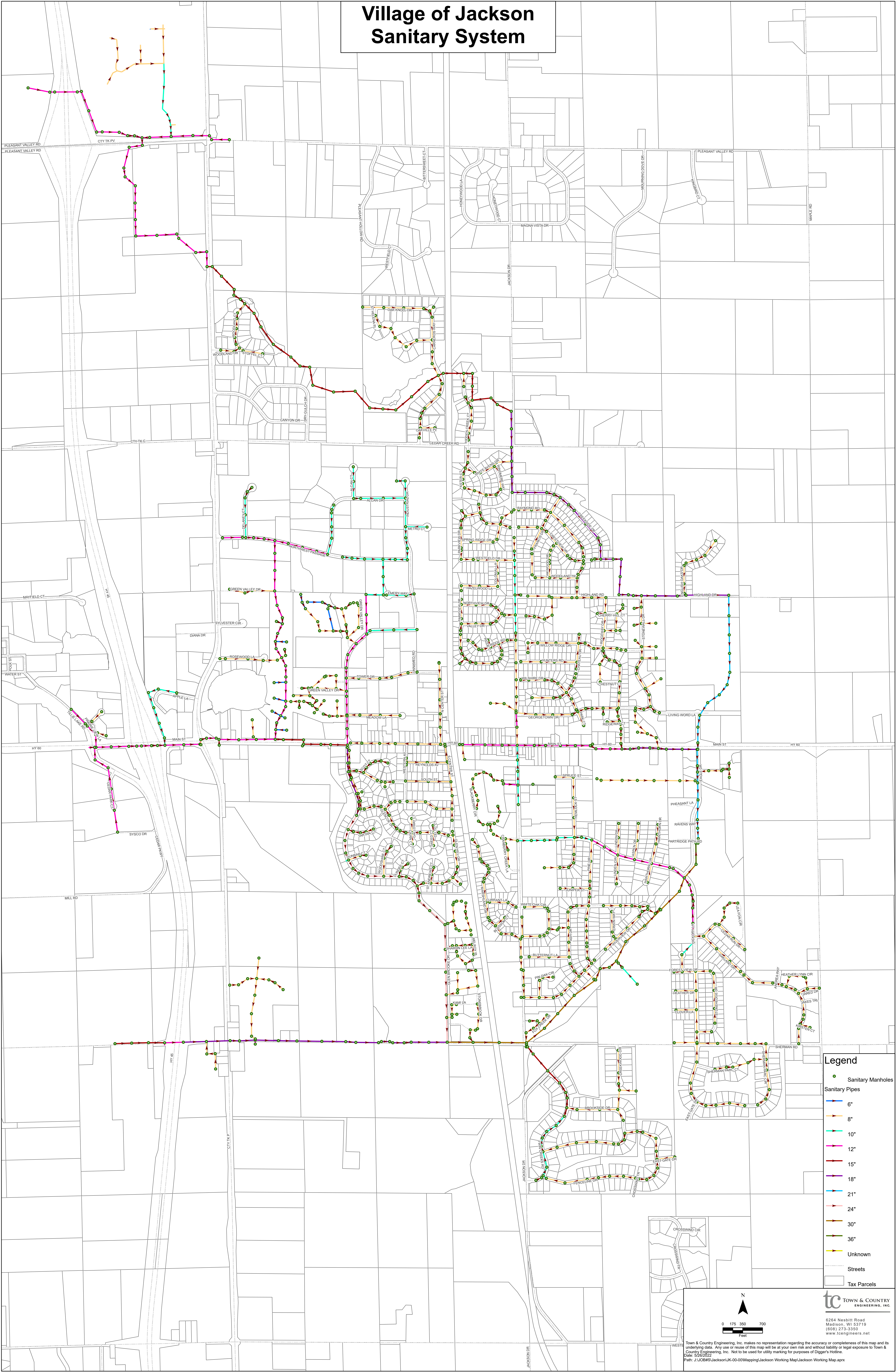
- This analysis relies on pre-defined catchments from the Wisconsin Hydrography Data-Plus and may not delineate from the exact location required. When assessing phosphorus loads for specific facility in support of efforts such as adaptive management, care should be taken to ensure that additional downstream point sources do not exist. For adaptive management information related to specific facilities please reference the PRESTO website <http://dnr.wi.gov/topic/surfacewater/presto.html>
- Delineation of watersheds is based on a topographic assessment and therefore do not account for modified drainage networks such as stormwater sewer systems and ditched agriculture.
- If a watershed requires delineation from an exact location the user may use the desktop version of PRESTO that requires ESRI ArcGIS. The PRESTO tool and default datasets can be downloaded at <http://dnr.wi.gov/topic/surfacewater/presto.html>
- Data sources for this report originate from the WDNR's Wisconsin Hydrography Data-Plus value-added dataset and the point and non-point source loading information including in the WDNR's PRESTO model.
- If you have questions about the report generated from the PRESTO-Lite application please contact:
DNRWATERQUALITYMODELING@wisconsin.gov

Sample Point ID	Permit No.	Facility Name	Receiving Water	Major Basin	Watershed Area	Nonpoint Load *	2009-2011 Avg. Upstream Point Source Load	2009-2011 Avg. Point Source Load	Total Load *	Point : Nonpoint Source Ratio *	Nonpoint Source Dominated?	Model Flag
					(mi ²)	(lbs)	(lbs)	(lbs)	(lbs)	(%)		**
50335	35866	SCHOOL DISTRICT OF SUPERIOR	Unnamed	Lake Superior	0.1	35	0	1	36	3:97	Yes	
49017	25593	SUPERIOR SEWAGE DISPOSAL SYSTEM	Lake Superior	Lake Superior				5205			No Result	
49859	30431	SUPERIOR VILLAGE OF	Pokegama River	Lake Superior	26.1	1737	0	361	2098	17:83	Yes	EC
48432	22675	WASHBURN CITY OF	Lake Superior	Lake Superior				1582			No Result	
50123	31747	WHITECAP MOUNTAINS SANITARY DISTRICT	Alder Creek	Lake Superior	19.2	6325	11	15	6351	0:100	Yes	
47452	4171	WI DNR BRULE RIVER STATE FISH HATCHERY	Little Bois Brule River	Lake Superior	28.8	365	0	369	734	50:50	Speak with WDNR Basin Engineer	
47448	4162	WI DNR LES VOIGT STATE FISH HATCHERY	Pikes Creek	Lake Superior	30.8	8253	0	276	8529	3:97	Yes	
46496	761	BRILLION IRON WORKS	Spring Creek	Manitowoc	6.5	2017	0	268	2285	12:88	Yes	
47663	20443	BRILLION WASTEWATER TREATMENT FACILITY	Unnamed	Manitowoc	6.8	3118	0	529	3647	15:85	Yes	
48489	22799	CHILTON WASTEWATER TREATMENT FACILITY	South Branch Manitowoc River	Manitowoc	74.6	16799	976	1093	18868	11:89	Yes	
50357	36030	CLARKS MILLS SANITARY DISTRICT	Manitowoc River	Manitowoc	392.2	175330	5303	45	180678	3:97	Yes	
49956	30848	CLEVELAND WASTEWATER TREATMENT FACILITY	Lake Michigan	Manitowoc				1052			No Result	
49336	27618	FOREMOST FARMS USA CHILTON	Unnamed	Manitowoc	1.3	16	0	976	992	98:2	Speak with WDNR Basin Engineer	
48016	21270	HILBERT WASTEWATER TREATMENT FACILITY	Unnamed	Manitowoc	3.4	943	0	233	1176	20:80	Yes	
49412	28142	HOLY FAMILY CONVENT WASTEWATER TREATMENT FAC	Silver Lake	Manitowoc	18.9	10786	0	14	10800	0:100	Yes	
46500	795	KOHLER COMPANY GENERATOR	Unnamed	Manitowoc	1.0	572	0	193	765	25:75	Yes	
57841	41475	LAKESIDE FOODS INC MANITOWOC PLANT	Manitowoc River	Manitowoc	526.4	323147	6437	0	329584	2:98	Yes	
51145	49573	LEMBERGER LANDFILL SUPERFUND SITE	Branch River	Manitowoc	79.7	101978	1089	0	103067	1:99	Yes	
48836	24601	MANITOWOC WASTEWATER TREATMENT FACILITY	Lake Michigan	Manitowoc				10640			No Result	
50414	36773	MORRISON SANITARY DISTRICT NO 1	Unnamed	Manitowoc	0.8	1275	0	561	1836	31:69	Yes	
47854	20893	NEW HOLSTEIN WASTEWATER TREATMENT FACILITY	Jordan Creek	Manitowoc	3.4	567	0	547	1114	49:51	Yes	
51120	49239	PARKER HANNIFIN CORPORATION PARFLEX DIV	Unnamed	Manitowoc	0.1	19	0	0	19	0:100	Yes	
49580	29025	POTTER WASTEWATER TREATMENT FACILITY	Unnamed	Manitowoc	1.8	174	0	69	243	28:72	Yes	
48036	21342	REEDSVILLE WASTEWATER TREATMENT FACILITY	Mud Creek	Manitowoc	26.8	19378	0	516	19894	3:97	Yes	
48495	22802	ROCKLAND SD1 WASTEWATER TREATMENT FACILITY	Mud Creek	Manitowoc	53.1	34021	516	60	34597	2:98	Yes	
48317	22195	ST NAZIANZ WASTEWATER TREATMENT FACILITY	Unnamed	Manitowoc	2.1	342	0	373	715	52:48	Speak with WDNR Basin Engineer	
48201	21831	VALDERS WASTEWATER TREATMENT FACILITY	Unnamed	Manitowoc	4.4	3318	0	639	3957	16:84	Yes	
48264	22047	WHITELAW WASTEWATER TREATMENT FACILITY	Unnamed	Manitowoc	0.6	150	0	528	678	78:22	Speak with WDNR Basin Engineer	
50246	33529	BADGER METER INC	Beaver Creek	Milwaukee River				151			No Result	
49159	26514	BRIGGS STRATTON CORP WAUWATOSA	Menomonee River	Milwaukee River				106			No Result	
47820	20818	CAMPBELLSPORT WASTEWATER TREATMENT FACILITY	Milwaukee River	Milwaukee River	53.9	14244	0	1232	15476	8:92	Yes	
50050	31372	CASCADE WASTEWATER TREATMENT FACILITY	North Branch Milwaukee River	Milwaukee River	9.1	927	0	658	1585	42:58	Yes	
47565	20222	CEDARBURG WASTEWATER TREATMENT FACILITY	Cedar Creek	Milwaukee River	125.2	27216	2676	2733	32625	17:83	Yes	
68524	62723	DRS POWER & CONTROL TECHNOLOGIES, INC.	Lincoln Creek	Milwaukee River				155			No Result	
47817	20800	FREDONIA MUNICIPAL SEWER AND WATER UTILITY	Milwaukee River	Milwaukee River	430.3	78652	13038	261	91951	14:86	Yes	
47548	20184	GRAFTON VILLAGE WATER & WASTEWATER UTILITY	Milwaukee River	Milwaukee River	470.7	87854	14852	2988	105694	17:83	Yes	
48198	21806	JACKSON (VILLAGE) WASTEWATER TREATMENT PLANT	Cedar Creek	Milwaukee River	53.6	14078	0	2494	16572	15:85	Yes	
48167	21733	KEWASKUM VILLAGE	Milwaukee River	Milwaukee River	147.2	33880	1232	625	35737	5:95	Yes	
51118	49204	KRIER FOODS INC RANDOM LAKE	Silver Creek	Milwaukee River	9.6	751	0	7	758	1:99	Yes	
85517	728	LADISH FORGING, LLC	Unnamed	Milwaukee River				419			No Result	
64507	62260	MAYFAIR MALL	Menomonee River	Milwaukee River				27			No Result	
44743	272	MAYNARD STEEL CASTING CO	Kinnickinnic River	Milwaukee River	17.7	1736	419	1	2156	19:81	Yes	
46755	1236	MILK SPECIALTIES CO INC - ADELL FACILITY	Unnamed	Milwaukee River	2.8	150	0	1350	1500	90:10	Speak with WDNR Basin Engineer	
46481	744	MILLERCOORS LLC	Menomonee River	Milwaukee River				1021			No Result	
50427	36820	MILWAUKEE METRO SEW DIST COMBINED	Lake Michigan	Milwaukee River				222431			No Result	
48913	24911	NEWBURG VILLAGE	Milwaukee River	Milwaukee River	263.2	50785	9586	630	61001	17:83	Yes	
48976	25321	P & H MINING EQUIPMENT	Menomonee River	Milwaukee River				297			No Result	
50652	41351	PENTAIR RESIDENTIAL FILTRATION, LLC	Milwaukee River	Milwaukee River				9			No Result	
48067	21415	RANDOM LAKE VILLAGE	Silver Creek	Milwaukee River	10.1	833	7	521	1361	39:61	Yes	
48112	21555	SAUKVILLE VILLAGE SEWER UTILITY	Milwaukee River	Milwaukee River	454.8	84461	13299	1553	99313	15:85	Yes	
49199	26751	SCHREIBER FOODS INC - WEST BEND	Cedar Creek	Milwaukee River	85.0	22630	2494	182	25306	11:89	Yes	
51137	49514	WASTE MANAGEMENT OMEGA HILLS LANDFILL	Menomonee River	Milwaukee River	34.5	8481	0	3	8484	0:100	Yes	
46631	931	WE - VALLEY POWER PLANT	Menomonee River	Milwaukee River				18623			No Result	
49051	25763	WEST BEND CITY	Milwaukee River	Milwaukee River	245.7	46496	1857	7729	56082	17:83	Yes	
49135	26255	WI DNR KETTLE MORAIN SPRINGS FISH HATCHERY	Unnamed	Milwaukee River	0.3	32	0	286	318	90:10	Speak with WDNR Basin Engineer	
50701	42218	WISCONSIN THERMOSET MOLDING INC	Milwaukee River	Milwaukee River				2			No Result	
49391	28053	ALLENTON SANITARY DISTRICT WWTP	East Branch rock River	Rock River	28.3	11835	0	317	12152	3:97	Yes	
48098	21512	ARLINGTON WASTEWATER TREATMENT FACILITY	Goose Lake	Rock River	0.2	140	0	1089	1229	89:11	Speak with WDNR Basin Engineer	EC
50054	31381	ASHIPPUN SANITARY DISTRICT WWTF	Rock River	Rock River	691.8	218662	23529	1654	243845	10:90	Yes	
48603	23345	BEAVER DAM WASTEWATER TREATMENT FACILITY	Beaver Dam River	Rock River	157.0	21371	2376	7561	31308	32:68	Yes	0
49228	26930	BELOIT TOWN WASTEWATER TREATMENT FACILITY	Rock River	Rock River	3441.3	809981	169428	1304	980713	17:83	Yes	
48619	23370	BELOIT WASTEWATER TREATMENT FACILITY	Rock River	Rock River	3467.0	817572	170732	8117	996421	18:82	Yes	
48640	23442	BRANDON WASTEWATER TREATMENT FACILITY	Unnamed	Rock River	0.0	14	0	1058	1072	99:1	Speak with WDNR Basin Engineer	
48129	21601	BROWNSVILLE WASTEWATER TREATMENT FACILITY	Kummel Creek	Rock River	11.4	2049	612	881	3542	42:58	Yes	
50089	31551	BURNETT SANITARY DISTRICT #1 WWTF	Spring Brook	Rock River	205.7	30411	8994	317	39722	23:77	Yes	
49231	26948	CAMBRIDGE OAKLAND WASTEWATER COMMISSION	Koshkonong Creek	Rock River	120.2	40814	8245	1430	50489	19:81	Yes	
48259	22039	CLINTON WASTEWATER TREATMENT FACILITY	Unnamed	Rock River	0.5	92	0	477	569	84:16	Speak with WDNR Basin Engineer	
47775	20702	CLYMAN WASTEWATER TREATMENT FACILITY	Unnamed	Rock River	0.9	153	0	216	369	58:42	Speak with WDNR Basin Engineer	
47909	21008	COLUMBUS WASTEWATER TREATMENT FACILITY	Crawfish River	Rock River	165.5	32425	324	1282	34031	5:95	Yes	
47932	21059	CONSOLIDATED KOSHONONG SANITARY DIST WWTF	Rock River	Rock River	2564.2	662703	84384	3632	750719	12:88	Yes	
48694	23744	DEERFIELD WASTEWATER TREATMENT FACILITY	Unnamed	Rock River	0.6	9	0	299	308	97:3	Speak with WDNR Basin Engineer	
50175	32026	DELAFIELD HARTLAND POLLUTION CONTROL COMM	Bark River	Rock River	59.5	4444	0	4684	9128	51:49	Speak with WDNR Basin Engineer	
48040	21351	DOUSMAN WASTEWATER TREATMENT FACILITY	Bark River	Rock River	62.1	4713	4684	462	9859	52:48	Speak with WDNR Basin Engineer	
47616	20346	EDGERTON WASTEWATER TREATMENT FACILITY	Rock River	Rock River	2635.5	669175	89626	563	759364	12:88	Yes	
48751	23973	FALL RIVER WASTEWATER TREATMENT FACILITY	Crawfish River	Rock River	135.7	23467	110	214	23791	1:99	Yes	
50354	36021	FONTANA WALWORTH WATER POLLUTION CONT. COMM	Piscasaw Creek	Rock River	10.8	1113	0	2804	3917	72:28	Speak with WDNR Basin Engineer	
48761	24023	FOOTVILLE WASTEWATER TREATMENT FACILITY	Bass Creek	Rock River	13.9	11250	0	1835	13085	14:86	Yes	
48411	22489	FORT ATKINSON WASTEWATER TREATMENT FACILITY	Rock River	Rock River	2268.6	607538	70165	4406	682109	11:89	Yes	
51155	50016	GRANDE CHEESE CO BROWNSVILLE	Kummel Creek	Rock River	11.4	2049	881	612	3542	42:58	Yes	

Appendix E

Existing Collection System Information

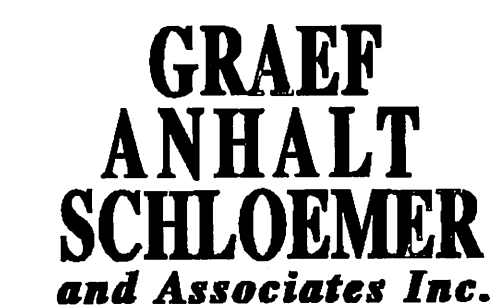
Village of Jackson Sanitary System



- Legend**
- Sanitary Manholes
 - Sanitary Pipes
 - 6"
 - 8"
 - 10"
 - 12"
 - 15"
 - 18"
 - 21"
 - 24"
 - 30"
 - 36"
 - Unknown
 - Streets
 - Tax Parcels

Appendix F

Existing WWTF Information



Other Offices Located In:

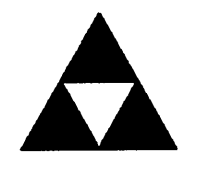
- Green Bay, Wisconsin
- Madison, Wisconsin
- Chicago, Illinois

VILLAGE OF JACKSON
WASTEWATER TREATMENT
FACILITY EXPANSION
PHASE 2

SITE GRADING AND EROSION
CONTROL - NORTH

SHEET NUMBER

P-5



**GRAEF
ANHALT
SCHLOEMER**
and Associates Inc.

345 North 95th Street
Milwaukee, Wisconsin 53226
414 259-1500
FAX 259-0037

Other Offices Located In:

Green Bay, Wisconsin
Madison, Wisconsin
Chicago, Illinois

PROJECT NAME:

VILLAGE OF JACKSON
WASTEWATER TREATMENT
FACILITY EXPANSION
PHASE 2

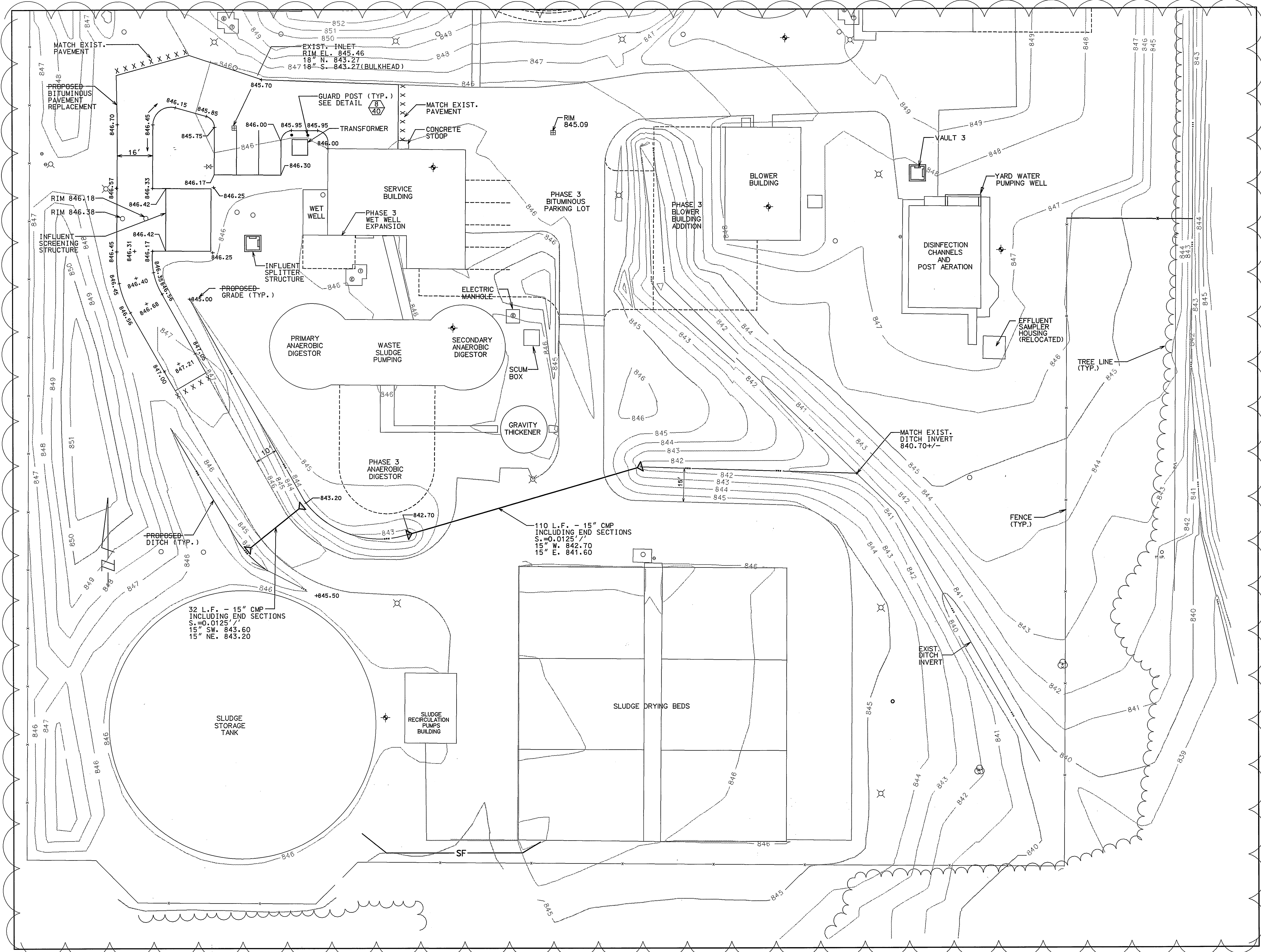
SHEET TITLE:

SITE GRADING AND EROSION
CONTROL - SOUTH

8-31-01		RECORD SET	JMB
NO.	DATE	REVISIONS	BY
PROJECT NUMBER:		965703.03	
DATE:		2-19-98	
DESIGNED BY:		JMB	
DRAWN BY:		WTS	
CHECKED BY:		JMB	
PROJECT MANAGER:		DANIEL H. GOETSCH, PE	
FILE NAME:		965703.03\PHASE2\PLANSET\VP-6.DGN	
SCALE:		1"=20'	

SHEET NUMBER

P-6



Village of Jackson
WWTF Capacity Evaluation

Primary Clarifiers

Number of tanks		2
Diameter	ft	32
SWD	ft	8
Surface Area per Clarifier	sf	804
Weir Diameter	ft	28.5
Estimated Weir Length per Clarifier	ft	90
Total Surface Area	sf	1,608
Total Weir Length	ft	179

Design Average Surface Overflow Rate	gpd/sf	1,000
Total Design Average Flow	MGD	1.608
Peak Hour Surface Overflow Rate	gpd/sf	2,000
Total Peak Hour Flow	MGD	3.217

Influent Pumping

Wetwell pumps

Number of Pumps		3
Pump Rated Capacity	gpm	2,200
Pump Horsepower	hp	
Firm Capacity	gpm	4,400
	MGD	6.340

Mechanical Screening

Design Flow	MGD	6.250
-------------	-----	-------

Grit Removal

Grit Chamber

Chamber Diameter	ft	10
Design Flow	MGD	1.580
Maximum Flow	MGD	7.000

Grease/Scum Tank

Length	ft	15.830
Width	ft	10.000
Depth	ft	7.250
Volume	cf	1,148
	gal	8,585

Tertiary Filters

Number of Filters		2
Number of disks per drum		9
Total Filter Area (sf)		
Max Hydraulic Loading Rate	gpm/sq ft	

Notes:

Recommend 10' minimum side-water depth per 10 States Standards
 Design Average Flow up to 1,000 gpd/sq. ft
 Peak hourly flow up to 1,500 - 2,000 gpd/sq. ft

NR 110.16 Approach velocities may be no less than 38 centimeters per second (1.25 feet per second) at average design flow conditions to prevent settling, and no greater than 91 centimeters per second (3 feet per second) at maximum daily flow to prevent forcing material through the openings.

Master Plan has this capacity labeled as "Grit Removal" so I don't know if it's the basin

submittal stated that only 8 discs per drum were installed

Disinfection

Chlorine Feed Equip

Chlorine gas cylinders		4	
Size of cylinders	lbs	150	

Dechlorination Feed Equip

Sodium bisulfate storage tanks		2	1
Volume per tank	gal	500	125
Total Volume	gal	1,125	
Chemical Metering pumps		2	

Chlorine Contact Tanks

Length	ft	46	
Width	ft	26.0	
SWD	ft	6.0	
Volume	cf	7,176	
	gallons	53,676	

Master Plan reports it as 54,000 gallons, I assume from the interior walls
Master Plan Estimated Capacity >1.30 MGD

Aeration Basins

No. of Basins in Use (Basins 1&2)		2	
Dimensions Each Basin (Basins 1&2)			
Diameter	ft	80.0	
SWD	ft	14.0	
Aeration Volume per Basin	gallons	526,380	
	kcf	70.4	

Total Aeration Volume	gal	1,052,760	
Total Aeration Volume	cf	140,743	

Master Plan calls this out as 1.24 MGD, they use total depth rather than SWD

Design BOD Loading Rate	lbs/kcf	19	30
BOD Loading Capacity/per Aeration Basin	lbs/d	1,302	2,111
Total Aeration Basin BOD Loading Capacity	lbs/d	2,604	4,222

NR 110 Maximum = 40 lbs/kcf

Assumed BOD Reduction in Headworks	%	0%	0%
Plant BOD Loading Capacity	lbs/d	2,604	4,222

Blowers

Number of Blowers		3	
Blower Rated Capacity	cfm	1,950	
Blower Horsepower	hp	40	
Firm Capacity	cfm	3,900	

Master Plan uses Firm Capacity as only 1 blower in service, third blower is a standby blower

Loadings to Aeration Basins2	Min	Design/Sust.	Peak
BOD (lbs/day)			
TKN (lbs/day)			
Design Air Temperature (deg F)			
Design water Temperature (deg C)			
Actual Oxygen Required (lbs/day)			
Required Air Flow (scfm)			
Required Air Flow (acfm)			
Estimated Discharge Pressure (psi)			
Number of Blowers Operational			

0.8 lb oxygen/lb BOD

4.6 lb oxygen/lb BOD

RAS pumps - Archimedes Screw Pumps

Number of Pumps		4
Pump Rated Capacity	gpm	1,325
Pump Horsepower	hp	
Firm Capacity	gpm	3,975
	MGD	5.728

Gravity WAS Thickening

Diameter	ft	20
SWD	ft	10
Surface Area	sq ft	314
Volume	cf	3,142
	gal	23,499

WAS pumps - Diaphragm

Number of Pumps		4
Pump Rated Capacity	gpm	
Pump Horsepower	hp	
Firm Capacity	gpm	0
	MGD	0.000

Secondary Clarifiers

65' dia Final Clarifiers

No. of Clarifiers		2
Diameter	ft	65.0
SWD	ft	13.0
Surface Area per Clarifier	sf	3,318
Weir Diameter	ft	61
Estimated Weir Length per Clarifier	ft	192
Total Surface Area	sf	6,637
Total Weir Length	ft	383

Min 12 feet recommended - Ten States for clarifiers after activated sludge

Design Average Surface Overflow Rate	gpd/sf	400	400	## Typical Design 200-300 gpd/sf, 400-500 gpd/sf acceptable
Total Design Average Flow	MGD	2.655	2.655	2
Peak Hour Surface Overflow Rate	gpd/sf	1,200	1,200	0 NR 110 Maximum = 1,200 gpd/sf based on influent flow
Total Peak Hour Flow	MGD	7.964	7.964	0 Ten States - reduce to 1,000 if 20 mg/L effluent TSS required
Desired MLSS	mg/L	2,500	2,350	
Average Solids Loading Rate	lbs/sf/h	0.70	0.70	NR 110 Maximum = 1.4 including Max RAS rate (assumed 100%)
Peak Solids Loading Rate	lbs/sf/h	2.09	1.96	NR 110 Maximum = 2.0 including Max RAS rate (assumed 100%)
				40 lb/d/sf per Ten States
Average Weir Overflow Rate	gpd/f	6,926	6,926	NR 110 Maximum = 10,000 gpd/f
Peak Weir Overflow Rate	gpd/f	20,779	20,779	Ten States - 30,000 gpf/ft for greater than 1 MGD Plant

Secondary Clarifiers

40' dia Final Clarifiers

No. of Clarifiers Operational		2
Diameter	ft	40.0
SWD	ft	8.0
Surface Area per Clarifier	sf	1,257
Weir Diameter	ft	36
Estimated Weir Length per Clarifier	ft	113
Total Surface Area	sf	2,513
Total Weir Length	ft	226

Min 12 feet recommended - Ten States for clarifiers after activated sludge

Design Average Surface Overflow Rate	gpd/sf		400	## Typical Design 200-300 gpd/sf, 400-500 gpd/sf acceptable
Total Design Average Flow	MGD	0.000	1.005	2
Peak Hour Surface Overflow Rate	gpd/sf		1,200	0 NR 110 Maximum = 1,200 gpd/sf based on influent flow
Total Peak Hour Flow	MGD	0.000	3.016	0 Ten States - reduce to 1,000 if 20 mg/L effluent TSS required
Desired MLSS	mg/L		2,350	
Average Solids Loading Rate	lbs/sf/h	0.00	0.00	NR 110 Maximum = 1.4 including Max RAS rate (assumed 100%)
Peak Solids Loading Rate	lbs/sf/h	0.00	1.96	NR 110 Maximum = 2.0 including Max RAS rate (assumed 100%)
				40 lb/d/sf per Ten States
Average Weir Overflow Rate	gpd/f	0	4,444	NR 110 Maximum = 10,000 gpd/f
Peak Weir Overflow Rate	gpd/f	0	13,333	Ten States - 30,000 gpf/ft for greater than 1 MGD Plant
Anaerobic Digesters				
Number of tanks		2		
Diameter	ft	35		
SWD	ft	24		
Total Volume	cf	45,540		
	gal	340,639		
No. of Recirculation Pumps		3		
Pump Rated Capacity	gpm	150		
Pump Horsepower	hp			
Firm Capacity	gpm	300		
	MGD	0.43		
Sludge Storage				
Sludge Storage				
Diameter	ft	120		
Depth	ft	19		
Volume	cf	214,885		
	gallons	1,607,339		Max Daily Sludge Flow
Storage Duration	days	180		Detention time
Sludge Feed able to be stored	cf/day	1194		NR 204 Minimum = 180 days at design flows

		max month				
	Units					REMARKS
GENERAL DATA						
		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
RAS, % of Influent Flow	%	150%	100%	NA	NA	
RAS Flow	mgd	2.249	2.619	2.619	2.619	Max. RAS = 100% of design influent
	cfs	3.48	4.05	4.05	4.05	
	gpm	1,561	1,819	1,819	1,819	
Internal Mixed Liquor Recycle		150%	100%	100%	100%	
	mgd	2.249	2.619	2.619	2.619	Max. IR = 100% of design influent
	cfs	3.48	4.05	4.05	4.05	
	gpm	1,561	1,819	1,819	1,819	
Receiving Stream Stage	ft MSL	840.00	840.00	840.00	840.00	1977 Plans had 100 year flood at 844.10 but normal level at 834
Outfall Invert	ft MSL	835.00	835.00	835.00	835.00	1977 Plans
Disinfection to Outfall						
Flow in Pipe	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Conduit Diameter	in	30	30.0	30.0	30.0	
Conduit Length	ft	520	520	520	520	Rough estimate - Final hydraulics should add manholes
Flow Area= $\pi \times (D/2)^2$	sq ft	4.91	4.91	4.91	4.91	
Velocity = Q/A	fps	0.47	0.83	1.71	2.49	
Hydraulic Radius, R = D/4	ft	0.6	0.6	0.6	0.6	
Hazen Williams C Value		110	110	110	110	This is a RCP Pipe
Pipe Losses, $hf=10.6*(Qmgd/C)^{1.852}*L/D^{4.87}$	ft	0.02	0.06	0.24	0.49	for pipe flowing full
Minor Losses = $KxV^2/2g$	ft	0.01	0.02	0.08	0.18	
# of fittings	k/ea.					
1. Entrance	1	0.50	0.5			
2. 45 deg Elbow	1	0.32	0.32			
3. Exit	1	1.00	1			
Subtotal	1.82					
Total Hydraulic Losses in this Segment	ft	0.03	0.08	0.32	0.66	
1 WSE in Flume Discharge	ft MSL	840.03	840.08	840.32	840.66	
Flume Channel Invert		842.26	842.26	842.26	842.26	1994 plans
Is Flume Restricted?		No	No	No	No	
Parshall Flume - Device loss						
Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Parshall Flume Throat	in	12	12.00	12.00	12.00	12" Flume, $H=(Qcfs/4)^{(1/1.522)}$ unsubmerged
Headloss	ft	0.70	1.01	1.63	2.09	9" Flume, $H=(Qcfs/3.07)^{0.6536}$ unsubmerged
2 WSE at Flume H_a	ft MSL	842.96	843.27	843.89	844.35	

		max month				
	Units					REMARKS
GENERAL DATA		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
UV Loss - Weir loss						
Flow in Tank	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Weir Crest El	ft	844.60	844.60	844.60	844.60	Minimum of 3" of free flow conditions
Weir Length	ft	85	85.0	85.0	85.0	Rich K - "In general we want to have no more than 1.5" over the weir at peak
Submerged Weir						
Weir Width	ft	2.23	2.23	2.23	2.23	
Weir Invert	ft	844.6	844.60	844.60	844.60	
Height of flow above weir crest (downstream)	ft	Not Subm.	Not Subm.	Not Subm.	Not Subm.	
Headloss in Weir	ft	-	-	-	-	see subweir AA w pumps
Unsubmerged Weir						
Headloss	ft	0.041	0.059	0.096	0.123	H=(Q/3.33L)^(2/3)
3 WSE at UV Discharge	ft MSL	844.64	844.66	844.70	844.72	Assumes negligible headloss through tank
UV Loss - Open Channel						
Flow in Channel	mgd	1.499	2.619	5.418	7.916	
	cfs	0.71	2.10	3.09	6.42	
	gpm	318	944	1,385	2,881	Turns in channel assumed negligible
Channel Elevation	ft	840.10	840.10	840.10	840.10	
Channel Width	ft	5.5	5.5	5.5	5.5	
Wetted Perimeter	ft	14.58	14.62	14.69	14.75	Based on WSE at UV
Area	ft ²	24.97	25.07	25.28	25.43	
Length	ft	220	220.00	220.00	220.00	
Hydraulic Radius	ft	1.71	1.72	1.72	1.72	
Manning's Roughness Coefficient (n)		0.01	0.01	0.01	0.01	
Channel losses; h _f = [Qn/(1.49AR ^{2/3})] ² *L	ft	0.00	0.00	0.00	0.00	
UV Loss - Device						
Total Hydraulic Losses in UV	ft	0.37	0.37	0.37	0.37	Assume 4.45 inches based on Trojan requirements (this is Max day head)
4 WSE in Common Effl. Channel	ft MSL	845.01	845.03	845.07	845.09	
Channel Wall Elevation		847.60	847.60	847.60	847.60	
Is Channel Flooded?		No	No	No	No	
Water depth/submergence		4.91	4.93	4.97	4.99	

		max month				
	Units					REMARKS
GENERAL DATA						
		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Vault 3 to UV Disinfection						
Flow in Pipe	mgd	1.499	2.619	5.418	7.916	
	cfs	2.3191	4.1	8.4	12.2	
	gpm	1,041	1,819	3,763	5,497	
Conduit Diameter	in	36	36.0	36.0	36.0	843.4 Invert Elevation at Vault 3 - Will need to establish any losses in th
Conduit Length	ft	15	15	15	15	Rough estimate
Flow Area= $\pi \times (D/2)^2$	sq ft	7.07	7.07	7.07	7.07	
Velocity = Q/A	fps	0.33	0.57	1.19	1.73	
Hydraulic Radius, R = D/4	ft	0.8	0.8	0.8	0.8	
Hazen Williams C Value		110	110	110	110	
Pipe Losses, hf=10.6*(Qmgd/C)^1.852*L/D^4.87)	ft	0.00	0.00	0.00	0.01	
Minor Losses = KxV^2/2g	ft	0.00	0.01	0.03	0.07	
# of fittings k/ea. Coefficient k						
1. Entrance	1	0.50	0.5			
2. 90 deg Elbow	0	0.00	0			
3. Exit	1	1.00	1			
Subtotal	1.5					
Total Hydraulic Losses in this Segment	ft	0.00	0.01	0.04	0.08	
5 WSE in Vault 3		845.01	845.04	845.10	845.17	
Vault 3 Rim Elevation Underwater?		No	No	No	No	top of wall = 848.53
Effluent Channel to Vault 3						
Number of pipes	#	2	2	2	2	Modeled as if we added a 2nd 24" pipe, so flow is split evenly.
Flow in Pipe	mgd	0.750	1.310	2.709	3.958	
	cfs	1.1596	2.0	4.2	6.1	
	gpm	520	909	1,881	2,749	
Conduit Diameter	in	24	24.0	24.0	24.0	843.4 Invert Elevation - This pipe goes under the building
Conduit Length	ft	85	85	85	85	Rough estimate
Flow Area= $\pi \times (D/2)^2$	sq ft	3.14	3.14	3.14	3.14	
Velocity = Q/A	fps	0.37	0.64	1.33	1.95	
Hydraulic Radius, R = D/4	ft	0.5	0.5	0.5	0.5	
Hazen Williams C Value		120	120	120	120	
Pipe Losses, hf=10.6*(Qmgd/C)^1.852*L/D^4.87)	ft	0.00	0.01	0.03	0.06	
Minor Losses = KxV^2/2g	ft	0.00	0.01	0.04	0.09	
# of fittings k/ea. Coefficient k						
1. Entrance	1	0.50	0.5			
2. 90 deg Elbow	0	0.00	0			
3. Exit	1	1.00	1			
Subtotal	1.5					
Total Hydraulic Losses in this Segment	ft	0.01	0.02	0.07	0.14	

max month						
	Units					REMARKS
GENERAL DATA		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
6 WSE In Effluent Channel		845.02	845.06	845.17	845.31	
Effl. Channel						
Flow in Channel	mgd	1.499	2.619	5.418	7.916	
	cfs	2.3191	4.1	8.4	12.2	
	gpm	1,041	1,819	3,763	5,497	
Channel Elevation	ft	843.42	843.42	843.42	843.42	
Channel Width	ft	2.5	2.5	2.5	2.5	
Wetted Perimeter	ft	5.70	5.77	6.00	6.29	
Area	ft ²	4.00	4.09	4.38	4.73	
Length	ft	8	8.00	8.00	8.00	
Hydraulic Radius	ft	0.70	0.71	0.73	0.75	
Manning's Roughness Coefficient (n)		0.01	0.01	0.01	0.01	
Channel losses; h _f = [Qn/(1.49AR ^{2/3})] ² *L	ft	0.00	0.00	0.00	0.01	
Total Hydraulic Losses in this Segment	ft	0.00	0.00	0.00	0.01	
7 WSE in Filter Effluent Channel		845.02	845.06	845.17	845.32	
<i>Is Filter Effluent Weir Submerged?</i>		No	No	No	No	
Effluent Channel to Filter Piping						
Flow in Pipe	mgd	0.500	0.873	1.806	2.639	
	cfs	0.7730	1.4	2.8	4.1	
	gpm	347	606	1,254	1,832	
Conduit Diameter	in	16	16.0	16.0	16.0	
Conduit Length	ft	10	10	10	10	
Flow Area= $\pi \times (D/2)^2$	sq ft	1.40	1.40	1.40	1.40	
Velocity = Q/A	fps	0.55	0.97	2.00	2.92	
Hydraulic Radius, R = D/4	ft	0.3	0.3	0.3	0.3	
Hazen Williams C Value		110	110	110	110	
Pipe Losses, hf=10.6*(Qmgd/C) ^{1.852} *L/D ^{4.87})	ft	0.00	0.00	0.01	0.03	
Minor Losses = KxV ² /2g	ft	0.01	0.02	0.09	0.20	
# of fittings k/ea. Coefficient k						
1. Entrance 1 0.50 0.5						
2. 90 deg Elbow 0 0.00 0						
3. Exit 1 1.00 1						
Subtotal 1.5						
Total Hydraulic Losses in this Segment	ft	0.01	0.03	0.11	0.22	
6 WSE In Effluent Channel		845.03	845.08	845.28	845.54	
<i>Is Filter Effluent Weir Submerged?</i>		No	No	No	No	

		max month				
	Units					REMARKS
GENERAL DATA		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Filter to Effluent Channel - Weir Loss						
Filters online	#	3	3	3	3	
Flow over Weir	mgd	0.50	0.87	1.81	1.97	flow/# of filters, PH equals filter firm capacity
	cfs	0.77	1.35	2.79	3.05	
	gpm	347	606	1254	1369	
	m ³ /s	0.02	0.04	0.08	0.09	
Filter Firm Capacity	mgd	5.914	5.914	5.914	5.914	see comments to the right
Weir Width	ft	24	23.6	23.6	23.6	Exisitng
Weir Invert	ft	847.39	847.39	847.39	847.39	existing
Submerged Weir						
Height of flow above weir crest (downstream)	ft	Not Subm.	Not Subm.	Not Subm.	Not Subm.	
Headloss in Weir	ft	0.00	0.00	0.00	0.00	see subweir AA w pumps
Unsubmerged Weir						
Headloss	ft	0.05	0.07	0.11	0.11	H=(Q/3.33L)^(2/3)
Total Hydraulic Losses in this Segment		0.05	0.07	0.11	0.11	
8 WSE DS of Filter	ft MSL	847.44	847.46	847.50	847.50	
Filter - Media Loss						
Flow to Filter	mgd	0.500	0.873	1.806	2.639	
Media Loss	ft	1.2	1.15	1.15	1.15	Assume 1.15' loss across filters since this is slightly below the existing t
9 WSE US of Filters	ft MSL	848.59	848.61	848.65	848.65	Assumes negligible headloss through tank
Influent Pipe to Filter-Weir Loss						
Flow over Weir	mgd	0.50	0.87	1.81	1.97	
	cfs	0.77	1.35	2.79	3.05	
	gpm	347	606	1254	1369	
Weir Width	ft		0.00	0.00	0.00	
Weir Invert	ft		0.00	0.00	0.00	
Submerged Weir						
Height of flow above weir crest (downstream)	ft	848.6	848.6	848.6	848.7	
Headloss in Weir	ft	0.0	0.0	0.0	0.0	see subweir AA w pumps
Unsubmerged Weir						
Headloss	ft	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	H=(Q/3.33L)^(2/3)
10 WSE in Influent box	ft MSL	848.59	848.61	848.65	848.70	T/Wall = 849.75 Peak hour is bypassing

		max month				
	Units					REMARKS
GENERAL DATA		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Influent Filter Pipe - Filter Weir						
Flow in Pipe	mgd	0.500	0.873	1.806	2.639	
	cfs	0.77	1.35	2.79	4.08	
	gpm	347	606	1,254	1,832	
Conduit Diameter	in	16.00	16.0	16.0	16.0	
Conduit Length	ft	12.50	12.5	12.5	12.5	
Flow Area= $\pi \times (D/2)^2$	sq ft	1.40	1.40	1.40	1.40	
Velocity = Q/A	fps	0.55	0.97	2.00	2.92	
Hydraulic Radius, R = D/4	ft	0.3	0.3	0.3	0.3	
Hazen Williams C Value		110	110	110	110	New DI
Pipe Losses, $h_f=10.6*(Q\text{mgd}/C)^{1.852}*L/D^{4.87}$	ft	0.00	0.00	0.02	0.03	for pipe flowing full
Minor Losses = $KxV^2/2g$	ft	0.01	0.02	0.09	0.20	
# of fittings	k/ea.	Coefficient k				
1. Entrance	1	0.50	0.5			
2. 90 deg Elbow	0	1.10	0			
3. Exit	1	1.00	1			
Subtotal	1.5					
Total Hydraulic Losses in this Segment	ft	0.01	0.03	0.11	0.23	
11 WSE in Inlet Discharge	ft MSL	848.59	848.63	848.76	848.93	
Influent Channel - Influent Filter Pipe						
Flow in Channel	mgd	0.500	0.873	1.806	2.639	
	cfs	0.7730	1.4	2.8	4.1	
	gpm	347	606	1,254	1,832	
Channel Elevation	ft	843.42	843.42	843.42	843.42	
Channel Width	ft	2.5	2.5	2.5	2.5	
Wetted Perimeter	ft	12.85	12.93	13.17	13.52	
Area	ft ²	12.94	13.03	13.34	13.77	
Length	ft	20	20.00	20.00	20.00	Estimate
Hydraulic Radius	ft	1.01	1.01	1.01	1.02	
Manning's Roughness Coefficient (n)		0.01	0.01	0.01	0.01	
Channel losses; $h_f = [Qn/(1.49AR^{2/3})]^2*L$	ft	0.00	0.00	0.00	0.00	
Total Hydraulic Losses in this Segment	ft	0.00	0.00	0.00	0.00	
12 WSE in Filter Effluent Channel		848.59	848.63	848.76	848.93	top of wall = 849.75
Is Wall Submerged?		No	No	No	No	

		max month				
	Units					REMARKS
GENERAL DATA		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Flocc Tank to influent filter channel						
Flow in Pipe	mgd	1.499	2.619	5.418	7.916	We have done splitter boxes here, but the existing channels are not set up with this option, so it was removed.
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Conduit Diameter	in	36	36.0	36.0	36.0	
Conduit Length	ft	10	10	10	10	
Flow Area= $\pi \times (D/2)^2$	sq ft	7.07	7.07	7.07	7.07	
Velocity = Q/A	fps	0.33	0.57	1.19	1.73	
Hydraulic Radius, R = D/4	ft	0.8	0.8	0.8	0.8	
Minor Losses = $K \times V^2 / 2g$	ft	0.01	0.02	0.08	0.17	
# of fittings	k/ea.	Coefficient k				
1. Entrance	1	0.50	0.5			
2. 90 deg Elbow	2	1.10	2.2			
3. Exit	1	1.00	1			
Subtotal	3.7					
Total Hydraulic Losses in this Segment	ft	0.01	0.02	0.08	0.18	
14 WSE in Flocc tank Discharge Box	ft MSL	848.60	848.65	848.84	849.11	
Flocc tank 3 - Weir loss						
Flow in Tank	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Weir Crest El	ft	849.15	849.15	849.15	849.15	
Weir Length	ft	30	30.0	30.0	30.0	
Submerged Weir						
Height of flow above weir crest (downstream)	ft	Not Subm.	Not Subm.	Not Subm.	Not Subm.	
Headloss in Weir	ft	#VALUE!	#VALUE!	#VALUE!	#VALUE!	see subweir AA w pumps
Unsubmerged Weir						
Headloss	ft	0.08	0.12	0.19	0.25	$H=(Q/3.33L)^{(2/3)}$
15 WSE in Flocc Tank 3	ft MSL	849.23	849.27	849.34	849.40	Assumes negligible headloss through tank

		max month				
	Units					REMARKS
<u>GENERAL DATA</u>						
		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Flocc tank 2 - Weir loss						
Flow in Tank	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Weir Crest El	ft	848.70	848.70	848.70	848.70	
Weir Length	ft	5	5.0	5.0	5.0	
Submerged Weir						
Height of flow above weir crest (downstream)	ft	0.53	0.57	0.64	0.70	
Headloss in Weir	ft	0.08	0.08	0.08	0.08	see subweir AA w pumps
Unsubmerged Weir						
Headloss	ft	0.27	0.39	0.63	0.81	$H=(Q/3.33L)^{(2/3)}$
16 WSE in Flocc Tank 2	ft MSL	849.31	849.35	849.42	849.48	Assumes negligible headloss through tank
Flocc tank 1 - Weir loss						
Flow in Tank	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Weir Crest El	ft	848.95	848.95	848.95	848.95	
Weir Length	ft	5	5.0	5.0	5.0	
Submerged Weir						
Height of flow above weir crest (downstream)	ft	0.36	0.40	0.47	0.53	
Headloss in Weir	ft	0.08	0.08	0.08	0.08	see subweir AA w pumps
Unsubmerged Weir						
Headloss	ft	0.27	0.39	0.63	0.81	$H=(Q/3.33L)^{(2/3)}$
17 WSE in Flocc Tank 1	ft MSL	849.40	849.43	849.51	849.56	Assumes negligible headloss through tank

Hydraulic Analysis for Facility Upgrades

J:\JOB#S\Jackson\JK-15-W1 WWTF Facilities Plan\10 Design Information\10.2 Process-Civil Design\JK-15 Plant Hydraulics\New HP - AA w Pumps
9/6/2022

		max month				
	Units					REMARKS
GENERAL DATA						
		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Final Clarifier to Filter Building Piping 2						
Flow in Pipe	mgd	0.500	0.873	1.806	2.639	
	cfs	0.77	1.35	2.79	4.08	
	gpm	347	606	1,254	1,832	
Conduit Diameter	in	30	30.0	30.0	30.0	
Conduit Length	ft	50	50	50	50	Rough Estimate
Flow Area= $\pi \times (D/2)^2$	sq ft	4.91	4.91	4.91	4.91	
Velocity = Q/A	fps	0.16	0.28	0.57	0.83	
Hydraulic Radius, R = D/4	ft	0.6	0.6	0.6	0.6	
Hazen Williams C Value		110	110	110	110	New DI
Pipe Losses, $hf=10.6 \times (Qmgd/C)^{1.852} \times L/D^{4.87}$	ft	0.00	0.00	0.00	0.01	for pipe flowing full
Minor Losses = $K \times V^2/2g$	ft	0.00	0.00	0.02	0.04	
# of fittings	k/ea.	Coefficient k				
1. Entrance	1	0.50	0.5			
2. 90 deg Elbow	2	1.10	2.2			
3. Exit	1	1.00	1			
Subtotal	3.7					
Total Hydraulic Losses in this Segment	ft	0.00	0.01	0.02	0.05	
19 WSE in Clarifier Discharge	ft MSL	849.43	849.52	849.86	850.31	
Final Clarifier Trough - Open Channel						
Number of Clarifiers online	EA	3	3	3	3	
Clarifier Diameter	Ft	65	65	65	65	
Flow per Launder	mgd	0.250	0.437	0.903	1.319	Forward Flow PER LAUNDER, No RAS, 3 clarifiers
	cfs	0.39	0.68	1.40	2.04	
	gpm	173	303	627	916	
Launder High Point	ft MSL	850.00	850.00	850.00	850.00	Existing is 848.00
Launder Low Point		849.50	849.50	849.50	849.50	Existing is 847.50
Launder Width	in	24	24	24	24	
Half Circumference	ft	51	51	51	51	
Slope	ft/ft	0.010	0.010	0.010	0.010	
Manning's n		0.015	0.015	0.015	0.015	Concrete conservative (0.01-0.017)
K' Value		0.009	0.016	0.033	0.049	
Depth of Gravity Flow	ft	0.23	0.27	0.33	0.36	
20 WSE in Clarifier Trough	ft MSL	849.73	849.79	850.19	850.67	
Weir Elevation	ft MSL	850.75	850.75	850.75	850.75	Existing is 848.75
Weir Flooded?		No	No	No	No	

		max month				
	Units					REMARKS
GENERAL DATA						
		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Final Clarifier - Weir Loss						
Flow per Tank	mgd	0.500	0.873	1.806	2.639	Forward Flow, No RAS / # of clarifiers
	cfs	0.77	1.35	2.79	4.08	
	gpm	347	606	1,254	1,832	
Tank Diameter	ft	65	65	65	65	
Weir Crest El	ft	850.75	850.75	850.75	850.75	Existing is 848.75
Weir Length (both sides)	ft	192	192	192	192	
Number of V notches		384	384	384	384	Assumed every 6 inches
Headloss	ft	0.06	0.07	0.10	0.11	$H = (Q/2.5)^{2/5}$, Q = per notch
21 WSE in New Clarifier	ft MSL	850.81	850.82	850.85	850.86	
Clarifier Wall Elevation	ft MSL	851.00	851.00	851.00	851.00	Existing is 851.00
Splitter Box to F Clarifiers - Pipe Loss						
Flow in Pipe	mgd	1.249	1.746	2.679	3.512	(Forward Flow + RAS) / # of Clarifiers
	cfs	1.93	2.70	4.14	5.43	
	gpm	867	1,213	1,860	2,439	
Conduit Diameter	in	30	30.0	30.0	30.0	
Conduit Length	ft	115	115	115	115	
Flow Area= $\pi \times (D/2)^2$	sq ft	4.91	4.91	4.91	4.91	
Velocity = Q/A	fps	0.39	0.55	0.84	1.11	
Hydraulic Radius, R = D/4	ft	0.6	0.6	0.6	0.6	
Hazen Williams C Value		110	110	110	110	DIP
Pipe Losses, $hf=10.6*(Qmgd/C)^{1.852}*L/D^{4.87}$	ft	0.00	0.01	0.01	0.02	for pipe flowing full
Minor Losses = $KxV^2/2g$	ft	0.01	0.02	0.04	0.07	
# of fittings k/ea. Coefficient k						
1. Entrance	1	0.50	0.5			
2. 90 deg Elbow	2	1.10	2.2			
3. Exit	1	1.00	1			
Subtotal	3.7					
Total Hydraulic Losses in this Segment	ft	0.01	0.02	0.06	0.09	
22 WSE in Final Clarifier Splitter Discharge	ft MSL	850.82	850.85	850.90	850.96	
Is Splitter Weir Submerged?		No	No	No	No	

		max month				
	Units					REMARKS
GENERAL DATA		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Splitter Box to F Clarifiers - Weir Loss						
Flow over Weir	mgd	1.249	1.746	2.679	3.512	(Forward Flow + RAS) / # of Clarifiers
	cfs	1.93	2.70	4.14	5.43	
	gpm	867	1,213	1,860	2,439	
Weir Width	ft	5.67	5.67	5.67	5.67	
Weir Invert	ft	851.00	851.00	851.00	851.00	Existing is 849.37- Stop Logs? Up to 847.70
Submerged Weir						
Height of flow above weir crest (downstream)	ft	Not Subm.	Not Subm.	Not Subm.	Not Subm.	
Headloss in Weir	ft	0.00	#VALUE!	#VALUE!	#VALUE!	see subweir AA w pumps
Unsubmerged Weir						
Headloss	ft	0.22	0.27	0.36	0.44	
23 WSE Before Splitter Weirs	ft MSL	851.22	851.27	851.36	851.44	
Splitter Box Influent - Pipe Loss						
Flow over Weir	mgd	3.748	5.238	8.037	10.535	Forward Flow + RAS
	cfs	5.80	8.10	12.43	16.30	
	gpm	2,602	3,638	5,581	7,316	
Conduit Diameter	in	24	24.0	24.0	24.0	
Conduit Length	ft	30	30	30	30	
Flow Area= $\pi \times (D/2)^2$	sq ft	3.14	3.14	3.14	3.14	
Velocity = Q/A	fps	1.85	2.58	3.96	5.19	
Hydraulic Radius, R = D/4	ft	0.5	0.5	0.5	0.5	
Hazen Williams C Value		110	110	110	110	DIP
Pipe Losses, $hf=10.6*(Qmgd/C)^{1.852}*L/D^{4.87}$	ft	0.02	0.04	0.09	0.14	for pipe flowing full
Minor Losses = $KxV^2/2g$	ft	0.14	0.27	0.63	1.08	
# of fittings k/ea. Coefficient k						
1. Entrance 1 0.50 0.5						
2. 90 deg Elbow 1 1.10 1.1						
3. Exit 1 1.00 1						
Subtotal 2.6						
Total Hydraulic Losses in this Segment	ft	0.16	0.31	0.72	1.22	
24 WSE in Aeration Basin 2	ft MSL	851.38	851.58	852.08	852.66	
AB Wall Elevation	ft MSL	852.00	852.00	852.00	852.00	
Is Channel Flooded?		No	No	Yes	Yes	

		max month				
	Units					REMARKS
GENERAL DATA		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Aeration Basin 2 to 1- Pipe Loss						
Flow over Weir	mgd	3.748	5.238	8.037	10.535	Forward Flow + RAS
	cfs	5.80	8.10	12.43	16.30	
	gpm	2,602	3,638	5,581	7,316	
Conduit Diameter	in	36	36.0	36.0	36.0	Connect to existing piping - Will need to model better after design
Conduit Length	ft	130	130	130	130	
Flow Area= $\pi \times (D/2)^2$	sq ft	7.07	7.07	7.07	7.07	
Velocity = Q/A	fps	0.82	1.15	1.76	2.31	
Hydraulic Radius, R = D/4	ft	0.8	0.8	0.8	0.8	
Hazen Williams C Value		110	110	110	110	DIP
Pipe Losses, $hf=10.6*(Qmgd/C)^{1.852}*L/D^{4.87}$	ft	0.01	0.02	0.05	0.08	for pipe flowing full
Minor Losses = $KxV^2/2g$	ft	0.04	0.08	0.18	0.30	
# of fittings	k/ea.					
1. Entrance	1	0.50	0.5			
2. 90 deg Elbow	2	1.10	2.2			
3. Exit	1	1.00	1			
Subtotal	3.7					
Total Hydraulic Losses in this Segment	ft	0.05	0.10	0.23	0.39	
25 WSE in Aeration Basin 1	ft MSL	851.43	851.68	852.31	853.05	Skip this step if not in series - This step is currently skipped
AB Wall Elevation	ft MSL	854.00	854.00	854.00	854.00	Existing is 852.00
Is Channel Flooded?		No	No	No	No	

		max month				
	Units					REMARKS
GENERAL DATA		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Splitter Box 1 to Aeration Basin						
Number of Aeration Basins Online		1	1	1	1	Modeled as running in series -
Flow in Pipe	mgd	3.748	5.238	8.037	10.535	Total flow coming to aeration basin (Forward Flow + RAS)/#Abs
	cfs	5.80	8.10	12.43	16.30	
	gpm	2,602	3,638	5,581	7,316	
Conduit Diameter	in	36	36.0	36.0	36.0	Existing is 20
Conduit Length	ft	85	85	85	85	
Flow Area= $\pi \times (D/2)^2$	sq ft	7.07	7.07	7.07	7.07	
Velocity = Q/A	fps	0.82	1.15	1.76	2.31	
Hydraulic Radius, R = D/4	ft	0.75	0.75	0.75	0.75	
Hazen Williams C Value		120.00	120.00	120.00	120.00	
Pipe Losses, hf=10.6*(Qmgd/C)^1.852*L/D^4.87)	ft	0.01	0.01	0.03	0.05	
Minor Losses = KxV^2/2g	ft	0.03	0.05	0.12	0.21	
# of fittings k/ea. Coefficient k						
1. Entrance 1 0.5 0.5						
2. 90 deg Elbow 1 1 1						
3. Exit 1 1 1						
Subtotal 2.5						
Total Hydraulic Losses in this Segment	ft	0.03	0.06	0.15	0.25	
26 WSE in Splitter Box 1	ft MSL	851.46	851.74	852.46	853.30	Top of wall 854.00
Splitter Box 1 Influent Weir Flooded?		No	No	No	No	
Splitter Box Weir						
Flow over Weir	mgd	3.748	5.238	8.037	10.535	Total Forward flow + RAS
	cfs	5.80	8.10	12.43	16.30	
	gpm	2,602	3,638	5,581	7,316	
Submerged Weir						
Weir Width	ft	4.5	4.50	4.50	4.50	
Weir Invert	ft	853.35	853.35	853.35	853.35	Existing bottom of concrete is 851.35
Height of flow above weir crest (downstream)	ft	Not Subm.	Not Subm.	Not Subm.	Not Subm.	
Headloss in Weir	ft	0.00	0.00	0.00	0.00	see subweir AA w pumps
Unsubmerged Weir						
Headloss	ft	0.53	0.66	0.88	1.06	H=(Q/3.33L)^(2/3)
27 WSE in Splitter Box	ft MSL	853.88	854.01	854.23	854.41	T/wall 854 of existing splitter box - will need raised

		max month				
	Units					REMARKS
GENERAL DATA						
		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Anaerobic 2 to Splitter Box 1						
Flow in Pipe	mgd	3.748	5.238	8.037	10.535	Total flow coming to aeration basin (Forward Flow + RAS)/#Abs
	cfs	5.80	8.10	12.43	16.30	
	gpm	2,602	3,638	5,581	7,316	
Conduit Diameter	in	36	36.0	36.0	36.0	FUTURE PIPING
Conduit Length	ft	50	50	50	50	
Flow Area= $\pi \times (D/2)^2$	sq ft	7.07	7.07	7.07	7.07	
Velocity = Q/A	fps	0.82	1.15	1.76	2.31	
Hydraulic Radius, R = D/4	ft	0.75	0.75	0.75	0.75	
Hazen Williams C Value		120.00	120.00	120.00	120.00	
Pipe Losses, $hf=10.6*(Qmgd/C)^{1.852}*L/D^{4.87}$	ft	0.00	0.01	0.02	0.03	
Minor Losses = $KxV^2/2g$	ft	0.04	0.07	0.17	0.29	
# of fittings k/ea. Coefficient k						
1. Entrance 1 0.5 0.5						
2. 90 deg Elbow 2 1 2						
3. Exit 1 1 1						
Subtotal 3.5						
Total Hydraulic Losses in this Segment	ft	0.04	0.08	0.18	0.32	
28 WSE in Splitter Box 1	ft MSL	853.92	854.09	854.42	854.72	
Top of Wall flooded?		No	No	No	No	Future TBD
Anaerobic 1 to Anaerobic 2						
Flow over Weir	mgd	5.996	7.857	10.656	13.154	Forward Flow + RAS
	cfs	9.28	12.16	16.49	20.35	
	gpm	4,164	5,456	7,400	9,135	
Submerged Weir						
Weir Width	ft	5.0	5.00	5.00	5.00	
Weir Invert	ft		0.00	0.00	0.00	3" of loss at peak hour - TBD
Height of flow above weir crest (downstream)	ft	853.9	854.1	854.4	854.7	
Headloss in Weir	ft	0.08	0.08	0.08	0.08	assume 1"
29 WSE in Anaerobic 1	ft MSL	854.00	854.18	854.50	854.81	
Selector Basin Wall Elevation	ft MSL	857.31	857.31	857.31	857.31	2.5' above peak hour
Are Selector Basins Flooded?		No	No	No	No	

max month						REMARKS
	Units					
GENERAL DATA						
		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Primary Clarifiers to Anaerobic 1						
Flow in Pipe	mgd	0.750	1.310	2.709	3.958	Assume 2 individual pipes going to selectors
	cfs	1.16	2.03	4.19	6.12	
	gpm	520	909	1,881	2,749	
Conduit Diameter	in	36.0	36.0	36.0	36.0	TBD
Conduit Length	ft	50.0	50	50	50	Guestimated
Flow Area= $\pi \times (D/2)^2$	sq ft	7.07	7.07	7.07	7.07	
Velocity = Q/A	fps	0.16	0.29	0.59	0.87	
Hydraulic Radius, R = D/4	ft	0.8	0.8	0.8	0.8	
Hazen Williams C Value		110	110	110	110	DI
Pipe Losses, hf=10.6*(Qmgd/C)^1.852*L/D^4.87)	ft	0.00	0.00	0.00	0.01	for pipe flowing full
Minor Losses = KxV^2/2g	ft	0.00	0.00	0.01	0.03	
# of fittings k/ea. Coefficient k						
1. Entrance 1	0.50	0.5				
2. 90 deg Elbow 1	1.00	1				
3. Exit 1	1.00	1				
Subtotal 2.5						
Total Hydraulic Losses in this Segment	ft	0.00	0.00	0.02	0.03	
30 WSE in Outlet Box	ft MSL	854.01	854.18	854.52	854.84	
Outlet Box Weir Flooded?		No	No	Yes	Yes	Existing 854.25 top of wall of primaries - Will need raised
Primary Clarifier Trough - Open Channel						
Number of Clarifiers online	EA	2	2	2	2	
Clarifier Diameter	Ft	50	50	50	50	Existing clarifiers are 32'
Flow per Launder	mgd	0.375	0.655	1.355	1.979	
	cfs	0.58	1.01	2.10	3.06	
	gpm	260	455	941	1,374	
Launder High Point	ft MSL	855.15	855.15	855.15	855.15	Existing = 851.75
Launder Low Point		854.90	854.90	854.90	854.90	Existing = 851.50
Launder Width	in	15	15	15	15	
Half Circumference	ft	39	39	39	39	
Slope	ft/ft	0.006	0.006	0.006	0.006	
Manning's n		0.015	0.015	0.015	0.015	
K' Value		0.060	0.105	0.217	0.317	
Depth of Gravity Flow	ft	0.24	0.40	0.60	0.69	
28 WSE in Primary Clarifier Trough	ft MSL	855.39	855.55	855.75	855.84	
Weir Elevation	ft MSL	856.00	856.00	856.00	856.00	

		max month				
	Units					REMARKS
GENERAL DATA						
		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
Weir Flooded?		No	No	No	No	Primary Weir is flooded
Primary Clarifier - Weir Loss						
Flow per Tank	mgd	0.750	1.310	2.709	3.958	
	cfs	1.16	2.03	4.19	6.12	
	gpm	520	909	1,881	2,749	
Tank Diameter	ft	50	50	50	50	
Weir Crest El	ft	856.00	856.00	856.00	856.00	Per 1977 plans - 2 feet below top of wall = 852.25
Weir Length (both sides)	ft	149	149	149	149	
Number of V notches		299	299	299	299	
Headloss	ft	0.08	0.09	0.13	0.15	
29 WSE in Primary Clarifier	ft MSL	856.08	856.09	856.13	856.15	
Primary Clarifier Wall Elevation	ft MSL	858.25	858.25	858.25	858.25	Existing 854.25
Are Primary Clarifiers Flooded?		No	No	No	No	
Headworks Splitter to Primary Clarifiers						
Flow in Pipe	mgd	0.750	1.310	2.709	3.958	
	cfs	1.16	2.03	4.19	6.12	
	gpm	520	909	1,881	2,749	
Conduit Diameter	in	36.0	36.0	36.0	36.0	TBD
Conduit Length	ft	50.0	50	50	50	Guestimated
Flow Area= p x (D/2)2	sq ft	7.07	7.07	7.07	7.07	
Velocity = Q/A	fps	0.16	0.29	0.59	0.87	This seems a bit low
Hydraulic Radius, R = D/4	ft	0.8	0.8	0.8	0.8	
Hazen Williams C Value		110	110	110	110	DI
Pipe Losses, hf=10.6*(Qmgd/C)^1.852*L/D^4.87)	ft	0.00	0.00	0.00	0.01	for pipe flowing full
Minor Losses = KxV^2/2g	ft	0.00	0.00	0.01	0.03	
# of fittings k/ea. Coefficient k						
1. Entrance 1 0.50 0.5						
2. 90 deg Elbow 1 1.00 1						
3. Exit 1 1.00 1						
Subtotal 2.5						
Total Hydraulic Losses in this Segment	ft	0.00	0.00	0.02	0.03	

		max month				
	Units					REMARKS
<u>GENERAL DATA</u>		Current	Design	Max Day	Peak Hr	
Total Plant Flow	mgd	1.499	2.619	5.418	7.916	
	cfs	2.32	4.05	8.38	12.25	
	gpm	1,041	1,819	3,763	5,497	
		856.08	856.10	856.14	856.18	
Splitter Box to P. Clarifiers - Weir Loss						
Flow over Weir	mgd	0.750	1.310	2.709	3.958	This will need to be revised with actual piping/design plan.
	cfs	1.16	2.03	4.19	6.12	
	gpm	520	909	1,881	2,749	
Submerged Weir						
Weir Width	ft	9.9	9.92	9.92	9.92	
Weir Invert	ft	856.20	856.20	856.20	856.20	
Height of flow above weir crest (downstream)	ft	Not Subm.	Not Subm.	Not Subm.	Not Subm.	
Headloss in Weir	ft	0.00	0.00	0.00	0.00	see subweir AA w pumps
Unsubmerged Weir						
Headloss	ft	0.11	0.16	0.25	0.33	
31 WSE in Splitter Box	ft MSL	856.31	856.36	856.45	856.53	T/wall = 857.00

Appendix G

Existing WWTF Flow and Loading Data

**Village of Jackson WWTF
Annual Loading Data**

WWTF Influent									
2017	Flow	BOD	TSS	Total P	NH ₃ -N	Flow			
	Average Monthly <i>MGD</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Min Day <i>MGD</i>	Min Week <i>MGD</i>	Max Day <i>MGD</i>	Max Week <i>MGD</i>
January	1.097	2,023	2,474	76	181	0.979	1.081	1.606	1.472
February	1.204	2,356	2,755	49	205	0.926	0.966	2.141	1.758
March	1.559	2,350	2,826	50	215	1.090	1.163	2.398	2.119
April	1.552	2,609	3,771	50	234	1.049	1.290	2.446	1.941
May	1.392	3,290	4,945	64	200	0.666	1.169	2.588	1.949
June	1.283	2,740	3,666	60	201	0.763	1.037	2.429	1.573
July	1.225	2,434	3,399	50	196	0.879	1.172	1.711	1.495
August	1.050	2,319	3,194	54	224	0.750	0.932	1.414	1.150
September	0.870	2,168	3,288	55	249	0.714	0.818	1.132	1.025
October	0.954	2,553	3,967	55	209	0.563	0.794	1.257	1.079
November	0.887	2,604	3,589	55	209	0.729	0.822	1.154	0.967
December	0.830	2,449	3,028	56	225	0.651	0.773	1.074	0.898
Ave Monthly Loading	1.159	2,491	3,409	56	212	0.813	1.001	1.779	1.452
High/Low Month 1	1.559	3,290	4,945	76	249	0.563	0.773	2.588	2.119
High/Low Month 2	1.552	2,740	3,967	64	234	0.651	0.794	2.446	1.949
High/Low Month 3	1.392	2,609	3,771	60	225	0.666	0.818	2.429	1.941
Ave of 3 High/Low	1.501	2,879	4,228	66	236	0.627	0.795	2.488	2.003

	<i>Flow</i>	<i>Month</i>
Min Day	0.563	October
Min Week	0.773	December
Max Day	2.588	May
Max Week	2.119	March
Max Month	1.559	March
Annual Average	1.170	N/A

BOD, TSS, Phosphorus and NH₃-N are calculated using the influent flow*influent concentration*8.34.

**Village of Jackson WWTF
Annual Loading Data**

WWTF Influent									
2018	Flow	BOD	TSS	Total P	NH ₃ -N	Flow			
	Average Monthly <i>MGD</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Min Day <i>MGD</i>	Min Week <i>MGD</i>	Max Day <i>MGD</i>	Max Week <i>MGD</i>
January	0.917	2,487	2,740	56	228	0.501	0.805	1.645	1.025
February	1.133	2,727	2,829	57	217	0.774	0.866	2.488	1.560
March	1.066	2,733	3,259	64	221	0.793	0.956	1.215	1.327
April	1.448	2,928	3,892	120	279	0.939	1.058	2.582	2.076
May	1.650	2,992	3,852	108	234	1.012	1.158	2.484	2.214
June	1.117	2,512	3,721	62	186	0.929	1.083	1.482	1.195
July	1.010	2,614	4,311	63	208	0.838	0.978	1.193	1.085
August	1.343	2,803	3,819	66	221	0.707	0.846	3.937	2.547
September	1.610	2,554	4,269	63	199	1.070	1.221	3.471	2.694
October	1.508	2,298	4,002	66	193	0.964	1.095	2.675	2.128
November	1.269	2,753	3,994	82	211	0.936	1.067	2.126	1.675
December	1.218	2,822	3,697	64	198	0.877	1.030	1.816	1.506
Ave Monthly Loading	1.274	2,685	3,699	73	216	0.862	1.014	2.260	1.753
High/Low Month 1	1.650	2,992	4,311	120	279	0.501	0.805	3.937	2.694
High/Low Month 2	1.610	2,928	4,269	108	234	0.707	0.846	3.471	2.547
High/Low Month 3	1.508	2,822	4,002	82	228	0.774	0.866	2.675	2.214
Ave of 3 High/Low	1.589	2,914	4,194	103	247	0.661	0.839	3.361	2.485

	<i>Flow</i>	<i>Month</i>
Min Day	0.501	January
Min Week	0.805	January
Max Day	3.937	August
Max Week	2.694	September
Max Month	1.650	May
Annual Average	1.274	N/A

BOD, TSS, Phosphorus and NH₃-N are calculated using the influent flow*influent concentration*8.34

**Village of Jackson WWTF
Annual Loading Data**

WWTF Influent									
2019	Flow	BOD	TSS	Total P	NH ₃ -N	Flow			
	Average Monthly <i>MGD</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Min Day <i>MGD</i>	Min Week <i>MGD</i>	Max Day <i>MGD</i>	Max Week <i>MGD</i>
January	1.272	2,360	2,627	58	206	0.898	0.944	2.661	1.758
February	1.231	1,999	1,978	51	254	0.849	0.934	1.980	1.563
March	1.381	2,403	2,594	53	235	0.915	1.040	2.788	1.960
April	1.485	2,854	3,333	63	209	1.022	1.149	2.656	1.889
May	1.543	2,813	3,536	58	194	1.317	1.379	1.959	1.718
June	1.184	2,400	3,075	56	211	0.934	1.108	1.524	1.461
July	1.252	2,402	3,540	66	192	0.969	1.083	1.849	1.482
August	1.099	2,728	4,068	66	202	0.830	0.997	1.470	1.216
September	1.254	2,385	3,217	66	210	0.800	0.950	2.050	1.523
October	1.703	3,311	5,455	100	192	1.070	1.207	4.020	2.526
November	1.502	2,478	3,126	57	222	1.150	1.273	2.270	1.737
December	1.376	2,359	2,422	65	223	0.910	1.071	2.150	1.877
Ave Monthly Loading	1.357	2,541	3,248	63	213	0.972	1.095	2.281	1.726
High/Low Month 1	1.703	3,311	5,455	100	254	1.317	1.379	4.020	2.526
High/Low Month 2	1.543	2,854	4,068	66	235	1.150	1.273	2.788	1.960
High/Low Month 3	1.502	2,813	3,540	66	223	1.070	1.207	2.661	1.889
Ave of 3 High/Low	1.582	2,992	4,354	77	238	1.179	1.286	3.156	2.125

	<i>Flow</i>	<i>Month</i>
Min Day	0.800	September
Min Week	0.934	February
Max Day	4.020	October
Max Week	2.526	October
Max Month	1.703	October
Annual Average	1.358	N/A

BOD, TSS, and Phosphorus are calculated using the influent flow*influent concentration*8.34.

Village of Jackson WWTF
Annual Loading Data

WWTF Influent									
2020	Flow	BOD	TSS	Total P	NH ₃ -N	Flow			
	Average Monthly <i>MGD</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Min Day <i>MGD</i>	Min Week <i>MGD</i>	Max Day <i>MGD</i>	Max Week <i>MGD</i>
January	1.282	1,974	2,029	52	208	1.060	1.123	1.720	1.710
February	1.207	2,045	2,077	51	208	0.970	1.104	1.640	1.417
March	1.504	2,279	2,211	48	204	0.910	1.096	2.290	1.733
April	1.285	2,754	3,415	64	254	0.940	1.087	2.210	1.723
May	1.609	3,628	5,278	104	235	1.010	1.140	4.100	2.716
June	1.178	2,240	2,740	59	198	0.980	1.094	1.510	1.313
July	1.271	2,245	3,169	57	217	0.810	1.000	2.370	1.706
August	1.042	2,030	2,755	56	193	0.760	0.904	1.510	1.286
September	1.148	1,965	2,594	76		0.810	0.973	1.850	1.530
October	1.172	2,273	3,022			0.870	0.997	2.210	1.619
November	1.122	3,145	3,010			0.860	0.974	1.770	1.436
December	1.164	2,359	2,615			0.940	1.020	1.480	1.450
Ave Monthly Loading	1.249	2,411	2,910	63	215	0.910	1.043	2.055	1.636
High/Low Month 1	1.609	3,628	5,278	104	254	1.060	1.140	4.100	2.716
High/Low Month 2	1.504	3,145	3,415	76	235	1.010	1.123	2.370	1.733
High/Low Month 3	1.285	2,754	3,169	64	217	0.980	1.104	2.290	1.723
Ave of 3 High/Low	1.466	3,176	3,954	81	235	1.017	1.122	2.920	2.057

	<i>Flow</i>	<i>Month</i>
Min Day	0.760	August
Min Week	0.904	August
Max Day	4.100	May
Max Week	2.716	May
Max Month	1.609	May
Annual Average	1.250	N/A

BOD, TSS, and Phosphorus are calculated using the influent flow*influent concentration*8.34.

Values calculated using effluent flow meter

**Village of Jackson WWTF
Annual Loading Data**

WWTF Influent									
2021	Flow	BOD	TSS	Total P	NH ₃ -N	Flow			
	Average Monthly <i>MGD</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Monthly Average <i>lbs/d</i>	Min Day <i>MGD</i>	Min Week <i>MGD</i>	Max Day <i>MGD</i>	Max Week <i>MGD</i>
January	1.075	2,721	2,492	63	221	0.880	0.971	1.460	1.304
February	1.015	4,525	2,974	67	239	0.830	0.914	1.590	1.219
March	1.525	2,598	2,656	67		1.160	1.294	1.970	1.716
April	1.264	2,703	3,486	75	213	1.020	1.074	1.950	1.611
May	1.108	2,431	2,713	68	227	0.880	0.981	1.450	1.231
June	1.091	2,266	2,839	60	191	0.810	0.910	1.670	1.387
July	0.983	2,133	2,733	57	191	0.820	0.899	1.510	1.420
August	1.282	2,487	3,070	74	215	0.776	0.880	2.526	2.032
September	0.933	2,357	3,079	66	189	0.714	0.836	1.175	1.043
October	0.930	2,250	2,998	62	179	0.770	0.851	1.140	1.014
November	0.854		2,878			0.717	0.813	0.970	0.921
December									
Ave Monthly Loading	1.096	2,647	2,902	66	207	0.852	0.948	1.583	1.355
High/Low Month 1	1.525	4,525	3,486	75	239	1.160	1.294	2.526	2.032
High/Low Month 2	1.282	2,721	3,079	74	227	1.020	1.074	1.970	1.716
High/Low Month 3	1.264	2,703	3,070	68	221	0.880	0.981	1.950	1.611
Ave of 3 High/Low	1.357	3,316	3,212	72	229	1.020	1.117	2.149	1.787

	<i>Flow</i>	<i>Month</i>
Min Day	0.714	September
Min Week	0.813	November
Max Day	2.526	August
Max Week	2.032	August
Max Month	1.525	March
Annual Average	1.098	N/A

BOD, TSS, and Phosphorus are calculated using the influent flow*influent concentration*8.34.

Village of Jackson WWTF
Annual Data Summary

WWTF Influent										
2017 - 2021 Summary	Average Monthly Loading					Average Monthly Loading				
						Flow Minimum Values		Flow Maximum Values		
	Flow MGD	BOD lbs/d	TSS lbs/d	Total P lbs/d	NH ₃ -N lbs/d	Min Day MGD	Min Week MGD	Max Day MGD	Max Week MGD	Max Month MGD
2017	1.159	2,491	3,409	56	212	0.813	1.001	1.779	1.452	1.559
2018	1.274	2,685	3,699	73	216	0.862	1.014	2.260	1.753	1.650
2019	1.357	2,541	3,248	63	213	0.972	1.095	2.281	1.726	1.703
2020	1.249	2,411	2,910	63	215	0.910	1.043	2.055	1.636	1.285
2021	1.096	2,647	2,902	66	207	0.852	0.948	1.583	1.355	1.264
Annual Average	1.227	2,555	3,233	64	213	0.882	1.020	1.992	1.584	1.492
Maximum	1.357	2,685	3,699	73	216	0.972	1.095	2.281	1.753	1.703

	Three Highest Months Averages				
	Flow MGD	BOD lbs/d	TSS lbs/d	Total P lbs/d	NH ₃ -N lbs/d
2017	1.501	2,879	4,228	66	236
2018	1.589	2,914	4,194	103	247
2019	1.582	2,992	4,354	77	238
2020	1.466	3,176	3,954	81	235
2021	1.357	3,316	3,212	72	229
Average	1.499	3,056	3,988	80	237
Maximum	1.589	3,316	4,354	103	247

BOD, TSS, and Phosphorus are calculated using the influent flow*influent concentration*8.34.

Appendix H

Infiltration and Inflow Calculations

**Village of Jackson WWTF
Infiltration and Inflow**

Annual Averages (MGD)

	Avg Flow	Sewer Sales	Annual Hauled Waste	Annual I/I
2017	1.159	0.455	0.060	0.643
2018	1.274	0.505	0.063	0.706
2019	1.357	0.495	0.056	0.806
2020	1.249	0.509	0.051	0.688
2021	1.096		0.056	

Average 2017-2020 = **0.711** = Annual Average I/I

Average of 3 Highest Months (MGD)

	WW Flow	Sewer Sales	Annual Hauled Waste	Annual I/I
2017	1.501	0.455	0.060	0.986
2018	1.589	0.505	0.063	1.021
2019	1.582	0.495	0.056	1.031
2020	1.466	0.509	0.051	0.905
2021	1.357		0.056	

Average of the 3 Highest Values = **1.013** = Maximum Month I/I

Two Week Average High/Low Flows

	Low Flow Periods			High Flow Periods		
	Influent WW	Monthly Sewer	I/I	Influent WW	Monthly Sewer	I/I
2017	0.811	0.455	0.356	1.920	0.455	1.465
	0.822	0.455	0.367	1.802	0.455	1.347
2018	0.826	0.505	0.321	2.614	0.505	2.109
	0.883	0.505	0.378	2.062	0.505	1.557
2019	0.992	0.495	0.497	2.064	0.495	1.569
	1.008	0.495	0.513	1.804	0.495	1.309
2020	0.915	0.509	0.406	2.041	0.509	1.532
	0.992	0.509	0.483	1.715	0.509	1.206
2021	0.835	No		1.669	No	
	0.884	data		1.626	data	
AVG	0.897		0.415			1.511

Average of the 3 Highest Values = **1.745** = Sustained I/I

Dry Weather Infiltration = **0.415** = Min Dry Weather I/I

**Village of Jackson WWTF
Infiltration and Inflow**

Weekly Flows (one week averages) (MGD)

	Low Flow Periods				High Flow Periods			
	Total WW	Monthly Sewer	Annual Septage	I/I	Total WW	Monthly Sewer	Annual Septage	I/I
2017	0.773	0.455	0.060	0.258	2.119	0.455	0.060	1.603
	0.794	0.455	0.060	0.278	1.949	0.455	0.060	1.434
	0.805	0.505	0.063	0.237	2.694	0.505	0.063	2.126
2018	0.846	0.505	0.063	0.278	2.547	0.505	0.063	1.979
	0.934	0.495	0.056	0.383	2.526	0.495	0.056	1.975
2019	0.944	0.495	0.056	0.393	1.960	0.495	0.056	1.409
	0.904	0.509	0.051	0.344	2.716	0.509	0.051	2.155
2020	0.973	0.509	0.051	0.412	1.733	0.509	0.051	1.172
	0.813	No	0.056		2.032	No	0.056	
	0.836	data	0.056		1.716	data	0.056	
AVG	0.862			0.323	2.199			1.732

Average of the 3 Highest Values = **2.087** = Max Week I/I
 Dry Weather Infiltration = **0.323** = Min Dry Weather I/I

**Village of Jackson WWTF
Infiltration and Inflow**

Daily High Flows (MGD)

	High 1	High 2	High 3	AVG	Sewer Sales	Billed Water Sales	Max Day I/I
2017	2.588	2.446	2.429	2.488	0.455	0.455	2.032
2018	3.937	3.601	3.471	3.670	0.505	0.505	3.164
2019	4.020	3.910	2.788	3.573	0.495	0.495	3.078
2020	4.100	3.700	3.530	3.777	0.509	0.509	3.267
2021	1.970	1.950	1.870	1.930	no data		1.930

2nd Largest Value = 3.164
Average= **3.170** = Maximum Day I/I

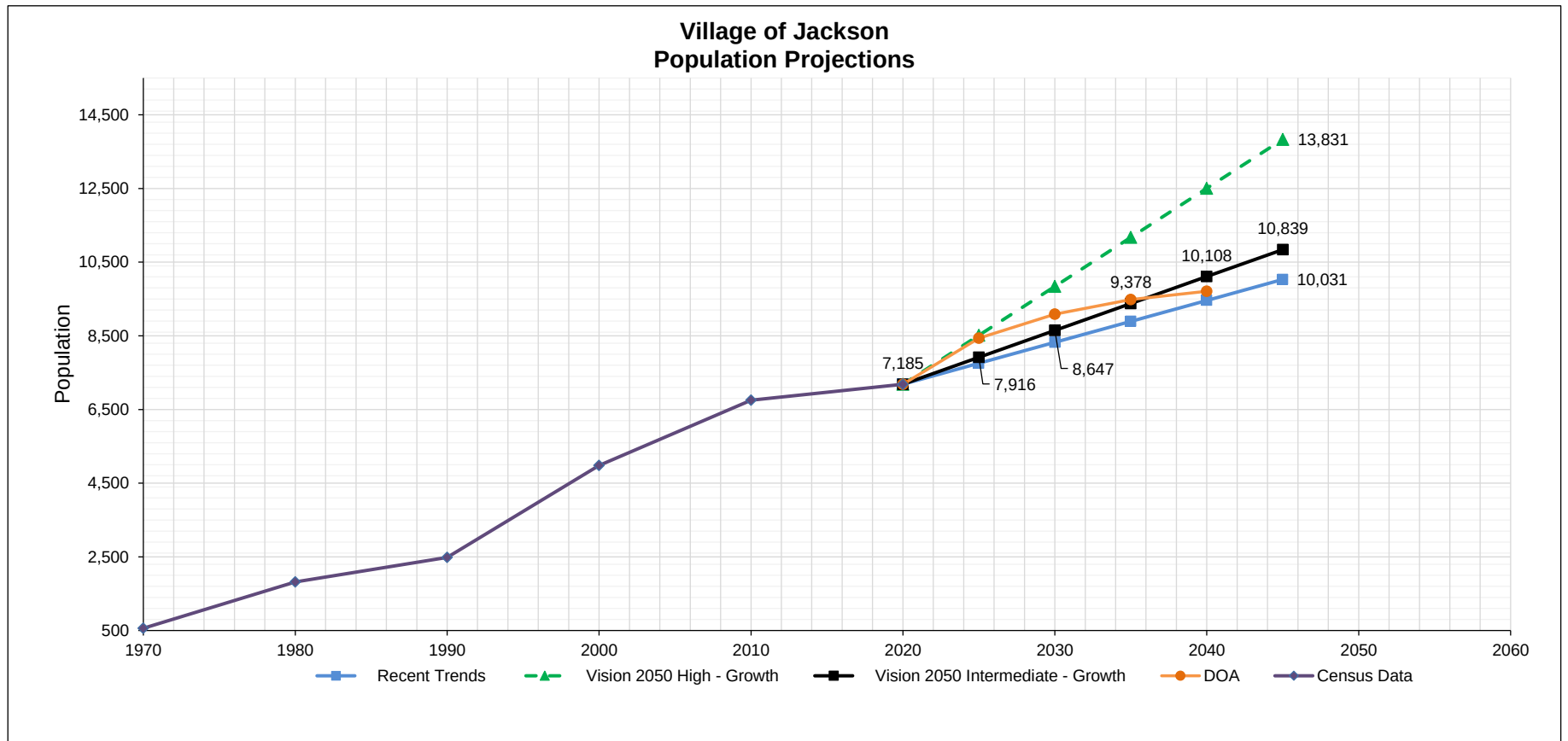
Dry Weather I/I 0.323 MGD
Maximum Day I/I 3.170 MGD
Maximum Week I/I 2.087 MGD
Maximum Month I/I 1.013 MGD
Annual Average I/I 0.711 MGD

Notes:

Dry weather flow is the minimum 1 week WWTF influent flow for the year with the lowest minimum 1 week.
WW Flow is WWTF influent flow

Appendix I

Future Loading Projections



Village of Jackson - Populations Projections

Census/ACS Population Data

	1970 Census	1980 Census	1990 Census	2000 Census	2010 Census	2020 Census	2025 Projection	2030 Projection	2035 Projection	2040 Projection	2045 Projection	2050 Projection
Jackson Comprehensive Plan												
Vision 2050 High - Growth	561	1,817	2,486	4,983	6,753	7,185	8,514	9,843	11,173	12,502	13,831	15,160
Vision 2050 Intermediate - Growth	561	1,817	2,486	4,983	6,753	7,185	7,916	8,647	9,378	10,108	10,839	11,570
Recent Trends	561	1,817	2,486	4,983	6,753	7,185	7,754	8,323	8,893	9,462	10,031	10,600
DOA												
Estimate/Projection	561	1,817	2,486	4,938	6,753	7,185	8,435	9,085	9,485	9,710		

* All population projections under the Jackson Comprehensive Plan are prepared by SEWERPC

Village of Jackson WWTF
Base Contributions

	Flow <i>MGD</i>	BOD <i>lbs/d</i>	TSS <i>lbs/d</i>	Total P <i>lbs/d</i>	NH ₃ -N <i>lbs/d</i>
Annual Average (2017 - 2021)	1.227	2,555	3,233	64	213
High Month Average (2017 - 2021)	1.499	3,056	3,988	80	237
	Flow <i>MGD</i>	BOD <i>mg/L</i>	TSS <i>mg/L</i>	Total P <i>mg/L</i>	NH ₃ -N <i>mg/L</i>
Billed Water Sales (2017-2020)	0.575	-	-	-	-
Billed Sewer Flow (2017-2020)	0.491	-	-	-	-
Average Concentrations (Billed Flow)	-	624	789	16	52
Annual per Capita Load	-	0.33	0.42	0.008	0.027
Sustained per Capita Load	-	0.39	0.52	0.010	0.031

BASE LOAD ALLOCATIONS

	Village Base (2020)		Flow		BOD		TSS		Total P		NH ₃ -N	
	<i>Quantity</i>	<i>Units</i>	<i>*Rate (gpcd)</i>	<i>mgd</i>	<i>Loading</i>	<i>lbs/day</i>	<i>Loading</i>	<i>lbs/day</i>	<i>Loading</i>	<i>lbs/day</i>	<i>Loading</i>	<i>lbs/day</i>
Total												
Residential	7,185	Capita	49	0.349	0.17	1,221	0.20	1,437	7	20	40	116
Commercial	91	Capita	707	0.064	250	134	250	134	7	4	40	21
Industrial	43	Capita	1,446	0.062	1500	778	1500	778	7	4	40	21
Public Authority	15	Capita	535	0.008	250	17	250	17	7	0	40	3
Multifamily Residential	52	Capita	643	0.033	250	70	250	70	7	2	40	11
Total Base (w/o I & I flow)				0.517		2,220		2,435		30		172

Notes:

Base values from 2017 - 2021 WWTF data

Customers based on 2020 billing cycle UCE

*Rate considers UCE associated with each year (2017-2020)

Future Loadings Projections - Year 2040 Ultimate Capacity
Village of Jackson WWTF

Peaking Factors Applied to Base Flow (Items 1 and 2)		
Maximum Weekly PF	125%	
Maximum Daily PF	175%	
Average Monthly Loading	250%	
2045 Population Projection =		10,839

Assumptions	
1	3,294 2020 Residential UCE
	7,185 2020 Population
	2.18 Residents per UCE

			Data Base		Flow		BOD			TSS			Phosphorus			NH ₃ -N				
			Quantity	Units	Rate	Units	Flow	Rate	Units	Loading	Rate	Units	Loading	Rate	Units	Loading	Rate	Units	Loading	
						MGD			lbs/day			lbs/day			lbs/day			lbs/day		
1	Village Base Loadings																			
	Residential		7,185	Capita																
	Annual				49	gpcd	0.349													
	Max Month				70	gpcd	0.503													
	Commercial		91	Cust.																
	Annual				707	gpcd	0.064													
	Max Month				1,043	gpcd	0.095													
	Industrial		43	Cust.																
	Annual				1,446	gpcd	0.062													
	Max Month				2,748	gpcd	0.118													
	Public		15	Cust.																
	Annual				535	gpcd	0.008													
	Max Month				1,386	gpcd	0.021													
	Multifamily Residential		52	Cust.																
	Annual				643	gpcd	0.033													
	Max Month				897	gpcd	0.047													
	Annual Average						0.517			2,220			2,435			30			172	
Current Sustained Base Loading						0.788			3,056			3,988			80			237		
*Max of 3 highest month avgs for each year																				
2	Future Village Increases																			
	Population Growth		3,654	capita	49	gpcd	0.179	0.17	ppd	621	0.20	ppd	731	7	mg/l	10	40	mg/l	60	
	Commercial Expansion		393	acres	750	gpac	0.295	250	mg/l	615	250	mg/l	615	7	mg/l	17	40	mg/l	98	
	Public Sector Growth		25	%	0.008	gpd	0.002	250	mg/l	4	250	mg/l	4	7	mg/l	0	40	mg/l	1	
	General Industrial Expansion		150	acres	1,500	gpac	0.225	250	mg/l	469	250	mg/l	469	7	mg/l	13	40	mg/l	75	
	Subtotal						0.701			1,709			1,819			41			234	
3	Additional Contributors																			
	Septage Hauling						0.009	1,500	mg/l	107	4,000	mg/l	285	300	mg/l	21	300	mg/l	21	
	Holding Tank Waste						0.049	600	mg/l	244	1,800	mg/l	733	30	mg/l	12	100	mg/l	41	
	Subtotal						0.057			351			1,018			34			62	
4	Future Major Industry Request																			
	Kerry Ingredients						0.060	238	mg/l	119	233	mg/l	117	10	mg/l	5	30	mg/l	15	
	Unallocated Industrial						0.000	0	mg/l	0	0	mg/l	0	0	mg/l	0	0	mg/l	0	
	Subtotal						0.060			119			117			5			15	
5	Clear Water Infiltration/Inflow																			
	Existing Dry Weather Infiltration																			
	Existing I/I (Max Month)																			
	Existing Annual Average I/I																			
	Existing Max Day Wet Weather I/I																			
	Future Dry Weather Infiltration		3,654	Capita	0	gpcd	0													
	Future Annual Average I/I		3,654	Capita	0	gpcd	0													
	Future I/I		3,654	Capita	0	gpcd	0													
	Proj. I/I Reduction						0													
Instantaneous Inflow Factor		(multiplied x max day I/I)		1.50		4.755														
6	Loadings Projections																			
	Average Dry Weather																			
	Average Annual																			
	Design (Max Sustained)																			
	Max Weekly - Peaking Factor																			
	Max Day - Peaking Factor																			
	Peak Hourly - Peaking Factor																			
	Peak Hourly - Peaking Factor					gpm	5,497													
7	Existing Facility Rated Capacity																			

Appendix J

Regulatory Agency Correspondence

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: 08/03/2022

TO: Brett Schmidt – WY/3

FROM: Nicole Krueger – SER *Nicole Krueger*

SUBJECT: Planning Water Quality-Based Effluent Limitations for Jackson (Village) Wastewater Treatment Plant
WPDES Permit No. WI-0021806-08

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Village of Jackson in Washington County who have requested a planning limits memo for updated future design flows for 2045. The current annual average design flow rate is 1.69 MGD and the planning design flow rate for 2045 is 2.046 MGD.

Jackson discharges to Cedar Creek, located in the Cedar Creek Watershed in the Milwaukee River Basin.

The following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1,2
BOD ₅					3,4
May – October			11 mg/L 169 lbs/day	11 mg/L	
November – April			17 mg/L 240 lbs/day	17 mg/L	
TSS			12 mg/L	12 mg/L	1,5
pH	9.0 s.u.	6.0 s.u.			1
Dissolved Oxygen		7.0 mg/L			1
Bacteria					6
Interim Limit Fecal Coliform				400 #/100 mL geometric mean	
Final Limit <i>E. coli</i>				126 #/100 mL geometric mean	
Ammonia Nitrogen					
March	14 mg/L		14 mg/L	7.0 mg/L	
April	14 mg/L		8.5 mg/L	4.3 mg/L	
May	14 mg/L		7.4 mg/L	5.7 mg/L	
June – September	14 mg/L		5.0 mg/L	3.9 mg/L	
October	14 mg/L		8.4 mg/L	4.3 mg/L	
November	14 mg/L		12 mg/L	6.8 mg/L	
December	14 mg/L		11 mg/L	7.0 mg/L	
January – February	14 mg/L		11 mg/L	6.5 mg/L	
Phosphorus					1,5
Interim				0.85 mg/L	
Final				TMDL	
Residual Chlorine	33 µg/L		7.7 µg/L	7.7 µg/L	7
Chloride			476 mg/L	476 mg/L	3,8,9

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
			6,900 lbs/day		
TKN, Nitrate+Nitrite, and Total Nitrogen					10
Mercury					1,2
WET					11
Temperature					12
1,2 - Diphenylhydrazine				7.3 µg/L	13

Footnotes:

1. No changes from the current permit.
2. Monitoring only.
3. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes, are included in bold.
4. If Jackson would like to request an increase to the BOD₅ mass limits to 189 lbs/day for May – October and 290 lbs/day for November – April, an assessment of their effluent data consistent with the requirements of s. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. Otherwise, the effective mass limits must be continued.
5. The TSS and phosphorus limits are based on the Total Maximum Daily Load (TMDL) for the Milwaukee River Basin to address phosphorus water quality impairments within the TMDL area. The TMDL was approved by EPA in March 2018. The phosphorus mass limits are shown below:

Month	Monthly Average TP Effluent Limit (lbs/day)
Jan	3.03
Feb	3.12
Mar	2.11
Apr	2.02
May	3.65
Jun	2.85
Jul	2.51
Aug	2.79
Sep	3.78
Oct	2.72
Nov	3.49
Dec	2.86

6. Bacteria limits apply during the disinfection season of May through September. The fecal coliform interim limit will apply until the end of the compliance schedule when *E. coli* limits take effect. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
7. Chlorine limits will be removed if chlorine is no longer added for disinfection.
8. An alternative wet weather mass limit is required.
9. If Jackson would like to request an increase to the chloride mass limit to 8,100 lbs/day, an assessment of their effluent data consistent with the requirements of s. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. Otherwise, the effective mass limit must be continued.
10. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, quarterly total nitrogen monitoring is recommended for all municipal

major permittees. Total Nitrogen is the sum of nitrate (NO₃), nitrite (NO₂), and total kjeldahl nitrogen (TKN) (all expressed as N).

11. 1x yearly acute and chronic WET testing. The Instream Waste Concentration (IWC) to assess chronic test results is 81%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5% and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from Cedar Creek. A chronic WET limit would be 1.2 TUC as a monthly average if a limit is needed.
12. Monitoring only. Another dissipative cooling study shall be conducted if there is reasonable potential for temperature limits in the future because of the increased design flows.
13. Limit may be dropped after more data is collected which shows there's not reasonable potential.

Calculated mass limits based on the current design flow are more stringent than potential future design flows. In the future, if Jackson would like to request an increase to existing limits, an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter by parameter basis and includes consideration of operations, maintenance and temporary upsets. If the facility can successfully demonstrate the need for increased effluent limitations required in ch. NR 207, Wis. Adm. Code, then a recalculation of the specific effluent limitation will be provided.

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Nicole Krueger at Nicole.Krueger@wisconsin.gov or Diane Figiel at Diane.Figiel@wisconsin.gov.

Attachments (4) – Narrative, Outfall Map, and Thermal Table

PREPARED BY: Nicole Krueger, Water Resources Engineer

E-cc: Nick Lent, Wastewater Engineer – SER
Bryan Hartsook, Regional Wastewater Supervisor – SER
Diane Figiel, Water Resources Engineer – WY/3

Attachment #1
**Water Quality-Based Effluent Limitations for
Jackson Wastewater Treatment Plant**

WPDES Permit No. WI-0021806-08

Prepared by: Nicole Krueger

PART 1 – BACKGROUND INFORMATION

Facility Description

The Village of Jackson operates an activated sludge plant and three significant industrial users. Treatment consists of influent screening, grit removal, grease removal, two aeration basins, four secondary clarifiers and disc filters followed by seasonal disinfection achieved through chlorination and dechlorination before being discharged to Cedar Creek. Alum is added prior to aeration to aid in phosphorus removal. Waste biosolids are thickened in a gravity thickener equipped with a polymer feed system, anaerobically digested in two primary digesters operated in series, and stored onsite prior to being land applied onto Department approved agricultural fields.

Jackson has requested effluent limits for facility planning to accommodate future loading conditions, upgrades, and phosphorus limits. The current annual average design flow is 1.69 MGD and the projected annual average design flow is 2.046 MGD.

Existing Permit Limitations

The current permit, expiring on 09/30/2022, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Flow Rate					1
BOD ₅					2
May – October			12 mg/L	12 mg/L	
November – April			17 mg/L	17 mg/L	
TSS			12 mg/L	12 mg/L	2
pH	9.0 s.u.	6.0 s.u.			2
Dissolved Oxygen		7.0 mg/L			2
Fecal Coliform				400#/100 mL	
May – September				geometric mean	
Ammonia Nitrogen					
April	14 mg/L		8.5 mg/L	4.3 mg/L	
May	14 mg/L		7.4 mg/L	5.7 mg/L	
June – September	14 mg/L		5.0 mg/L	3.9 mg/L	
October	14 mg/L		8.4 mg/L	4.3 mg/L	
November – March	14 mg/L		14 mg/L	7.0 mg/L	
Phosphorus					3
Interim				0.85 mg/L	
Final				TMDL	
Residual Chlorine	38 µg/L		7.7 µg/L	7.7 µg/L	

Attachment #1

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Footnotes
Chloride					1
Copper					1
Mercury					1
WET					4
Temperature					1

Footnotes:

1. Monitoring only.
2. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
3. A compliance schedule is in the current permit to meet the final WQBEL by 09/30/2026.

Month	Monthly Avg Total P Effluent Limit (lbs/day)
January	3.03
February	3.12
March	2.11
April	2.02
May	3.65
June	2.85
July	2.51
August	2.79
September	3.78
October	2.72
November	3.49
December	2.86

4. Annual acute and chronic WET tests are required. The instream waste concentration (IWC) is 73%.

A final WQBEL memo dated 07/21/2022 for permit reissuance in 2022 recommended the following changes to the existing permit limitations:

Parameter	Daily Maximum	Weekly Average	Monthly Average
BOD ₅			
May – October		12 mg/L 169 lbs/day	12 mg/L
November – April		17 mg/L	17 mg/L

Attachment #1

Parameter	Daily Maximum	Weekly Average	Monthly Average
		240 lbs/day	
Ammonia Nitrogen			
April	14 mg/L	8.5 mg/L	4.3 mg/L
May	14 mg/L	7.4 mg/L	5.7 mg/L
June – September	14 mg/L	5.0 mg/L	3.9 mg/L
October	14 mg/L	8.4 mg/L	4.3 mg/L
November	14 mg/L	13 mg/L	7.0 mg/L
December	14 mg/L	12 mg/L	7.0 mg/L
January – March	14 mg/L	14 mg/L	7.0 mg/L
Residual Chlorine	36 µg/L	7.7 µg/L	7.7 µg/L
Chloride		493 mg/L 6,900 lbs/day 12,800 lbs/day	493 mg/L
Wet weather			
Chronic WET			1.3 TUc
1,2 -Diphenylhydrazine			8.1 µg/L

Receiving Water Information

- Name: Cedar Creek
- Waterbody Identification Code (WBIC): 21300
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply. (Cold Water and Public Water Supply criteria are used for bioaccumulating compounds of concern, because the discharge is within the Great Lakes basin.)
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q₁₀ and 7-Q₂ values are from USGS for Station 04086500 updated 04/17/2017, where Outfall 001 is located.
 7-Q₁₀ = 3.0 cfs (cubic feet per second)
 7-Q₂ = 7.6 cfs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q ₁₀ (cfs)	5.3	6.0	12	25	13	6.5	4.6	3.9	4.5	5.4	7.9	6.1
7-Q ₂ (cfs)	18	18	38	51	32	19	12	11	11	14	20	21

- Hardness = 319 mg/L as CaCO₃. This value represents the geometric mean of data from WET testing from 09/17/2019 to 02/22/2022.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Metals data from the Milwaukee River at Batavia is used for this evaluation because there is no data available for Cedar Creek upstream of the discharge. Milwaukee River is within the same ecological landscape so ambient water quality characteristics are expected to be similar. Chloride data from Cedar Creek at East Sherman Road, upstream of the discharge, is used in this evaluation. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.

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- Multiple dischargers: There are several other dischargers to Cedar Creek, however they are not in the immediate vicinity and the mixing zones do not overlap. Therefore, the other dischargers do not impact this evaluation.
- Impaired water status: The immediate receiving water is 303(d) listed as impaired for PCBs and total phosphorus.

Effluent Information

- Design flow rate(s):
Current Annual Average = 1.69 MGD (Million Gallons per Day)
2045 Annual Average = 2.046 MGD
2045 Monthly Maximum = 2.619 MGD
2045 Daily Maximum = 5.418 MGD
- Hardness = 365 mg/L as CaCO₃. This value represents the geometric mean of data from the permit reissuance application from 04/22/2022 to 05/06/2022.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).

PART 2 - BOD₅

In establishing BOD₅ (Biochemical Oxygen Demand) limitations, the primary intent is to prevent a lowering of dissolved oxygen levels in the receiving water below water quality standards as specified in ss. NR 102.04(4)(a) and (b). The 26-lb method is the most frequently used approach for calculating BOD₅ limits when resources are not available to develop a detailed water quality model. This simplified model was developed in the 1970's by the Wisconsin Committee on Water Pollution on the Fox, Wisconsin, Oconto, and Flambeau Rivers. Further studies throughout the 1970's proved this model to be relatively accurate. The model has since then been used by the Department on many occasions when resources are not available to perform a site-specific model. The "26" value stems from the following equation:

$$\frac{26 \text{ lbs/day}}{\text{ft}^3/\text{sec}} * \frac{1 \text{ day}}{86,400 \text{ sec}} * \frac{454,000 \text{ mg}}{\text{lbs}} * \frac{1 \text{ ft}^3}{28.32 \text{ L}} = 4.8 = 2.4 * 2 \text{ mg/L}$$

The 4.8 has been calculated by taking 2.4 which is the number one receives when converting 26 lbs of BOD/day/cfs into mg/L, multiplied by 2.0 which is the change in the DO level. A typical background DO level for Wisconsin waters is 7 mg/L, so a 2 mg/L decrease is allowed in order to meet the 5 mg/L standard for warm water streams. The above relationship is temperature dependent and an appropriate temperature correction factor is applied. The 26-lb method is based on a typical 24°C summer value for warm water streams. Adjustments for temperature are made using the following equation:

$$k_t = k_{24} (0.967^{(T-24)})$$

Where k_{24} = 26 lbs of BOD/day/cfs

Calculations based on Full Assimilative Capacity at 7Q10 Conditions:

$$\text{Limitation (mg / L)} = 2.4(DO_{\text{stream}} - DO_{\text{std}}) \left(\frac{(7 Q_{10} + Q_{\text{eff}})}{Q_{\text{eff}}} \right) (0.967^{(T-24)})$$

Where:

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Q_{eff} = effluent design flow = 2.046 MGD

DO_{stream} = background dissolved oxygen = 7 mg/L

DO_{std} = dissolved oxygen criteria from s. NR 102.04(4) = 5 mg/L

$7Q_{10}$ = 3.0 cfs

T = Receiving water temperature from s. NR 102.25

BOD Effluent Limitations (26 LB Method)		Summer	Winter
Background Information:	7- Q_{10} (cfs)	3.0	3.0
	River Temperature (°C)	19	3
Dissolved Oxygen mg/L:	Effluent	7	7
	Background	7	7
	Mix DO	7	7
	Criteria	5	5
Weekly Ave BOD Effluent Limitations	Concentration Limits (mg/L)	11	19

The current weekly and monthly average is 17 mg/L for the winter season which is more stringent than the calculated limit of 19 mg/L. **The current weekly and monthly average concentration limits for BOD₅ are recommended to be retained consistent with s. NR 207.04(2), Wis. Adm. Code for the winter season.**

The calculated weekly average limit of 11 mg/L for summer is recommended along with a monthly average limit of 11 mg/L to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Codes.

Weekly average mass limits per s. NR 106.07(2) Wis. Adm. Code are required in the reissued permit. The mass limits are calculated: WQBEL (mg/L) x annual average design flow (MGD) x 8.34. The table below summarizes the BOD₅ limits based on the projected design flow and based on the current design flow.

	Summer	Winter
Concentration Limits (mg/L) based on 2.046 MGD	11	17
Concentration Limits (mg/L) based on 1.69 MGD	12	17
Mass limits (lbs/day) based on 2.046 MGD	189	290
Mass limits (lbs/day) based on 1.69 MGD	169	240

The permit is expected to be reissued in 2022 with the mass limits based on the current design flow rate of 1.69 MGD which are more restricted than mass limits based on the projected design flow rate of 2.046 MGD.

In the future, if Jackson would like to request an increase to existing mass limits for BOD₅, an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter by parameter basis and includes consideration of

operations, maintenance and temporary upsets. If the facility can successfully demonstrate the need for increased effluent limitations required in ch. NR 207, Wis. Adm. Code, then a recalculation of the specific effluent limitation will be provided.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P₉₉) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Daily Maximum Limit Calculation Method

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. In accordance with s. NR 106.06(3)(b), limitations based on acute toxicity are either set equal to two times the acute criteria (the final acute value) or calculated using the mass balance equation below, whichever is more restrictive.

$$\text{Limitation} = \frac{(\text{WQC}) (Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)}{Q_e}$$

Where:

WQC = Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Q_s = average minimum 1-day flow which occurs once in 10 years (1-day Q₁₀)
if the 1-day Q₁₀ flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q₁₀).

Q_e = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

C_s = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

In this case, limits set equal to two times the acute criteria are more restrictive and this method is used to calculate the daily maximum limits shown in the table below.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling for all the detected substances. All concentrations are expressed in terms of micrograms per Liter (µg/L), except for hardness and chloride (mg/L) and mercury (ng/L).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 2.4 cfs, (1-Q₁₀ (estimated as 80% of 7-Q₁₀)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

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SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK- GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P ₉₉	1-day MAX. CONC.
Chlorine		19		33	6.7	0.35		
Arsenic		340		597	119	1.0		
Cadmium	365	45.5	0.02	80	16	<6		
Chromium (+3)	301	4446	0.50	7816	1563	<2		
Copper	365	52.6	1.26	92	18	4.1		
Lead	356	365	0.65	641	128	<8		
Mercury		830	4.11	1456			1.76	1.64
Nickel	268	1080		1899	380	2.9		
Zinc	333	345	2.61	604	121	59.4		
Chloride (mg/L)		757	55	1289			737	741

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

** Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q₁₀ flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0.75 cfs (¼ of the 7-Q₁₀), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK- GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P ₉₉
Chlorine		7.28		9.00	1.80	0.35	
Arsenic		152		188	37.7	1.0	
Cadmium	175	3.82	0.02	4.72	0.94	<6	
Chromium (+3)	301	326	0.50	403	80.6	<3	
Copper	319	27.9	1.26	34.2	6.85	4.1	
Lead	319	85.9	0.65	106	21.2	<8	
Mercury		440	4.11	440			1.26
Nickel	268	120		149	29.7	2.9	
Zinc	319	332	2.61	410	82.0	59.4	
Chloride (mg/L)		395	55	476			566

* The indicated hardness may differ from the receiving water hardness because the receiving water hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the chronic criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

Monthly Average Limits based on Wildlife Criteria (WC)

RECEIVING WATER FLOW = 1.62 cfs (¼ of the 90-Q₁₀), as specified in s. NR 106.06(4), Wis. Adm. Code

SUBSTANCE	WC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	30-day P ₉₉
Mercury (ng/L)	1.3	4.11	1.3	0.93

Monthly Average Limits based on Human Threshold Criteria (HTC)

RECEIVING WATER FLOW = 3.80 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK- GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	30-day P ₉₉
Cadmium	370	0.02	815	163	<6	
Chromium (+3)	3818000	0.50	8406056	1681211	<2	
Lead	140	0.65	307	61.5	<8	
Mercury	1.5	4.11	1.5			0.93
Nickel	43000		94673	18935	2.9	

Monthly Average Limits based on Human Cancer Criteria (HCC)

RECEIVING WATER FLOW = 3.80 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	29.3	5.86	1.0
1,2 -Diphenylhydrazine	3.3	7.27	1.45	3.81

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

Conclusions and Recommendations

Based on a comparison of the effluent data and calculated effluent limitations, effluent limitations are required for chlorine, 1,2 -Diphenylhydrazine, and chloride.

Total Residual Chlorine – Because chlorine is added as a disinfectant, effluent limitations are recommended to assure proper operation of the de-chlorination system. Section NR 210.06(2)(b), Wis. Adm. Code, states, “When chlorine is used for disinfection, the daily maximum total residual chlorine concentration of the discharge may not exceed 0.10 mg/L.” Because the WQBELs are more restrictive, they are recommended instead. Specifically, **a daily maximum limit of 33 µg/L is required. The current weekly and monthly average limits of 7.7 µg/L are also recommended to be continued in the reissued permit. If chlorine is discontinued as a disinfectant, these limits would no longer be needed.**

Chloride – Considering available effluent data from the current permit term (10/16/2017 to 03/03/2022), the 1-day P₉₉ chloride concentration is 737 mg/L, and the 4-day P₉₉ of effluent data is 566 mg/L. The 4-day P₉₉ of 566 mg/L is greater than the calculated weekly average limit of 476 mg/L. Therefore, **a weekly average effluent limit of 476 mg/L is needed.**

Sections NR 106.07(3) and NR 205.067(7), Wis. Adm. Code require WPDES permits contain weekly average and monthly average limitations for municipal dischargers whenever practicable and necessary to protect water quality. **Therefore a monthly average limit of 476 mg/L is also required** to meet expression of limits requirements in addition to the weekly average limit.

Because a weekly average concentration limit is needed, weekly average mass limits are also required in the reissued permit. **A weekly average mass limit of 8,100 lbs/day** ($476 \text{ mg/L} \times 2.046 \text{ MGD} \times 8.34$) and an alternative wet weather mass limit are required.

The final QBEL memo dated 07/21/2022 recommended the following chloride limits to become effective after a compliance schedule:

	Weekly	Monthly
Concentration Limits (mg/L) based on 1.69 MGD	493	493
Mass limits (lbs/day) based on 1.69 MGD	6,900	

Mass limits based on the current design flow of 1.69 MGD are more stringent than potential future design flow of 2.046 MGD. In the future, if Jackson would like to request an increase to existing mass limits for chloride, an assessment of their effluent data consistent with the requirements of ss. NR 207.04(1)(a) and (c), Wis. Adm. Code, must be provided. This evaluation is on a parameter by parameter basis and includes consideration of operations, maintenance and temporary upsets. If the facility can successfully demonstrate the need for increased effluent limitations required in ch. NR 207, Wis. Adm. Code, then a recalculation of the specific effluent limitation will be provided.

1,2 -Diphenylhydrazine – The average effluent data for 1,2 -Diphenylhydrazine from two data points (04/22/2022 and 06/14/2022) was greater than $1/5^{\text{th}}$ of the calculated limit of $7.3 \text{ } \mu\text{g/L}$ based on HCC. **Therefore, a monthly average limit of $7.3 \text{ } \mu\text{g/L}$ is recommended in the reissued permit per s. NR 106.05(6)(b) Wis. Adm Code.**

The final QBEL (07/21/2022) for permit reissuance recommends a monthly average limit is $8.1 \text{ } \mu\text{g/L}$ after a compliance schedule. If more data is collected and there is no longer reasonable potential for this parameter, the limit will be removed.

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has daily maximum, weekly average and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- Section NR 106.07(3), Wis. Adm. Code requires weekly and monthly average limits for municipal treatment plants.
- The maximum expected effluent pH has changed

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation:

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - \text{pH})})] + [B \div (1 + 10^{(\text{pH} - 7.204)})]$$

Where:

A = 0.411 and B = 58.4 for a Warm Water Sport fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 1643 sample results were reported from 10/02/2017 to 03/31/2022. The maximum reported value was 7.9 s.u. (Standard pH Units). The effluent pH was 7.8 s.u. or less 99% of the time. The 1-day P₉₉, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 7.7 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 7.7 s.u. Therefore, a value of 7.8 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 7.8 s.u. into the equation above yields an ATC = 12 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code daily maximum ammonia limitations are either set equal to two times the acute criteria (the final acute value) or calculated using the mass balance equation in s. NR 106.32(2)(e), Wis. Adm. Code.

In this case, limits calculated based on the mass balance equation are more restrictive. This method is used to calculate the daily maximum limit of 21 mg/L. This is less stringent than the current daily maximum limit of 14 mg/L. **The current daily maximum limit is recommended to be retained consistent with s. NR 207.04(2), Wis. Adm. Code.**

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)

The ammonia limit calculation also warrants evaluation of weekly and monthly average limits based on chronic toxicity criteria for ammonia, because those limits relate to the assimilative capacity of the receiving water.

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Sport Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$\text{CTC} = E \times \{[0.0676 \div (1 + 10^{(7.688 - \text{pH})})] + [2.912 \div (1 + 10^{(\text{pH} - 7.688)})]\} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 0.854,

C = the minimum of 2.85 or $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Present), or

C = $1.45 \times 10^{(0.028 \times (25 - T))}$ – (Early Life Stages Absent), and

T = the temperature (°C) of the receiving water – (Early Life Stages Present), or

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T = the maximum of the actual temperature (°C) and 7 - (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q₁₀ (4-Q₃, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q₅ (estimated as 85% of the 7-Q₂ if the 30-Q₅ is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 °C, during the winter and spring months. Burbot, an early spawning species, are not believed to be present in Cedar Creek, based on conversations with local fisheries biologists. So “ELS Absent” criteria apply from October through March, and “ELS Present” criteria will apply from April through September for a warmwater sport fish classification.

The “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, because minimum ambient data is available. These values are shown in the table below, with the resulting criteria and effluent limitations.

Weekly and Monthly Ammonia Nitrogen Limits

		January	February	March	April	May	June
Effluent Flow	Qe (MGD)	2.046	2.046	2.046	2.046	2.046	2.046
Background Information	7-Q ₁₀ (cfs)	5.3	6.0	12	25	13	6.5
	7-Q ₂ (cfs)	18	18	38	51	32	19
	Ammonia (mg/L)	0.11	0.11	0.11	0.04	0.04	0.03
	Average Temperature (°C)	4	4	4	12	12	19
	Maximum Temperature (°C)	10	10	10	14	14	21
	pH (s.u.)	7.90	7.90	7.90	8.09	8.09	8.09
	% of Flow used	25	25	25	50	50	100
	Reference Weekly Flow (cfs)	1.33	1.50	3.00	12.5	6.50	6.50
	Reference Monthly Flow (cfs)	3.83	3.83	8.08	21.7	13.6	16.2
Criteria mg/L	4-day Chronic						
	Early Life Stages Present				5.57	5.57	5.57
	Early Life Stages Absent	7.45	7.45	7.45			
	30-day Chronic						
	Early Life Stages Present				2.23	2.23	2.23
	Early Life Stages Absent	2.98	2.98	2.23			
Effluent Limitations mg/L	Weekly Average						
	Early Life Stages Present				27.4	16.9	16.9
	Early Life Stages Absent	10.5	10.9	14.4			
	Monthly Average						
	Early Life Stages Present				17.2	11.6	13.4
	Early Life Stages Absent	6.45	6.45	10.3			

		July	August	September	October	November	December
Effluent Flow	Qe (MGD)	2.046	2.046	2.046	2.046	2.046	2.046
Background	7-Q ₁₀ (cfs)	4.6	3.9	4.5	5.4	7.9	6.1

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		July	August	September	October	November	December
Information	7-Q ₂ (cfs)	12	11	11	14	20	21
	Ammonia (mg/L)	0.03	0.03	0.03	0.11	0.11	0.11
	Average Temperature (°C)	19	19	19	4	4	4
	Maximum Temperature (°C)	21	21	21	10	10	10
	pH (s.u.)	8.08	8.08	8.08	8.06	8.06	8.06
	% of Flow used	100	100	100	25	25	25
	Reference Weekly Flow (cfs)	4.60	3.90	4.50	1.35	1.98	1.53
	Reference Monthly Flow (cfs)	10.2	9.35	9.35	2.98	4.25	4.46
Criteria mg/L	4-day Chronic						
	Early Life Stages Present	5.57	5.57	5.57			
	Early Life Stages Absent				7.45	7.45	7.45
	30-day Chronic						
	Early Life Stages Present	2.23	2.23	2.23			
	Early Life Stages Absent				2.98	2.98	2.98
Effluent Limitations mg/L	Weekly Average						
	Early Life Stages Present	13.6	12.4	13.4			
	Early Life Stages Absent				10.6	12.0	11.0
	Monthly Average						
	Early Life Stages Present	9.31	8.72	8.72			
	Early Life Stages Absent				5.68	6.84	7.03

Antidegradation

Some limits (weekly average limits for March – October and monthly average limits for March – October and December) are less restrictive than the limits in the current permit. Without a demonstration of need for a higher limit in accordance with s. NR 207.04, Wis. Adm. Code, the current monthly average limits must be continued in the reissued permit.

Conclusions and Recommendations

In summary, after rounding to two significant figures, **the following ammonia nitrogen limitations are recommended.** No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. A.dm Code.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
March	14	14	7.0
April	14	8.5	4.3
May	14	7.4	5.7
June – September	14	5.0	3.9
October	14	8.4	4.3
November	14	12	6.8
December	14	11	7.0
January – February	14	11	6.5

PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Codes, became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.
2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

E. coli monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Because Jackson's permit requires 2/weekly monitoring, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

These limits are required during May through September. No changes are recommended to the current recreational period and the required disinfection season.

Effluent Data

Jackson has monitored effluent *E. coli* from 06/02/2020 to 06/29/2022 and a total of 14 results are available using Colilert method. A geometric mean of 126 counts/100 mL was exceeded once, with a maximum monthly geometric mean of 270 counts/100 mL. Effluent data has exceeded 410 counts/100 mL once (which is 7% of the total sample results). The maximum reported value was 921 counts/100 mL. Based on this effluent data, it appears that the facility can't meet the new *E. coli* limits consistently and a compliance schedule is needed in the reissued permit.

Interim Limit

At this time, there is not enough effluent *E. coli* data available to determine if these limits are currently met. The permit will include a compliance schedule to meet these limits. During the compliance schedule, an interim limit applies to prevent back-sliding from the current level of disinfection during the compliance schedule period. Therefore, the current **fecal coliform limit shall be included in the reissued permit as an interim limit of 400 counts/100 mL as a monthly geometric mean.**

PART 6 – PHOSPHORUS

Technology-Based Effluent Limit

Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of Total Phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Because Jackson currently has a limit of 0.85 mg/L which is more stringent than the TBEL of 1.0 mg/L, this limit should be included in the reissued permit.

Milwaukee River Basin Total Maximum Daily Load

The TMDL report addresses phosphorus water quality impairments within the Milwaukee River Basin and provides waste load allocations (WLAs) required to meet water quality standards. There are no changes for TMDL limits due to a change in design flow. For informational purposes, the TMDL mass limits in the following table are equivalent to monthly average concentrations ranging 0.12 mg/L to 0.22 mg/L at the annual average design flow of 2.046 MGD.

Total Phosphorus Wasteload Allocations and Effluent Limits

Month	Monthly Maximum TP WLA ¹ (lbs/month)	Days Per Month	Monthly Average TP Effluent Limit ² (lbs/day)	Equivalent Concentrations (mg/L)
Jan	93.87	31	3.03	0.18
Feb	87.43	28	3.12	0.18
Mar	65.51	31	2.11	0.12
Apr	60.57	30	2.02	0.12
May	113.12	31	3.65	0.21
Jun	85.46	30	2.85	0.17
Jul	77.84	31	2.51	0.15
Aug	86.62	31	2.79	0.16
Sep	113.28	30	3.78	0.22
Oct	84.46	31	2.72	0.16
Nov	104.72	30	3.49	0.20
Dec	88.71	31	2.86	0.17

Footnotes:

1- Milwaukee River Basin TMDL Appendix A. Monthly Total Suspended Solids Wasteload Allocation by Permitted Point Source. Table A.17 for the Milwaukee River Watershed

2- Monthly Average Total P effluent limit (lbs/day) = monthly Total P WLA (lbs/month) ÷ days per month

PART 7 – TOTAL SUSPENDED SOLIDS

The TMDL also has wasteload allocations (WLAs) for total suspended solids (TSS). For a municipal facility, the limits for TSS must be expressed as weekly and monthly averages. The current permit includes a weekly and monthly average limit of 12 mg/L.

Monthly average and weekly average mass effluent limitations derived from the TMDL WLAs should be included in the permit according to the table below, along with the currently imposed concentration limits. Consistent with Section 6.4.1 of the Milwaukee River TMDL Report, in cases where the equivalent TSS concentration limit is ≤ 12 mg/L, the effluent limit will be expressed as a concentration of 12 mg/L monthly average.

Total Suspended Solids Wasteload Allocations

Month	Monthly TSS WLA ¹ (lbs/month)	Days Per Month	Monthly Ave TSS Effluent Limit ² (lbs/day)	Equivalent Conc. Limit ³ at 2.046 MGD (mg/L)	Weekly Ave TSS Effluent Limit ⁴ (lbs/day)	Equivalent Conc. Limit ³ at 2.046 MGD (mg/L)
Jan	1,897.60	31	61.2	3.59	116	6.82
Feb	957.59	28	34.2	2.00	65.0	3.81
Mar	713.86	31	23.0	1.35	43.8	2.56

Attachment #1

Apr	866.59	30	28.9	1.69	54.9	3.22
May	1,966.30	31	63.4	3.72	121	7.06
Jun	1,617.72	30	53.9	3.16	102	6.00
Jul	1,316.54	31	42.5	2.49	80.7	4.73
Aug	1,093.42	31	35.3	2.07	67.0	3.93
Sep	1,791.81	30	59.7	3.50	113	6.65
Oct	1,571.14	31	50.7	2.97	96.3	5.64
Nov	2,631.20	30	87.7	5.14	167	9.77
Dec	1,958.26	31	63.2	3.70	120	7.03

Footnotes:

1- Milwaukee River Basin TMDL Appendix A. Monthly Total Suspended Solids Wasteload Allocation by Permitted Point Source. Table A.19 for the Milwaukee River Watershed

2- Monthly average TSS effluent limit (lbs/day) = maximum monthly TSS WLA (lbs/month) ÷ days per month

3- Equivalent Concentration = mass / (annual average design flow * 8.34)

4- Weekly average effluent limit (lbs/day) = monthly average limit (lbs/day) x multiplier

The multiplier used in the weekly average calculation was determined according to implementation guidance. A coefficient of variation was calculated, based on TSS mass monitoring data, to be 0.7. This is the standard deviation divided by the mean of mass data. However, it is believed that the optimization of the wastewater treatment system to achieve the WLA-derived permit limits will reduce effluent variability. Thus, the maximum anticipated coefficient of variation expected by the facility is 0.6. This value, along with monitoring frequency, is used to select the multiplier. The current permit specifies TSS monitoring as 4/week; if a different monitoring frequency is used, the stated limits should be reevaluated.

Because the weekly and monthly average TSS effluent limits equate to concentration limits of less than 12 mg/L year-round, mass-based limits for TSS are not needed for permit reissuance. Instead, **it is recommended that the monthly and weekly average limits of 12 mg/L be included in the reissued permit.**

PART 8 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation.

Temperature limits are based on actual effluent flow. For planning purposes, temperature limits below are calculated using the proposed daily maximum design flow of 5.418 MGD and monthly maximum design flow of 2.619 MGD.

The table below summarizes the maximum temperatures reported during monitoring from 01/01/2021 to 12/31/2021.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(°F)
JAN	52	52	54	83
FEB	50	51	56	84
MAR	51	52	62	91
APR	54	58	66	102
MAY	67	69	71	91
JUN	69	71	80	87
JUL	70	70	84	87
AUG	76	77	84	86
SEP	69	75	77	85
OCT	68	81	65	85
NOV	61	62	53	86
DEC	56	57	54	83

Reasonable Potential

Permit limits for temperature are recommended based on the procedures in s. NR 106.56, Wis. Adm. Code.

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
 - (a) The highest recorded representative daily maximum effluent temperature
 - (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub-lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
 - (a) The highest weekly average effluent temperature for the month.
 - (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. The months in which limitations are recommended are shown in bold. Based on this analysis, weekly average temperature maximum limits are necessary for the months of October, November, and December.

Dissipative Cooling Study

Jackson submitted a dissipative cooling (DC) study in February 2016 which is why there aren't current temperature limits. **With the increase in design flow rates, another DC study would need to be conducted.**

PART 9 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document (October 29, 2019)*.

The need for WET testing was not evaluated for this planning limits memo. It will be evaluated in the next permit reissuance. Due to the increase in design flow, the chronic WET limit calculation would change if a limit is needed, which is shown below.

The instream waste concentration (IWC) is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The IWC of **81%** shown in the WET Checklist summary below was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

$$\text{IWC (as \%)} = Q_e \div \{(1 - f) Q_e + Q_s\} \times 100$$

Where:

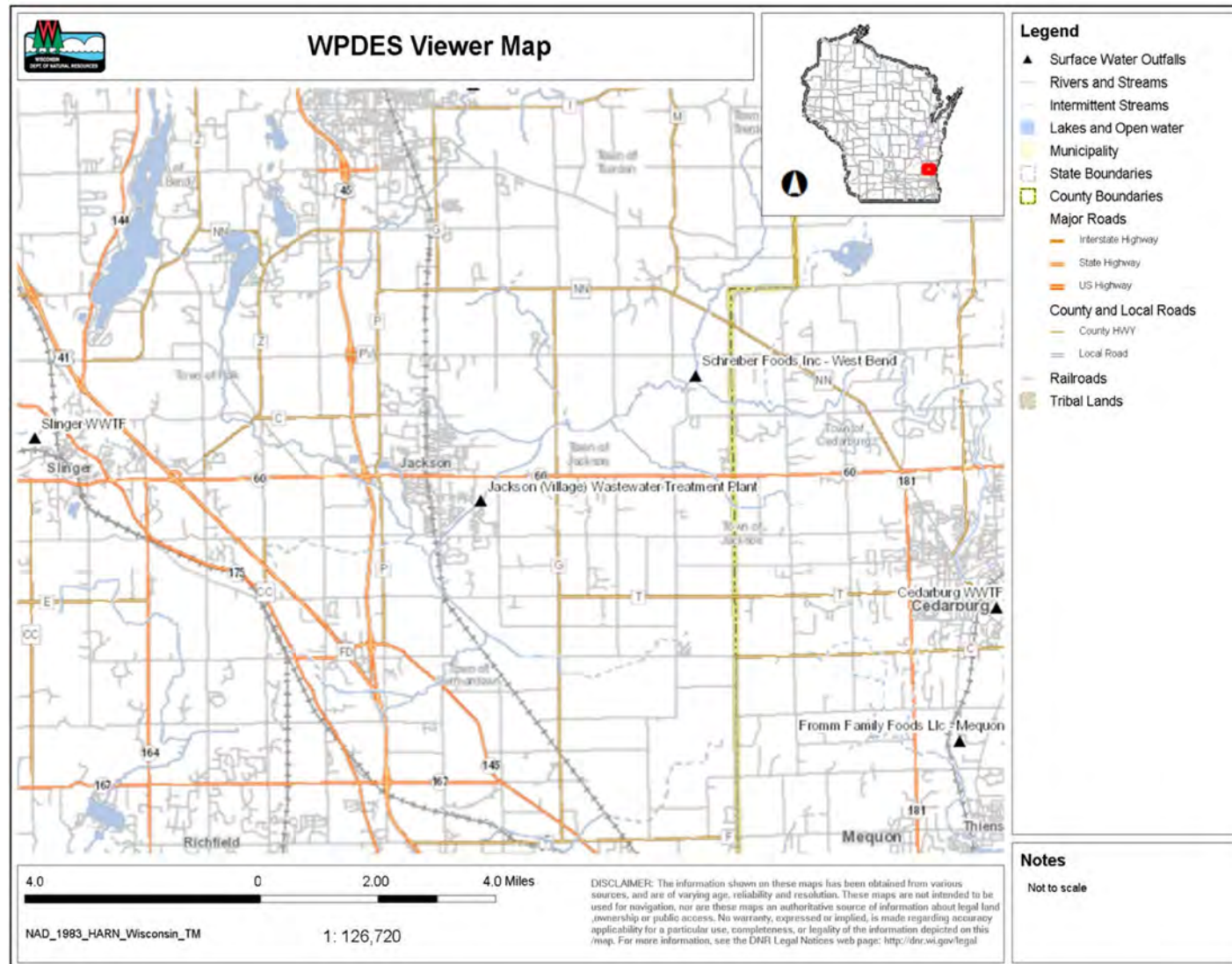
Q_e = annual average flow = 2.046 MGD = 3.17 cfs

f = fraction of the Q_e withdrawn from the receiving water = 0

Q_s = $\frac{1}{4}$ of the 7- Q_{10} = 3.0 cfs $\div$ 4 = 0.75 cfs

$$\text{IWC} = 81\%$$

Chronic WET limit = $[100/\text{IWC}] \text{ TU}_c = 1.2 \text{ TU}_c$ expressed as a monthly average



Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

Facility:	Jackson	7-Q₁₀:	3.00	cfs	Temp Dates	
Outfall(s):	001	Dilution:	25%		Start:	04/01/21 10/01/17
Date Prepared:	5/19/2022	f:	0		End:	12/31/21 03/31/22
Design Flow (Q_e):	2.046 MGD	Stream type:	Small warm water sport or forage fish co			
Storm Sewer Dist.	540 ft	Qs:Q_e ratio:	0.2	:1		
		Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs) (cfs)	Representative Highest Effluent Flow Rate (Q _e)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	T _a (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Q _{esl})	Daily Maximum Flow Rate (Q _{ea})		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)		(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	33	49	76	5.30	2.619	5.418	0	52	52	54	83
FEB	34	50	76	6.00	2.619	5.418	0	50	51	56	84
MAR	38	52	77	12.00	2.619	5.418	0	51	52	62	91
APR	48	55	79	25.00	2.619	5.418	0	54	58	66	102
MAY	58	65	82	13.00	2.619	5.418	0	60	63	71	91
JUN	66	76	84	6.50	2.619	5.418	0	66	66	80	87
JUL	69	81	85	4.60	2.619	5.418	0	70	70	84	87
AUG	67	81	84	3.90	2.619	5.418	0	70	72	84	86
SEP	60	73	82	4.50	2.619	5.418	0	69	70	77	85
OCT	50	61	80	5.40	2.619	5.418	0	68	68	65	85
NOV	40	49	77	7.90	2.619	5.418	0	61	62	53	86
DEC	35	49	76	6.10	2.619	5.418	0	56	57	54	83

July 5, 2022

Mr. Jason Knutson, P.E.
Environmental Engineer Supervisor
Department of Natural Resources
101 South Webster Street
P.O. Box 7921
Madison, WI 53707-7921

Dear Mr. Knutson,

The Village of Jackson is undertaking facilities planning for an upgrade to their wastewater treatment facility. This facilities planning document will evaluate the requirements necessary to accommodate future loading conditions, WWTF upgrades, and future phosphorus limits.

At this time we are requesting planning effluent limits for the proposed facility at the current outfall location so that we may proceed with the planning process. The design effluent flow for the proposed upgrade is based on the Village's population projections and an estimation of the infiltration and inflow rates for the collection system. The facility currently discharges to Cedar Creek in the Milwaukee River Basin, with the outfall located on the east side of the WWTF site. This outfall location is shown on the attached map.

In addition to the map, I am also attaching an Effluent Limit Request Worksheet. Please let me know if you need additional information to complete your evaluation. If you have any questions or concerns, please feel free to contact me at 608.273.3350, or at gdroessler@tcengineers.net.

Sincerely,
TOWN & COUNTRY ENGINEERING, INC.



Gregory J. Droessler, P.E.
Vice-President

Enclosures

cc: Mr. Brian Kober, P.E. - Director of Public Works, Village of Jackson (email)



Surface Water Data Viewer Map



Legend

- Waterway and Wetland Alterations
- ◆ Informal Actions
- ▲ Exemption Determinations
- Ordinary High Water Mark Determinations
- Navigability Determinations
 - Yes
 - Yes with Agricultural Exemption
 - No
- ▲ Surface Water Outfalls
- Railroads
- Index to EN_Image_Basemap_Leaf_Off

0.1 0 0.03 0.1 Miles

NAD_1983_HARN_Wisconsin_TM

1: 1,980

DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

Notes

EFFLUENT LIMIT REQUEST WORKSHEET

Page 1 of 2

Part I - General Information

A. Permittee	Village of Jackson
B. Permit Number	WI 0021806-07-1
C. County	Washington
D. Discharge Location Map	Attached
E. 20-Year Sewer Service Area	Attached
F. Population Projection	
1. Existing Population	7,185
2. Future 20-Year Increase	3,654
3. Un-sewered area Increase	0
G. Approval from Regional Planning	SEWRPC

Part II - Flow Projections

A. Residential		
1. Existing Per Capita Flow	GPCD	49
2. Future Increase Per Capita Flow	GPCD	49
3. Un-sewered Area Per Capita Flow	GPCD	0
4. Total Residential Flow	MGD	0.561
B. Commercial		
1. Existing Commercial Flow	MGD	0.064
2. Future Commercial Increase	MGD	0.295
C. Industrial Flow		
1. Total Non-Metered Industries	MGD	0.000
2. Total Metered Industries	MGD	0.062
3. Future Industrial Increase	MGD	0.285
D. Public Sector		
1. Existing Public Sector Flow	MGD	0.008
2. Future Public Sector Increase	MGD	0.002
E. Outside Contributors		
1. Septage Hauling	MGD	0.009
2. Holding Tank Waste	MGD	0.049
F. Dry Weather Infiltration		
1. Min Sustained Infiltration	MGD	0.415
2. Average Annual I and I	MGD	0.711
G. Wet Weather I and I		
1. Max Monthly	MGD	1.284
2. Sustained	MGD	1.284
3. Future Sustained	MGD	0.000
4. Max Weekly	MGD	2.087
5. Max Daily	MGD	3.110
H. Future Clear Water Reduction	MGD	0.000
I. Peaking Factors		
1. Max Week Peaking Factor (for A through D)		1.25
2. Max Daily Peaking Factor (for A through D)		1.75
3. Max Hourly Peaking Factor (for A through D)		2.50
4. Instantaneous Inflow Factor		1.50

EFFLUENT LIMIT REQUEST WORKSHEET

Page 2 of 2

Part III - Flow Summary

A. Dry Weather Flows

1. Average: $A+B+C+D+E+F1$	MGD	1.750
2. Max Daily: $PF \times (A+B+C+D)+E+F1+G3$	MGD	2.708
3. Annual Average: $A+B+C+D+E+F2+G3-H$	MGD	2.046

B. Wet Weather Flows

1. Max Monthly: $A+B+C+D+E+G1-H$	MGD	2.619
2. Sustained Design: $A+B+C+D+E+G2+G3-H$	MGD	2.619
3. Max Weekly: $PF1 \times (A+B+C+D)+E+G3+G4-H$	MGD	3.741
4. Max Daily: $PF2 \times (A+B+C+D)+E+G3+G5-H$	MGD	5.403
5. Peak Hourly: $PF3 \times (A+B+C+D)+E+G3+(PF4 \times G5)-H$	MGD	7.916

Part IV - Anti-Degradation

A. Current Permitted Design Flow	MGD	1.690
B. Design Flow > Current Permit Flow?		No

Appendix K

Compliance Maintenance Annual Reports

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:

7/11/2019

2018

Influent Flow and Loading

1. Monthly Average Flows and (C)BOD Loadings

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

Influent No. 701	Influent Monthly Average Flow, MGD	x	Influent Monthly Average (C)BOD Concentration mg/L	x	8.34	=	Influent Monthly Average (C)BOD Loading, lbs/day
January	0.8933	x	318	x	8.34	=	2,369
February	1.0724	x	277	x	8.34	=	2,475
March	1.0113	x	297	x	8.34	=	2,508
April	1.3816	x	258	x	8.34	=	2,969
May	1.5771	x	216	x	8.34	=	2,836
June	1.0530	x	254	x	8.34	=	2,234
July	0.9429	x	298	x	8.34	=	2,341
August	1.3423	x	275	x	8.34	=	3,079
September	1.6080	x	201	x	8.34	=	2,698
October	1.5397	x	186	x	8.34	=	2,388
November	1.2677	x	253	x	8.34	=	2,670
December	1.2177	x	278	x	8.34	=	2,819

2. Maximum Monthly Design Flow and Design (C)BOD Loading

2.1 Verify the design flow and loading for your facility.

Design	Design Factor	x	%	=	% of Design
Max Month Design Flow, MGD	1.875	x	90	=	1.6875
		x	100	=	1.875
Design (C)BOD, lbs/day	2980	x	90	=	2682
		x	100	=	2980

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

	Months of Influent	Number of times flow was greater than 90% of	Number of times flow was greater than 100% of	Number of times (C)BOD was greater than 90% of design	Number of times (C)BOD was greater than 100% of design
January	1	0	0	0	0
February	1	0	0	0	0
March	1	0	0	0	0
April	1	0	0	1	0
May	1	0	0	1	0
June	1	0	0	0	0
July	1	0	0	0	0
August	1	0	0	1	1
September	1	0	0	1	0
October	1	0	0	0	0
November	1	0	0	0	0
December	1	0	0	1	0
Points per each		2	1	3	2
Exceedances		0	0	5	1
Points		0	0	15	2
Total Number of Points					17

17

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:

7/11/2019

2018

3. Flow Meter

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

- ☒ Yes Enter last calibration date (MM/DD/YYYY)

2018-08-19

☐ No

If No, please explain:

4. Sewer Use Ordinance

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

☒ Yes

☐ No

If No, please explain:

4.2 Was it necessary to enforce the ordinance?

☐ Yes

☒ No

If Yes, please explain:

5. Septage Receiving

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

Septic Tanks

Holding Tanks

Grease Traps

☒ Yes

☒ Yes

☐ Yes

☐ No

☐ No

☒ No

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

Septic Tanks

☒ Yes

3,443,800 gallons

☐ No

Holding Tanks

☒ Yes

19,412,850 gallons

☐ No

Grease Traps

☐ Yes

gallons

☒ No

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

Septic flow is controlled at a rate that doesn't affect the performance of the plant.

6. Pretreatment

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

☐ Yes

☒ No

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

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

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:
7/11/2019 **2018**

☐ Yes ☒ No If yes, describe the types of wastes received and any procedures or other restrictions that were in place to protect the facility from the discharge of hauled industrial wastes.	
--	--

Total Points Generated	17
Score (100 - Total Points Generated)	83
Section Grade	B

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:

7/11/2019

2018

Effluent Quality and Plant Performance (BOD/CBOD)

1. Effluent (C)BOD Results

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

Outfall No. 001	Monthly Average Limit (mg/L)	90% of Permit Limit > 10 (mg/L)	Effluent Monthly Average (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance	90% Permit Limit Exceedance
January	17	15.3	4	1	0	0
February	17	15.3	4	1	0	0
March	17	15.3	5	1	0	0
April	17	15.3	5	1	0	0
May	12	10.8	6	1	0	0
June	12	10.8	4	1	0	0
July	12	10.8	5	1	0	0
August	12	10.8	4	1	0	0
September	12	10.8	3	1	0	0
October	12	10.8	4	1	0	0
November	17	15.3	5	1	0	0
December	17	15.3	5	1	0	0

* Equals limit if limit is ≤ 10

Months of discharge/yr	12		
Points per each exceedance with 12 months of discharge		7	3
Exceedances		0	0
Points		0	0
Total number of points			0

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

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

2. Flow Meter Calibration

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

- ☒ Yes Enter last calibration date (MM/DD/YYYY)

2018-08-19

- ☐ No

If No, please explain:

3. Treatment Problems

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

None

4. Other Monitoring and Limits

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

- ☒ Yes

- ☐ No

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:
7/11/2019 **2018**

If Yes, please explain:

09/28/2018 - High Cl₂ residual result due to dechlor chemical line becoming dislodged and partially sucking air into line. Line was secured and two hours later retested with results less than 12ug/l.

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

- ☐ Yes
- ☒ No

If Yes, please explain:

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

- ☐ Yes
- ☐ No
- ☒ N/A

Please explain unless not applicable:

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

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:

7/11/2019

2018

Effluent Quality and Plant Performance (Total Suspended Solids)

1. Effluent Total Suspended Solids Results

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

Outfall No. 001	Monthly Average Limit (mg/L)	90% of Permit Limit >10 (mg/L)	Effluent Monthly Average (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance	90% Permit Limit Exceedance
January	12	10.8	2	1	0	0
February	12	10.8	3	1	0	0
March	12	10.8	2	1	0	0
April	12	10.8	2	1	0	0
May	12	10.8	2	1	0	0
June	12	10.8	2	1	0	0
July	12	10.8	2	1	0	0
August	12	10.8	2	1	0	0
September	12	10.8	2	1	0	0
October	12	10.8	2	1	0	0
November	12	10.8	3	1	0	0
December	12	10.8	3	1	0	0

* Equals limit if limit is <= 10

Months of Discharge/yr	12		
Points per each exceedance with 12 months of discharge:		7	3
Exceedances		0	0
Points		0	0
Total Number of Points		0	

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

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

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

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

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Effluent Quality and Plant Performance (Ammonia - NH3)

1. Effluent Ammonia Results

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

Outfall No. 001	Monthly Average NH3 Limit (mg/L)	Weekly Average NH3 Limit (mg/L)	Effluent Monthly Average NH3 (mg/L)	Monthly Permit Limit Exceed ance	Effluent Weekly Average for Week 1	Effluent Weekly Average for Week 2	Effluent Weekly Average for Week 3	Effluent Weekly Average for Week 4	Weekly Permit Limit Exceed ance
January	7		.19777777	8 0					
February	7		.453125	0					
March	7		.16823529	4 0					
April	4.3		.48833333	3 0					
May	5.7		.49166666	7 0					
June	3.9		.171875	0					
July	3.9		1.11166666	7 0					
August	3.9		.25444444	4 0					
September	3.9		.18647058	8 0					
October	4.3		.19888888	9 0					
November	7		.20529411	8 0					
December	7		.17222222	2 0					
Points per each exceedance of Monthly average:									10
Exceedances, Monthly:									0
Points:									0
Points per each exceedance of weekly average (when there is no monthly average):									2.5
Exceedances, Weekly:									0
Points:									0
Total Number of Points									0

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

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

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

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Effluent Quality and Plant Performance (Phosphorus)

1. Effluent Phosphorus Results

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

Outfall No. 001	Monthly Average phosphorus Limit (mg/L)	Effluent Monthly Average phosphorus (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance
January	.85	0.695	1	0
February	.85	0.775	1	0
March	.85	0.744	1	0
April	.85	0.800	1	0
May	.85	0.768	1	0
June	.85	0.644	1	0
July	.85	0.700	1	0
August	.85	0.661	1	0
September	.85	0.542	1	0
October	.85	0.636	1	0
November	.85	0.819	1	0
December	.85	0.575	1	0
Months of Discharge/yr			12	
Points per each exceedance with 12 months of discharge:				10
Exceedances				0
Total Number of Points				0

0

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

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

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

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

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Biosolids Quality and Management

1. Biosolids Use/Disposal

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

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

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

1.1.1 If you checked Other, please describe:

3. Biosolids Metals

Number of biosolids outfalls in your WPDES permit:

3.1 For each outfall tested, verify the biosolids metal quality values for your facility during the last calendar year.

Outfall No. 002 - ANAEROBIC LIQUID

Parameter	80% of Limit	H.Q. Limit	Ceiling Limit	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	80% Value	High Quality	Ceiling
Arsenic		41	75				6.29										0	0
Cadmium		39	85				<3.3										0	0
Copper		1500	4300		741		950			21.1				18.7			0	0
Lead		300	840				17.8										0	0
Mercury		17	57				.9										0	0
Molybdenum	60		75				17.2									0		0
Nickel	336		420				25.5									0		0
Selenium	80		100				<19.8									0		0
Zinc		2800	7500				930										0	0

3.1.1 Number of times any of the metals exceeded the high quality limits OR 80% of the limit for molybdenum, nickel, or selenium = 0

Exceedence Points

- 0 (0 Points)
- 1-2 (10 Points)
- > 2 (15 Points)

3.1.2 If you exceeded the high quality limits, did you cumulatively track the metals loading at each land application site? (check applicable box)

- Yes
- No (10 points)
- N/A - Did not exceed limits or no HQ limit applies (0 points)
- N/A - Did not land apply biosolids until limit was met (0 points)

3.1.3 Number of times any of the metals exceeded the ceiling limits = 0

Exceedence Points

- 0 (0 Points)
- 1 (10 Points)
- > 1 (15 Points)

3.1.4 Were biosolids land applied which exceeded the ceiling limit?

- Yes (20 Points)
- No (0 Points)

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3.1.5 If any metal limit (high quality or ceiling) was exceeded at any time, what action was taken? Has the source of the metals been identified?	0
4. Pathogen Control (per outfall): 4.1 Verify the following information. If any information is incorrect, use the Report Issue button under the Options header in the left-side menu. 4.2 If exceeded Class B limit or did not meet the process criteria at the time of land application. 4.2.1 Was the limit exceeded or the process criteria not met at the time of land application? ○ Yes (40 Points) ● No If yes, what action was taken?	0
5. Vector Attraction Reduction (per outfall): 5.1 Verify the following information. If any of the information is incorrect, use the Report Issue button under the Options header in the left-side menu. 5.2 Was the limit exceeded or the process criteria not met at the time of land application? ○ Yes (40 Points) ● No If yes, what action was taken?	0
6. Biosolids Storage 6.1 How many days of actual, current biosolids storage capacity did your wastewater treatment facility have either on-site or off-site? ● >= 180 days (0 Points) ○ 150 - 179 days (10 Points) ○ 120 - 149 days (20 Points) ○ 90 - 119 days (30 Points) ○ < 90 days (40 Points) ○ N/A (0 Points) 6.2 If you checked N/A above, explain why.	0
7. Issues 7.1 Describe any outstanding biosolids issues with treatment, use or overall management: No biosolids issues and overall management went well in 2018.	

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

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Staffing and Preventative Maintenance (All Treatment Plants)

1. Plant Staffing 1.1 Was your wastewater treatment plant adequately staffed last year? ● Yes ○ No If No, please explain: Could use more help/staff for: 1.2 Did your wastewater staff have adequate time to properly operate and maintain the plant and fulfill all wastewater management tasks including recordkeeping? ● Yes ○ No If No, please explain:	
2. Preventative Maintenance 2.1 Did your plant have a documented AND implemented plan for preventative maintenance on major equipment items? ● Yes (Continue with question 2) ☐☐ ○ No (40 points)☐☐ If No, please explain, then go to question 3: 2.2 Did this preventative maintenance program depict frequency of intervals, types of lubrication, and other tasks necessary for each piece of equipment? ● Yes ○ No (10 points) 2.3 Were these preventative maintenance tasks, as well as major equipment repairs, recorded and filed so future maintenance problems can be assessed properly? ● Yes ○ Paper file system ○ Computer system ● Both paper and computer system ○ No (10 points)	0
3. O&M Manual 3.1 Does your plant have a detailed O&M and Manufacturer Equipment Manuals that can be used as a reference when needed? ● Yes ○ No	
4. Overall Maintenance /Repairs 4.1 Rate the overall maintenance of your wastewater plant. ○ Excellent ● Very good ○ Good ○ Fair ○ Poor Describe your rating: The WWTF Staff maintains the plant O&M in a efficient & timely Manner.	

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

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Operator Certification and Education

1. Operator-In-Charge

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

- Yes (0 points)
- No (20 points)

Name:

DANIEL J WAALA

Certification No:

19632

0

2. Certification Requirements

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

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

2.2 Was the operator-in-charge certified at the appropriate level and subclass(es) to operate this plant? (Note: Certification in subclass SS, N and A5 not required in 2018; subclass SS is basic level only.)

- Yes (0 points)
- No (20 points)

0

3. Succession Planning

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

- ☒ One or more additional certified operators on staff
- ☐ An arrangement with another certified operator
- ☒ An arrangement with another community with a certified operator
- ☐ An operator on staff who has an operator-in-training certificate for your plant and is expected to be certified within one year
- ☒ A consultant to serve as your certified operator
- ☐ None of the above (20 points)

If "None of the above" is selected, please explain:

0

4. Continuing Education Credits

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4.1 If you had a designated operator-in-charge, was the operator-in-charge earning Continuing Education Credits at the following rates? OIT and Basic Certification: ○ Averaging 6 or more CECs per year. ○ Averaging less than 6 CECs per year. Advanced Certification: ● Averaging 8 or more CECs per year. ○ Averaging less than 8 CECs per year.	
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Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	A

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Financial Management

1. Provider of Financial Information

Name:

Brian W. Kober

Telephone:

262-677-0707

(XXX) XXX-XXXX

E-Mail Address
(optional):

dirpubwks@villageofjackson.com

2. Treatment Works Operating Revenues

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

● Yes (0 points) ☐

○ No (40 points)

If No, please explain:

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

2018

● 0-2 years ago (0 points) ☐

○ 3 or more years ago (20 points) ☐

○ N/A (private facility)

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

● Yes (0 points)

○ No (40 points)

0

REPLACEMENT FUNDS [PUBLIC MUNICIPAL FACILITIES SHALL COMPLETE QUESTION 3]

3. Equipment Replacement Funds

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

Year:

2018

● 1-2 years ago (0 points) ☐

○ 3 or more years ago (20 points) ☐

○ N/A

If N/A, please explain:

3.2 Equipment Replacement Fund Activity

3.2.1 Ending Balance Reported on Last Year's CMAR

\$ 736,978.48

3.2.2 Adjustments - if necessary (e.g. earned interest, audit correction, withdrawal of excess funds, increase making up previous shortfall, etc.)

\$ 0.00

3.2.3 Adjusted January 1st Beginning Balance

\$ 736,978.48

3.2.4 Additions to Fund (e.g. portion of User Fee, earned interest, etc.)

+ \$ 235,533.00

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

- \$ 349,490.13

3.2.6 Ending Balance as of December 31st for CMAR Reporting Year

\$ 623,021.35

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

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

SCADA System upgrade was a major expense.

3.3 What amount should be in your Replacement Fund? \$ 235,533.00

0

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

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

● Yes

○ No

If No, please explain.

4. Future Planning

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

● Yes - If Yes, please provide major project information, if not already listed below. ☐ ☐

○ No

Project #	Project Description	Estimated Cost	Approximate Construction Year
1	The current discharge permit has a ten year compliance requirement for lower phosphorus limit. We are investigating a variety of option to meet the lower limit.	75000	2022

5. Financial Management General Comments

ENERGY EFFICIENCY AND USE

6. Collection System

6.1 Energy Usage

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

COLLECTION SYSTEM PUMPAGE: Total Power Consumed

Number of Municipally Owned Pump/Lift Stations: 1

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	Electricity Consumed (kWh)	Natural Gas Consumed (therms)
January	259	
February	278	
March	273	
April	273	
May	366	
June	334	
July	243	
August	204	
September	383	
October	344	
November	311	
December	388	
Total	3,656	0
Average	305	0

6.1.2 Comments:

6.2 Energy Related Processes and Equipment

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

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

6.2.2 Comments:

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

● No

○ Yes

Year:

By Whom:

Describe and Comment:

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6.4 Future Energy Related Equipment

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

none

7. Treatment Facility

7.1 Energy Usage

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

TREATMENT PLANT: Total Power Consumed/Month

	Electricity Consumed (kWh)	Total Influent Flow (MG)	Electricity Consumed/ Flow (kWh/MG)	Total Influent BOD (1000 lbs)	Electricity Consumed/ Total Influent BOD (kWh/1000lbs)	Natural Gas Consumed (therms)
January	111,760	27.69	4,036	73.44	1,522	4,841
February	93,360	30.03	3,109	69.30	1,347	4,579
March	90,480	31.35	2,886	77.75	1,164	2,436
April	106,240	41.45	2,563	89.07	1,193	2,901
May	86,560	48.89	1,771	87.92	985	1,134
June	86,000	31.59	2,722	67.02	1,283	977
July	89,840	29.23	3,074	72.57	1,238	978
August	86,960	41.61	2,090	95.45	911	679
September	88,560	48.24	1,836	80.94	1,094	858
October	81,920	47.73	1,716	74.03	1,107	1,316
November	85,360	38.03	2,245	80.10	1,066	2,029
December	104,320	37.75	2,763	87.39	1,194	4,292
Total	1,111,360	453.59		954.98		27,020
Average	92,613	37.80	2,568	79.58	1,175	2,252

7.1.2 Comments:

Higher electric and gas usage because of Scada System upgrade

7.2 Energy Related Processes and Equipment

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

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

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7.2.2 Comments:

7.3 Future Energy Related Equipment

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

Always looking to save on energy!

8. Biogas Generation

8.1 Do you generate/produce biogas at your facility?

☐ No

☒ Yes

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

☒ Flared Off

☒ Building Heat

☒ Process Heat

☐ Generate Electricity

☐ Other:

9. Energy Efficiency Study

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

☒ No

☐ Yes

☐ Entire facility

Year:

By Whom:

Describe and Comment:

☐ Part of the facility

Year:

By Whom:

Describe and Comment:

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

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Sanitary Sewer Collection Systems

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

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

- ☒ Yes
- ☐ No

If No, explain:

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

- ☒ Yes
- ☐ No (30 points)
- ☐ N/A

If No or N/A, explain:

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

☒ Goals [NR 210.23 (4)(a)]

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

Prevent Overflows, SSO's and basement backup. Rehabilitation and replacement of collection system components

Did you accomplish them?

- ☒ Yes
- ☐ No

If No, explain:

☒ Organization [NR 210.23 (4) (b)] ☐ ☐

Does this chapter of your CMOM include:

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

☒ Legal Authority [NR 210.23 (4) (c)]

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

Sewer Use Ordinance

If you have a Sewer Use Ordinance or other similar document, when was it last reviewed and revised? (MM/DD/YYYY) 2017-05-09

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

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

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

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

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

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

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

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

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

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

Does your emergency response capability include:

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

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

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

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

0

2. Operation and Maintenance

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

Cleaning	1.5	% of system/year
Root removal	0	% of system/year
Flow monitoring	0	% of system/year
Smoke testing	0	% of system/year
Sewer line televising	5.3	% of system/year
Manhole inspections	2.3	% of system/year
Lift station O&M	2	# per L.S./year
Manhole rehabilitation	.5	% of manholes rehabbed
Mainline rehabilitation	.1	% of sewer lines rehabbed
Private sewer inspections	4.5	% of system/year

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Private sewer I/I removal % of private services

River or water crossings % of pipe crossings evaluated or maintained

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

3. Performance Indicators

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

36.56	Total actual amount of precipitation last year in inches
34.3	Annual average precipitation (for your location)
42.5	Miles of sanitary sewer
1	Number of lift stations
0	Number of lift station failures
0	Number of sewer pipe failures
0	Number of basement backup occurrences
0	Number of complaints
1.14	Average daily flow in MGD (if available)
1.608	Peak monthly flow in MGD (if available)
	Peak hourly flow in MGD (if available)

3.2 Performance ratios for the past year:

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

4. Overflows

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

Date	Location	Cause	Estimated Volume (MG)
------	----------	-------	-----------------------

None reported

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

5. Infiltration / Inflow (I/I)

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

☐ Yes

☒ No

If Yes, please describe:

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

☐ Yes

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● No If Yes, please describe: 5.3 Explain any infiltration/inflow (I/I) changes this year from previous years: Repaired 5 manholes, Replaced 21 laterals to property line, Replaced 3 lateral to home, Replaced 247 feet of mainline, Televised 206 private laterals 5.4 What is being done to address infiltration/inflow in your collection system? The utility will continue to address I&I by replacing old mainline when needed, manhole repair or replacement as needed, Replacing private laterals that are found to be failing through lateral inspection.	
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Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	A

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:
7/11/2019 **2018**

Grading Summary

WPDES No: 0021806

SECTIONS	LETTER GRADE	GRADE POINTS	WEIGHTING FACTORS	SECTION POINTS
Influent	B	3	3	9
BOD/CBOD	A	4	10	40
TSS	A	4	5	20
Ammonia	A	4	5	20
Phosphorus	A	4	3	12
Biosolids	A	4	5	20
Staffing/PM	A	4	1	4
OpCert	A	4	1	4
Financial	A	4	1	4
Collection	A	4	3	12
TOTALS			37	145
GRADE POINT AVERAGE (GPA) = 3.92				

Notes:

A = Voluntary Range (Response Optional)

B = Voluntary Range (Response Optional)

C = Recommendation Range (Response Required)

D = Action Range (Response Required)

F = Action Range (Response Required)

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Resolution or Owner's Statement

Name of Governing
Body or Owner:

Village of Jackson

Date of Resolution or
Action Taken:

2019-07-09

Resolution Number:

19-16

Date of Submittal:

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

Influent Flow and Loadings: Grade = B

Effluent Quality: BOD: Grade = A

Effluent Quality: TSS: Grade = A

Effluent Quality: Ammonia: Grade = A

Effluent Quality: Phosphorus: Grade = A

Biosolids Quality and Management: Grade = A

Staffing: Grade = A

Operator Certification: Grade = A

Financial Management: Grade = A

Collection Systems: Grade = A

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

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

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

G.P.A. = 3.92

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DNR Response to Resolution or Owner's Statement

Name of Governing
Body or Owner:

Village of Jackson

Date of Resolution or
Action Taken:

2019-07-09

Resolution Number:

19-16

Date of Submittal:

7/11/2019

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

Influent Flow and Loadings: Grade = B

Permittee Response:

DNR Response:

Although the organic loading approached or exceeded the rated capacity, the treatment level was not negatively affected.

Effluent Quality: BOD: Grade = A

Permittee Response:

DNR Response:

Nice and low indicating a high level of treatment.

Effluent Quality: TSS: Grade = A

Permittee Response:

DNR Response:

Nice and low indicating a high level of treatment.

Effluent Quality: Ammonia: Grade = A

Permittee Response:

DNR Response:

Nice and low indicating a high level of treatment.

Effluent Quality: Phosphorus: Grade = A

Permittee Response:

DNR Response:

Biosolids Quality and Management: Grade = A

Permittee Response:

DNR Response:

Staffing: Grade = A

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Permittee Response:

DNR Response:

Operator Certification: Grade = A

Permittee Response:

DNR Response:

Financial Management: Grade = A

Permittee Response:

DNR Response:

Collection Systems: Grade = A

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

Permittee Response:

DNR Response:

Goals of the CMOM program look good. Peaking factor does not seem too high. Glad there were no SSOs in 2018.

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

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

G.P.A. = 3.92

Permittee Response:

DNR G.P.A. Response:

DNR CMAR Overall Response:

Another year with high grades, nice job everyone!

Thank you for completing your 2018 CMAR. Everything looks to be in order. Based on your grades, no further action is required for this report. Please continue to operate and maintain the wastewater treatment facility and collection system in an efficient and proactive manner.

DNR Reviewer: Lent, Nicholas

Phone: (414) 263-8623

Address: 2300 N Dr Martin Luther King Jr Dr, Milwaukee, WI 53212

Date: 8/23/2019

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:
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Influent Flow and Loading

1. Monthly Average Flows and BOD Loadings

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

Influent No. 701	Influent Monthly Average Flow, MGD	x	Influent Monthly Average BOD Concentration mg/L	x	8.34	=	Influent Monthly Average BOD Loading, lbs/day
January	1.2700	x	216	x	8.34	=	2,283
February	1.2289	x	187	x	8.34	=	1,916
March	1.3790	x	202	x	8.34	=	2,328
April	1.4827	x	224	x	8.34	=	2,765
May	1.5419	x	215	x	8.34	=	2,763
June	1.1830	x	237	x	8.34	=	2,336
July	1.2513	x	226	x	8.34	=	2,357
August	1.0984	x	271	x	8.34	=	2,484
September	1.2527	x	227	x	8.34	=	2,370
October	1.6994	x	239	x	8.34	=	3,386
November	1.4997	x	193	x	8.34	=	2,416
December	1.3723	x	206	x	8.34	=	2,360

2. Maximum Monthly Design Flow and Design BOD Loading

2.1 Verify the design flow and loading for your facility.

Design	Design Factor	x	%	=	% of Design
Max Month Design Flow, MGD	1.875	x	90	=	1.6875
		x	100	=	1.875
Design BOD, lbs/day	2980	x	90	=	2682
		x	100	=	2980

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

	Months of Influent	Number of times flow was greater than 90% of	Number of times flow was greater than 100% of	Number of times BOD was greater than 90% of design	Number of times BOD was greater than 100% of design
January	1	0	0	0	0
February	1	0	0	0	0
March	1	0	0	0	0
April	1	0	0	1	0
May	1	0	0	1	0
June	1	0	0	0	0
July	1	0	0	0	0
August	1	0	0	0	0
September	1	0	0	0	0
October	1	1	0	1	1
November	1	0	0	0	0
December	1	0	0	0	0
Points per each		2	1	3	2
Exceedances		1	0	3	1
Points		2	0	9	2
Total Number of Points					13

13

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3. Flow Meter

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

- ☒ Yes Enter last calibration date (MM/DD/YYYY)

2019-07-07

☐ No

If No, please explain:

4. Sewer Use Ordinance

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

☒ Yes

☐ No

If No, please explain:

4.2 Was it necessary to enforce the ordinance?

☐ Yes

☒ No

If Yes, please explain:

5. Septage Receiving

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

Septic Tanks

Holding Tanks

Grease Traps

☒ Yes

☒ Yes

☒ Yes

☐ No

☐ No

☐ No

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

Septic Tanks

☒ Yes

2,971,000 gallons

☐ No

Holding Tanks

☒ Yes

17,632,600 gallons

☐ No

Grease Traps

☒ Yes

1000 gallons

☐ No

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

The WWTF has a 126,000 gallon septic receiving tank capacity. The operators control flow into the head works to empty the tanks in a 24 hr period. The plant adjust well to this operation

6. Pretreatment

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

☐ Yes

☒ No

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

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6.2 Did your facility accept hauled industrial wastes, landfill leachate, etc.? ☐ Yes ☒ No If yes, describe the types of wastes received and any procedures or other restrictions that were in place to protect the facility from the discharge of hauled industrial wastes.	
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Total Points Generated	13
Score (100 - Total Points Generated)	87
Section Grade	B

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Jackson (Village) Wastewater Treatment Plant

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Effluent Quality and Plant Performance (BOD/CBOD)

1. Effluent (C)BOD Results

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

Outfall No. 001	Monthly Average Limit (mg/L)	90% of Permit Limit > 10 (mg/L)	Effluent Monthly Average (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance	90% Permit Limit Exceedance
January	17	15.3	6	1	0	0
February	17	15.3	6	1	0	0
March	17	15.3	4	1	0	0
April	17	15.3	5	1	0	0
May	12	10.8	4	1	0	0
June	12	10.8	3	1	0	0
July	12	10.8	4	1	0	0
August	12	10.8	4	1	0	0
September	12	10.8	3	1	0	0
October	12	10.8	3	1	0	0
November	17	15.3	4	1	0	0
December	17	15.3	3	1	0	0

* Equals limit if limit is ≤ 10

Months of discharge/yr	12		
Points per each exceedance with 12 months of discharge		7	3
Exceedances		0	0
Points		0	0
Total number of points			0

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

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

N/A

2. Flow Meter Calibration

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

- ☒ Yes Enter last calibration date (MM/DD/YYYY)

☐ No

If No, please explain:

3. Treatment Problems

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

None experienced but, there are always mechanical breakdowns that challenge treatment. The staff adjust to all of these occurrences.

4. Other Monitoring and Limits

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

- ☒ Yes

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☐ No

If Yes, please explain:

9/29/19 the plant experience a high Cl2 residual result. After investigation it was found that the SO2 feeding tube was dislodge from a fitting. The feeding tube broke suction causing no SO2 being fed to the Cl2 chamber. The tube was fixed and the next sample was normal.

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

☐ Yes

☒ No

If Yes, please explain:

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

☐ Yes

☐ No

☒ N/A

Please explain unless not applicable:

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

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Jackson (Village) Wastewater Treatment Plant

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2019

Effluent Quality and Plant Performance (Total Suspended Solids)

1. Effluent Total Suspended Solids Results

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

Outfall No. 001	Monthly Average Limit (mg/L)	90% of Permit Limit >10 (mg/L)	Effluent Monthly Average (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance	90% Permit Limit Exceedance
January	12	10.8	3	1	0	0
February	12	10.8	2	1	0	0
March	12	10.8	2	1	0	0
April	12	10.8	2	1	0	0
May	12	10.8	3	1	0	0
June	12	10.8	2	1	0	0
July	12	10.8	3	1	0	0
August	12	10.8	2	1	0	0
September	12	10.8	1	1	0	0
October	12	10.8	1	1	0	0
November	12	10.8	2	1	0	0
December	12	10.8	2	1	0	0

* Equals limit if limit is ≤ 10

Months of Discharge/yr	12		
Points per each exceedance with 12 months of discharge:		7	3
Exceedances		0	0
Points		0	0
Total Number of Points		0	

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

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

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

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

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Effluent Quality and Plant Performance (Ammonia - NH3)

1. Effluent Ammonia Results

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

Outfall No. 001	Monthly Average NH3 Limit (mg/L)	Weekly Average NH3 Limit (mg/L)	Effluent Monthly Average NH3 (mg/L)	Monthly Permit Limit Exceed ance	Effluent Weekly Average for Week 1	Effluent Weekly Average for Week 2	Effluent Weekly Average for Week 3	Effluent Weekly Average for Week 4	Weekly Permit Limit Exceed ance
January	7		1.118333	333 0					
February	7		1.599375	0					
March	7		.42470588	2 0					
April	4.3		.18411764	7 0					
May	5.7		.15555555	56 0					
June	3.9		.21294117	6 0					
July	3.9		.46722222	22 0					
August	3.9		.36470588	2 0					
September	3.9		.52222222	22 0					
October	4.3		.12222222	22 0					
November	7		.144375	0					
December	7		.24777777	78 0					
Points per each exceedance of Monthly average:									10
Exceedances, Monthly:									0
Points:									0
Points per each exceedance of weekly average (when there is no monthly average):									2.5
Exceedances, Weekly:									0
Points:									0
Total Number of Points									0

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

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

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

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Effluent Quality and Plant Performance (Phosphorus)

1. Effluent Phosphorus Results

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

Outfall No. 001	Monthly Average phosphorus Limit (mg/L)	Effluent Monthly Average phosphorus (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance
January	.85	0.563	1	0
February	.85	0.533	1	0
March	.85	0.488	1	0
April	.85	0.584	1	0
May	.85	0.595	1	0
June	.85	0.626	1	0
July	.85	0.641	1	0
August	.85	0.731	1	0
September	.85	0.746	1	0
October	.85	0.594	1	0
November	.85	0.613	1	0
December	.85	0.605	1	0
Months of Discharge/yr			12	
Points per each exceedance with 12 months of discharge:				10
Exceedances				0
Total Number of Points				0

0

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

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

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

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

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Biosolids Quality and Management

1. Biosolids Use/Disposal

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

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

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

1.1.1 If you checked Other, please describe:

3. Biosolids Metals

Number of biosolids outfalls in your WPDES permit:

3.1 For each outfall tested, verify the biosolids metal quality values for your facility during the last calendar year.

3.1.1 Number of times any of the metals exceeded the high quality limits OR 80% of the limit for molybdenum, nickel, or selenium = 0

Exceedence Points

- 0 (0 Points)
- 1-2 (10 Points)
- > 2 (15 Points)

3.1.2 If you exceeded the high quality limits, did you cumulatively track the metals loading at each land application site? (check applicable box)

- Yes
- No (10 points)

- N/A - Did not exceed limits or no HQ limit applies (0 points)
- N/A - Did not land apply biosolids until limit was met (0 points)

3.1.3 Number of times any of the metals exceeded the ceiling limits = 0

Exceedence Points

- 0 (0 Points)
- 1 (10 Points)
- > 1 (15 Points)

3.1.4 Were biosolids land applied which exceeded the ceiling limit?

- Yes (20 Points)
- No (0 Points)

3.1.5 If any metal limit (high quality or ceiling) was exceeded at any time, what action was taken? Has the source of the metals been identified?

0

4. Pathogen Control (per outfall):

4.1 Verify the following information. If any information is incorrect, use the Report Issue button under the Options header in the left-side menu.

4.2 If exceeded Class B limit or did not meet the process criteria at the time of land application.

4.2.1 Was the limit exceeded or the process criteria not met at the time of land application?

- Yes (40 Points)
- No

If yes, what action was taken?

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	0
5. Vector Attraction Reduction (per outfall): 5.1 Verify the following information. If any of the information is incorrect, use the Report Issue button under the Options header in the left-side menu. 5.2 Was the limit exceeded or the process criteria not met at the time of land application? ☐ Yes (40 Points) ☒ No If yes, what action was taken?	0
6. Biosolids Storage 6.1 How many days of actual, current biosolids storage capacity did your wastewater treatment facility have either on-site or off-site? ☒ >= 180 days (0 Points) ☐ 150 - 179 days (10 Points) ☐ 120 - 149 days (20 Points) ☐ 90 - 119 days (30 Points) ☐ < 90 days (40 Points) ☐ N/A (0 Points) 6.2 If you checked N/A above, explain why.	0
7. Issues 7.1 Describe any outstanding biosolids issues with treatment, use or overall management: No issues noted	

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

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Jackson (Village) Wastewater Treatment Plant

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Staffing and Preventative Maintenance (All Treatment Plants)

1. Plant Staffing 1.1 Was your wastewater treatment plant adequately staffed last year? ● Yes ○ No If No, please explain: Could use more help/staff for: 1.2 Did your wastewater staff have adequate time to properly operate and maintain the plant and fulfill all wastewater management tasks including recordkeeping? ● Yes ○ No If No, please explain:	
2. Preventative Maintenance 2.1 Did your plant have a documented AND implemented plan for preventative maintenance on major equipment items? ● Yes (Continue with question 2) ☐☐ ○ No (40 points)☐☐ If No, please explain, then go to question 3: 2.2 Did this preventative maintenance program depict frequency of intervals, types of lubrication, and other tasks necessary for each piece of equipment? ● Yes ○ No (10 points) 2.3 Were these preventative maintenance tasks, as well as major equipment repairs, recorded and filed so future maintenance problems can be assessed properly? ● Yes ○ Paper file system ○ Computer system ● Both paper and computer system ○ No (10 points)	0
3. O&M Manual 3.1 Does your plant have a detailed O&M and Manufacturer Equipment Manuals that can be used as a reference when needed? ● Yes ○ No	
4. Overall Maintenance /Repairs 4.1 Rate the overall maintenance of your wastewater plant. ○ Excellent ● Very good ○ Good ○ Fair ○ Poor Describe your rating: WWTF staff maintains the plant in a efficient and timely manner	

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Last Updated: Reporting For:
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Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	A

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Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:
9/10/2020 **2019**

Operator Certification and Education

1. Operator-In-Charge

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

- Yes (0 points)
- No (20 points)

Name:

CHAD M RUSS

Certification No:

35582

0

2. Certification Requirements

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

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

2.2 Was the operator-in-charge certified at the appropriate level and subclass(es) to operate this plant? (Note: Certification in subclass SS, N and A5 not required in 2019; subclass SS is basic level only.)

- Yes (0 points)
- No (20 points)

0

3. Succession Planning

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

- ☒ One or more additional certified operators on staff
- ☐ An arrangement with another certified operator
- ☒ An arrangement with another community with a certified operator
- ☐ An operator on staff who has an operator-in-training certificate for your plant and is expected to be certified within one year
- ☐ A consultant to serve as your certified operator
- ☐ None of the above (20 points)

If "None of the above" is selected, please explain:

0

4. Continuing Education Credits

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4.1 If you had a designated operator-in-charge, was the operator-in-charge earning Continuing Education Credits at the following rates?

OIT and Basic Certification:

- Averaging 6 or more CECs per year.
- Averaging less than 6 CECs per year.

Advanced Certification:

- Averaging 8 or more CECs per year.
- Averaging less than 8 CECs per year.

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

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Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:
9/10/2020 **2019**

Financial Management

1. Provider of Financial Information

Name:

Brian W. Kober

Telephone:

262-677-0707

(XXX) XXX-XXXX

E-Mail Address
(optional):

brian.kober@villageofjackson.com

2. Treatment Works Operating Revenues

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

● Yes (0 points) ☐

○ No (40 points)

If No, please explain:

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

2019

● 0-2 years ago (0 points) ☐

○ 3 or more years ago (20 points) ☐

○ N/A (private facility)

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

● Yes (0 points)

○ No (40 points)

0

REPLACEMENT FUNDS [PUBLIC MUNICIPAL FACILITIES SHALL COMPLETE QUESTION 3]

3. Equipment Replacement Funds

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

Year:

2019

● 1-2 years ago (0 points) ☐

○ 3 or more years ago (20 points) ☐

○ N/A

If N/A, please explain:

3.2 Equipment Replacement Fund Activity

3.2.1 Ending Balance Reported on Last Year's CMAR

\$ 623,021.35

3.2.2 Adjustments - if necessary (e.g. earned interest, audit correction, withdrawal of excess funds, increase making up previous shortfall, etc.)

\$ 0.00

3.2.3 Adjusted January 1st Beginning Balance

\$ 623,021.35

3.2.4 Additions to Fund (e.g. portion of User Fee, earned interest, etc.)

+

\$ 343,062.84

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

- \$ 76,117.21

3.2.6 Ending Balance as of December 31st for CMAR Reporting Year

\$ 889,966.98

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

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

Pump, air exchange units, Slice gate replacement, Vulcan motor, Clarifier arm

3.3 What amount should be in your Replacement Fund? \$ 247,810.00

0

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

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

● Yes

○ No

If No, please explain.

4. Future Planning

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

● Yes - If Yes, please provide major project information, if not already listed below. ☐ ☐

○ No

Project #	Project Description	Estimated Cost	Approximate Construction Year
1	The current discharge permit has a August 31, 2026 compliance date requirement for lower phosphorus limit. We are investigating a variety of option to meet the lower limit.	75000	2024

5. Financial Management General Comments

None

ENERGY EFFICIENCY AND USE

6. Collection System

6.1 Energy Usage

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

COLLECTION SYSTEM PUMPAGE: Total Power Consumed

Number of Municipally Owned Pump/Lift Stations: 1

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	Electricity Consumed (kWh)	Natural Gas Consumed (therms)
January	388	
February	440	
March	350	
April	340	
May	396	
June	377	
July	363	
August	382	
September	294	
October	336	
November	373	
December	391	
Total	4,430	0
Average	369	0

6.1.2 Comments:

6.2 Energy Related Processes and Equipment

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

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

6.2.2 Comments:

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

● No

○ Yes

Year:

By Whom:

Describe and Comment:

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6.4 Future Energy Related Equipment

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

None

7. Treatment Facility

7.1 Energy Usage

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

TREATMENT PLANT: Total Power Consumed/Month

	Electricity Consumed (kWh)	Total Influent Flow (MG)	Electricity Consumed/ Flow (kWh/MG)	Total Influent BOD (1000 lbs)	Electricity Consumed/ Total Influent BOD (kWh/1000lbs)	Natural Gas Consumed (therms)
January	113,200	39.37	2,875	70.77	1,600	4,286
February	98,640	34.41	2,867	53.65	1,839	4,291
March	88,720	42.75	2,075	72.17	1,229	3,371
April	88,240	44.48	1,984	82.95	1,064	2,394
May	86,640	47.80	1,813	85.65	1,012	1,215
June	84,800	35.49	2,389	70.08	1,210	456
July	84,240	38.79	2,172	73.07	1,153	245
August	87,680	34.05	2,575	77.00	1,139	336
September	87,440	37.58	2,327	71.10	1,230	413
October	81,360	52.68	1,544	104.97	775	738
November	91,120	44.99	2,025	72.48	1,257	1,816
December	112,080	42.54	2,635	73.16	1,532	2,261
Total	1,104,160	494.93		907.05		21,822
Average	92,013	41.24	2,273	75.59	1,253	1,819

7.1.2 Comments:

7.2 Energy Related Processes and Equipment

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

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

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7.2.2 Comments: 7.3 Future Energy Related Equipment 7.3.1 What energy efficient equipment or practices do you have planned for the future for your treatment facility? none	
8. Biogas Generation 8.1 Do you generate/produce biogas at your facility? ☐ No ☒ Yes If Yes, how is the biogas used (Check all that apply): ☒ Flared Off ☒ Building Heat ☒ Process Heat ☐ Generate Electricity ☐ Other:	
9. Energy Efficiency Study 9.1 Has an Energy Study been performed for your treatment facility? ☒ No ☐ Yes ☐ Entire facility Year: By Whom: Describe and Comment: ☐ Part of the facility Year: By Whom: Describe and Comment:	

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

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Sanitary Sewer Collection Systems

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

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

- ☒ Yes
- ☐ No

If No, explain:

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

- ☒ Yes
- ☐ No (30 points)
- ☐ N/A

If No or N/A, explain:

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

☒ Goals [NR 210.23 (4)(a)]

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

Prevent Overflows,SSO's and mainline backup. Rehabilitation and replacement of laterals and mainline sewer

Did you accomplish them?

- ☒ Yes
- ☐ No

If No, explain:

☐ Organization [NR 210.23 (4) (b)] ☐

Does this chapter of your CMOM include:

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

☒ Legal Authority [NR 210.23 (4) (c)]

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

Sewer Use Ordinance

If you have a Sewer Use Ordinance or other similar document, when was it last reviewed and revised? (MM/DD/YYYY) 2017-09-05

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

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

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

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

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

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

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

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

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

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

Does your emergency response capability include:

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

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

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

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

0

2. Operation and Maintenance

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

Cleaning	1.2	% of system/year
Root removal	0	% of system/year
Flow monitoring	0	% of system/year
Smoke testing	0	% of system/year
Sewer line televising	1.2	% of system/year
Manhole inspections	2.7	% of system/year
Lift station O&M	2	# per L.S./year
Manhole rehabilitation	.01	% of manholes rehabbed
Mainline rehabilitation	0	% of sewer lines rehabbed
Private sewer inspections	3.6	% of system/year

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Private sewer I/I removal % of private services

River or water crossings % of pipe crossings evaluated or maintained

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

3. Performance Indicators

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

Total actual amount of precipitation last year in inches

Annual average precipitation (for your location)

Miles of sanitary sewer

Number of lift stations

Number of lift station failures

Number of sewer pipe failures

Number of basement backup occurrences

Number of complaints

Average daily flow in MGD (if available)

Peak monthly flow in MGD (if available)

Peak hourly flow in MGD (if available)

3.2 Performance ratios for the past year:

Lift station failures (failures/year)

Sewer pipe failures (pipe failures/sewer mile/yr)

Sanitary sewer overflows (number/sewer mile/yr)

Basement backups (number/sewer mile)

Complaints (number/sewer mile)

Peaking factor ratio (Peak Monthly:Annual Daily Avg)

Peaking factor ratio (Peak Hourly:Annual Daily Avg)

4. Overflows

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

Date	Location	Cause	Estimated Volume (MG)
------	----------	-------	-----------------------

None reported

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

5. Infiltration / Inflow (I/I)

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

☐ Yes

☒ No

If Yes, please describe:

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

☐ Yes

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● No If Yes, please describe: 5.3 Explain any infiltration/inflow (I/I) changes this year from previous years: Repaired 7 Manholes, Fixed 2 private laterals, televised 95 laterals 5.4 What is being done to address infiltration/inflow in your collection system? Utility will continue to address I&I by replacing old mainline when needed, manhole repair or replacement as needed. Replacing private laterals that are found to be failing through lateral inspection.	
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Total Points Generated	0
Score (100 - Total Points Generated)	100
Section Grade	A

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Grading Summary

WPDES No: 0021806

SECTIONS	LETTER GRADE	GRADE POINTS	WEIGHTING FACTORS	SECTION POINTS
Influent	B	3	3	9
BOD/CBOD	A	4	10	40
TSS	A	4	5	20
Ammonia	A	4	5	20
Phosphorus	A	4	3	12
Biosolids	A	4	5	20
Staffing/PM	A	4	1	4
OpCert	A	4	1	4
Financial	A	4	1	4
Collection	A	4	3	12
TOTALS			37	145
GRADE POINT AVERAGE (GPA) = 3.92				

Notes:

A = Voluntary Range (Response Optional)

B = Voluntary Range (Response Optional)

C = Recommendation Range (Response Required)

D = Action Range (Response Required)

F = Action Range (Response Required)

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Resolution or Owner's Statement

Name of Governing
Body or Owner:

Village of Jackson

Date of Resolution or
Action Taken:

2020-09-08

Resolution Number:

20-12

Date of Submittal:

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

Influent Flow and Loadings: Grade = B

Effluent Quality: BOD: Grade = A

Effluent Quality: TSS: Grade = A

Effluent Quality: Ammonia: Grade = A

Effluent Quality: Phosphorus: Grade = A

Biosolids Quality and Management: Grade = A

Staffing: Grade = A

Operator Certification: Grade = A

Financial Management: Grade = A

Collection Systems: Grade = A

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

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

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

G.P.A. = 3.92

The staff at the WWTF operate and maintain the facility with a high degree of efficiency. The staff have a great respect for the environment.

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DNR Response to Resolution or Owner's Statement

Name of Governing
Body or Owner:

Village of Jackson

Date of Resolution or
Action Taken:

2020-09-08

Resolution Number:

20-12

Date of Submittal:

9/17/2020

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

Influent Flow and Loadings: Grade = B

Permittee Response:

DNR Response:

Influent flows and loadings were well within the design capacity of the plant.

Effluent Quality: BOD: Grade = A

Permittee Response:

DNR Response:

Effluent BOD quality was great. Approximately 98% removal from influent to effluent on average.

Effluent Quality: TSS: Grade = A

Permittee Response:

DNR Response:

Looks good, per usual.

Effluent Quality: Ammonia: Grade = A

Permittee Response:

DNR Response:

Average concentration < 1 mg/L. Always nice to see that.

Effluent Quality: Phosphorus: Grade = A

Permittee Response:

DNR Response:

The future effluent limits for total phosphorus will be derived from Table A 17 of the Milwaukee River Basin TMDL Report, Appendix A, for the Village of Jackson. These monthly mass discharge limits should be a little bit easier for the Village to meet compared to the previously specified concentration limit of 0.075 mg/L.

Biosolids Quality and Management: Grade = A

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Permittee Response:

DNR Response:

Looks good. I noticed that the most recent soil test reports we have on record (entered into system) are from 2015. I will follow up with a separate email about this showing what we have to make sure we have everything we need for continued land application of biosolids under the Village's WPDES permit. Updated soil test reports should primarily be sent to the specialist for the region: Steve Warrner. His email address is stephen.warrner@wisconsin.gov.

Staffing: Grade = A

Permittee Response:

DNR Response:

No issues

Operator Certification: Grade = A

Permittee Response:

DNR Response:

No issues

Financial Management: Grade = A

Permittee Response:

DNR Response:

No issues

Collection Systems: Grade = A

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

Permittee Response:

DNR Response:

No issues

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

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

G.P.A. = 3.92

Permittee Response:

The staff at the WWTF operate and maintain the facility with a high degree of efficiency. The staff have a great respect for the environment.

DNR G.P.A. Response:

DNR CMAR Overall Response:

Thank you for completing the 2019 CMAR for the Village of Jackson. Everything looks good. Based on the grading for 2019 and the requirements in ch. NR 208, Wis. Adm. Code, no further action is required for this report.

DNR Reviewer: Lent, Nicholas

Address: 2300 N Dr Martin Luther King Jr Dr, Milwaukee, WI 53212

Phone: (414) 263-8623

Date: 9/18/2020

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2020

Influent Flow and Loading

1. Monthly Average Flows and BOD Loadings

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

Influent No. 701	Influent Monthly Average Flow, MGD	x	Influent Monthly Average BOD Concentration mg/L	x	8.34	=	Influent Monthly Average BOD Loading, lbs/day
January	1.2797	x	182	x	8.34	=	1,947
February	1.2210	x	197	x	8.34	=	2,007
March	1.5810	x	188	x	8.34	=	2,483
April	1.2833	x	247	x	8.34	=	2,640
May	1.6074	x	237	x	8.34	=	3,176
June	1.1777	x	219	x	8.34	=	2,149
July	1.2694	x	212	x	8.34	=	2,245
August	1.0419	x	228	x	8.34	=	1,978
September	1.1483	x	206	x	8.34	=	1,972
October	1.1719	x	234	x	8.34	=	2,285
November	1.1223	x	227	x	8.34	=	2,121
December	1.1642	x	236	x	8.34	=	2,291

2. Maximum Monthly Design Flow and Design BOD Loading

2.1 Verify the design flow and loading for your facility.

Design	Design Factor	x	%	=	% of Design
Max Month Design Flow, MGD	1.875	x	90	=	1.6875
		x	100	=	1.875
Design BOD, lbs/day	2980	x	90	=	2682
		x	100	=	2980

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

	Months of Influent	Number of times flow was greater than 90% of	Number of times flow was greater than 100% of	Number of times BOD was greater than 90% of design	Number of times BOD was greater than 100% of design
January	1	0	0	0	0
February	1	0	0	0	0
March	1	0	0	0	0
April	1	0	0	0	0
May	1	0	0	1	1
June	1	0	0	0	0
July	1	0	0	0	0
August	1	0	0	0	0
September	1	0	0	0	0
October	1	0	0	0	0
November	1	0	0	0	0
December	1	0	0	0	0
Points per each		2	1	3	2
Exceedances		0	0	1	1
Points		0	0	3	2
Total Number of Points					5

5

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3. Flow Meter

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

- ☒ Yes Enter last calibration date (MM/DD/YYYY)
2020-08-06

☐ No

If No, please explain:

4. Sewer Use Ordinance

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

☒ Yes

☐ No

If No, please explain:

4.2 Was it necessary to enforce the ordinance?

☐ Yes

☒ No

If Yes, please explain:

5. Septage Receiving

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

Septic Tanks	Holding Tanks	Grease Traps
☒ Yes	☒ Yes	☒ Yes
☐ No	☐ No	☐ No

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

Septic Tanks
☒ Yes 2946550 gallons

☐ No

Holding Tanks
☒ Yes 15874420 gallons

☐ No

Grease Traps
☒ Yes 3100 gallons

☐ No

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

The WWTF has a 126,000 gallon septic receiving station capacity. The operators control the flow from the station to the headworks through a automated valve connected to a flow meter. Operators adjust valve to slowly empty the station over a 24 hr time. The plant adjust well to this operation.

6. Pretreatment

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

☐ Yes

☒ No

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

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6.2 Did your facility accept hauled industrial wastes, landfill leachate, etc.? ☐ Yes ☒ No If yes, describe the types of wastes received and any procedures or other restrictions that were in place to protect the facility from the discharge of hauled industrial wastes.	
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Total Points Generated	5
Score (100 - Total Points Generated)	95
Section Grade	A

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8/12/2021 **2020**

Effluent Quality and Plant Performance (BOD/CBOD)

1. Effluent (C)BOD Results

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

Outfall No. 001	Monthly Average Limit (mg/L)	90% of Permit Limit > 10 (mg/L)	Effluent Monthly Average (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance	90% Permit Limit Exceedance
January	17	15.3	3	1	0	0
February	17	15.3	4	1	0	0
March	17	15.3	3	1	0	0
April	17	15.3	4	1	0	0
May	12	10.8	4	1	0	0
June	12	10.8	3	1	0	0
July	12	10.8	3	1	0	0
August	12	10.8	3	1	0	0
September	12	10.8	4	1	0	0
October	12	10.8	4	1	0	0
November	17	15.3	4	1	0	0
December	17	15.3	3	1	0	0

* Equals limit if limit is ≤ 10

Months of discharge/yr	12		
Points per each exceedance with 12 months of discharge		7	3
Exceedances		0	0
Points		0	0
Total number of points			0

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

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

2. Flow Meter Calibration

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

- ☒ Yes Enter last calibration date (MM/DD/YYYY)

2020-08-06

☐ No

If No, please explain:

3. Treatment Problems

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

N/A

4. Other Monitoring and Limits

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

- ☐ Yes
☒ No

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If Yes, please explain: 4.2 At any time in the past year was there a failure of an effluent acute or chronic whole effluent toxicity (WET) test? ☐ Yes ☒ No If Yes, please explain: 4.3 If the biomonitoring (WET) test did not pass, were steps taken to identify and/or reduce source(s) of toxicity? ☐ Yes ☐ No ☒ N/A Please explain unless not applicable:	
--	--

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

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2020

Effluent Quality and Plant Performance (Total Suspended Solids)

1. Effluent Total Suspended Solids Results

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

Outfall No. 001	Monthly Average Limit (mg/L)	90% of Permit Limit >10 (mg/L)	Effluent Monthly Average (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance	90% Permit Limit Exceedance
January	12	10.8	2	1	0	0
February	12	10.8	2	1	0	0
March	12	10.8	1	1	0	0
April	12	10.8	2	1	0	0
May	12	10.8	2	1	0	0
June	12	10.8	2	1	0	0
July	12	10.8	2	1	0	0
August	12	10.8	2	1	0	0
September	12	10.8	2	1	0	0
October	12	10.8	2	1	0	0
November	12	10.8	2	1	0	0
December	12	10.8	3	1	0	0

* Equals limit if limit is ≤ 10

Months of Discharge/yr	12		
Points per each exceedance with 12 months of discharge:		7	3
Exceedances		0	0
Points		0	0
Total Number of Points		0	

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

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

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

n/a

0

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

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Effluent Quality and Plant Performance (Ammonia - NH3)

1. Effluent Ammonia Results

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

Outfall No. 001	Monthly Average NH3 Limit (mg/L)	Weekly Average NH3 Limit (mg/L)	Effluent Monthly Average NH3 (mg/L)	Monthly Permit Limit Exceed ance	Effluent Weekly Average for Week 1	Effluent Weekly Average for Week 2	Effluent Weekly Average for Week 3	Effluent Weekly Average for Week 4	Weekly Permit Limit Exceed ance
January	7		.25388888	0					
February	7		.255	0					
March	7		.19	0					
April	4.3		.15833333	0					
May	5.7		.14411764	0					
June	3.9		.24411764	0					
July	3.9		.49283333	0					
August	3.9		.28944444	0					
September	3.9		1.1076470	0					
October									
November									
December									
Points per each exceedance of Monthly average:									10
Exceedances, Monthly:									0
Points:									0
Points per each exceedance of weekly average (when there is no monthly average):									2.5
Exceedances, Weekly:									0
Points:									0
Total Number of Points									0

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

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

n/a

0

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

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Effluent Quality and Plant Performance (Phosphorus)

1. Effluent Phosphorus Results

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

Outfall No. 001	Monthly Average phosphorus Limit (mg/L)	Effluent Monthly Average phosphorus (mg/L)	Months of Discharge with a Limit	Permit Limit Exceedance
January	.85	0.625	1	0
February	.85	0.754	1	0
March	.85	0.597	1	0
April	.85	0.676	1	0
May	.85	0.665	1	0
June	.85	0.662	1	0
July	.85	0.587	1	0
August	.85	0.535	1	0
September	.85	0.742	1	0
October	.85	0.606	1	0
November	.85	0.548	1	0
December	.85	0.738	1	0
Months of Discharge/yr			12	
Points per each exceedance with 12 months of discharge:				10
Exceedances				0
Total Number of Points				0

0

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

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

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

n/a

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

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Biosolids Quality and Management

1. Biosolids Use/Disposal

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

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

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

1.1.1 If you checked Other, please describe:

2. Land Application Site

2.1 Last Year's Approved and Active Land Application Sites

2.1.1 How many acres did you have?

980.40 acres

2.1.2 How many acres did you use?

52 acres

2.2 If you did not have enough acres for your land application needs, what action was taken?

2.3 Did you overapply nitrogen on any of your approved land application sites you used last year?

☐ Yes (30 points)

☒ No

2.4 Have all the sites you used last year for land application been soil tested in the previous 4 years?

☒ Yes

☐ No (10 points)

☐ N/A

0

3. Biosolids Metals

Number of biosolids outfalls in your WPDES permit:

3.1 For each outfall tested, verify the biosolids metal quality values for your facility during the last calendar year.

3.1.1 Number of times any of the metals exceeded the high quality limits OR 80% of the limit for molybdenum, nickel, or selenium = 0

Exceedence Points

☒ 0 (0 Points)

☐ 1-2 (10 Points)

☐ > 2 (15 Points)

3.1.2 If you exceeded the high quality limits, did you cumulatively track the metals loading at each land application site? (check applicable box)

☐ Yes

☐ No (10 points)

☒ N/A - Did not exceed limits or no HQ limit applies (0 points)

☐ N/A - Did not land apply biosolids until limit was met (0 points)

3.1.3 Number of times any of the metals exceeded the ceiling limits = 0

Exceedence Points

☒ 0 (0 Points)

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○ 1 (10 Points) ○ > 1 (15 Points) 3.1.4 Were biosolids land applied which exceeded the ceiling limit? ○ Yes (20 Points) ● No (0 Points) 3.1.5 If any metal limit (high quality or ceiling) was exceeded at any time, what action was taken? Has the source of the metals been identified? n/a	0
4. Pathogen Control (per outfall): 4.1 Verify the following information. If any information is incorrect, use the Report Issue button under the Options header in the left-side menu. 4.2 If exceeded Class B limit or did not meet the process criteria at the time of land application. 4.2.1 Was the limit exceeded or the process criteria not met at the time of land application? ○ Yes (40 Points) ● No If yes, what action was taken?	0
5. Vector Attraction Reduction (per outfall): 5.1 Verify the following information. If any of the information is incorrect, use the Report Issue button under the Options header in the left-side menu. 5.2 Was the limit exceeded or the process criteria not met at the time of land application? ○ Yes (40 Points) ● No If yes, what action was taken?	0
6. Biosolids Storage 6.1 How many days of actual, current biosolids storage capacity did your wastewater treatment facility have either on-site or off-site? ● >= 180 days (0 Points) ○ 150 - 179 days (10 Points) ○ 120 - 149 days (20 Points) ○ 90 - 119 days (30 Points) ○ < 90 days (40 Points) ○ N/A (0 Points) 6.2 If you checked N/A above, explain why.	0
7. Issues 7.1 Describe any outstanding biosolids issues with treatment, use or overall management: No outstanding biosolids issues noted	

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

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Staffing and Preventative Maintenance (All Treatment Plants)

1. Plant Staffing 1.1 Was your wastewater treatment plant adequately staffed last year? ● Yes ○ No If No, please explain: Could use more help/staff for: 1.2 Did your wastewater staff have adequate time to properly operate and maintain the plant and fulfill all wastewater management tasks including recordkeeping? ● Yes ○ No If No, please explain:	
2. Preventative Maintenance 2.1 Did your plant have a documented AND implemented plan for preventative maintenance on major equipment items? ● Yes (Continue with question 2) ☐☐ ○ No (40 points)☐☐ If No, please explain, then go to question 3: 2.2 Did this preventative maintenance program depict frequency of intervals, types of lubrication, and other tasks necessary for each piece of equipment? ● Yes ○ No (10 points) 2.3 Were these preventative maintenance tasks, as well as major equipment repairs, recorded and filed so future maintenance problems can be assessed properly? ● Yes ○ Paper file system ○ Computer system ● Both paper and computer system ○ No (10 points)	0
3. O&M Manual 3.1 Does your plant have a detailed O&M and Manufacturer Equipment Manuals that can be used as a reference when needed? ● Yes ○ No	
4. Overall Maintenance /Repairs 4.1 Rate the overall maintenance of your wastewater plant. ○ Excellent ● Very good ○ Good ○ Fair ○ Poor Describe your rating: WWTF staff maintains the plant in a efficient and timely matter	

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

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Operator Certification and Education

1. Operator-In-Charge

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

- Yes (0 points)
- No (20 points)

Name:

CHAD M RUSS

Certification No:

35582

0

2. Certification Requirements

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

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

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

- Yes (0 points)
- No (20 points)

0

3. Succession Planning

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

- ☒ One or more additional certified operators on staff
- ☐ An arrangement with another certified operator
- ☒ An arrangement with another community with a certified operator
- ☐ An operator on staff who has an operator-in-training certificate for your plant and is expected to be certified within one year
- ☐ A consultant to serve as your certified operator
- ☐ None of the above (20 points)

If "None of the above" is selected, please explain:

0

4. Continuing Education Credits

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4.1 If you had a designated operator-in-charge, was the operator-in-charge earning Continuing Education Credits at the following rates?

OIT and Basic Certification:

- Averaging 6 or more CECs per year.
- Averaging less than 6 CECs per year.

Advanced Certification:

- Averaging 8 or more CECs per year.
- Averaging less than 8 CECs per year.

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

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Financial Management

1. Provider of Financial Information

Name:

Brian W. Kober

Telephone:

262-677-0707

(XXX) XXX-XXXX

E-Mail Address
(optional):

brian.kober @villageofjackson.com

2. Treatment Works Operating Revenues

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

● Yes (0 points) ☐

○ No (40 points)

If No, please explain:

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

2020

● 0-2 years ago (0 points) ☐

○ 3 or more years ago (20 points) ☐

○ N/A (private facility)

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

● Yes (0 points)

○ No (40 points)

0

REPLACEMENT FUNDS [PUBLIC MUNICIPAL FACILITIES SHALL COMPLETE QUESTION 3]

3. Equipment Replacement Funds

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

Year:

2020

● 1-2 years ago (0 points) ☐

○ 3 or more years ago (20 points) ☐

○ N/A

If N/A, please explain:

3.2 Equipment Replacement Fund Activity

3.2.1 Ending Balance Reported on Last Year's CMAR

\$ 889,966.98

3.2.2 Adjustments - if necessary (e.g. earned interest, audit correction, withdrawal of excess funds, increase making up previous shortfall, etc.)

\$ 0.00

3.2.3 Adjusted January 1st Beginning Balance

\$ 889,966.98

3.2.4 Additions to Fund (e.g. portion of User Fee, earned interest, etc.)

+

\$ 249,222.27

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

- \$ 72,111.63

3.2.6 Ending Balance as of December 31st for CMAR Reporting Year

\$ 1,067,077.62

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

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

Replaced Various Equipment

3.3 What amount should be in your Replacement Fund? \$ 247,810.00

0

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

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

● Yes

○ No

If No, please explain.

4. Future Planning

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

● Yes - If Yes, please provide major project information, if not already listed below. ☐ ☐

○ No

Project #	Project Description	Estimated Cost	Approximate Construction Year
1	The current discharge permit has a August 31, 2026 compliance date requirement for lower phosphorus limit. We are investigating a variety of options to meet the lower limit. Also, a new Facilities Planning Study is being created.	120,000	2024

5. Financial Management General Comments

ENERGY EFFICIENCY AND USE

6. Collection System

6.1 Energy Usage

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

COLLECTION SYSTEM PUMPAGE: Total Power Consumed

Number of Municipally Owned Pump/Lift Stations: 1

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	Electricity Consumed (kWh)	Natural Gas Consumed (therms)
January	424	
February	340	
March	387	
April	378	
May	341	
June	338	
July	298	
August	239	
September	265	
October	241	
November	259	
December	310	
Total	3,820	0
Average	318	0

6.1.2 Comments:

6.2 Energy Related Processes and Equipment

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

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

6.2.2 Comments:

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

● No

○ Yes

Year:

By Whom:

Describe and Comment:

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6.4 Future Energy Related Equipment

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

None

7. Treatment Facility

7.1 Energy Usage

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

TREATMENT PLANT: Total Power Consumed/Month

	Electricity Consumed (kWh)	Total Influent Flow (MG)	Electricity Consumed/ Flow (kWh/MG)	Total Influent BOD (1000 lbs)	Electricity Consumed/ Total Influent BOD (kWh/1000lbs)	Natural Gas Consumed (therms)
January	101,360	39.67	2,555	60.36	1,679	2,787
February	88,560	35.41	2,501	58.20	1,522	2,400
March	89,360	49.01	1,823	76.97	1,161	1,828
April	98,800	38.50	2,566	79.20	1,247	880
May	91,782	49.83	1,842	98.46	932	1,100
June	83,360	35.33	2,359	64.47	1,293	916
July	96,000	39.35	2,440	69.60	1,379	265
August	84,560	32.30	2,618	61.32	1,379	295
September	91,360	34.45	2,652	59.16	1,544	470
October	85,360	36.33	2,350	70.84	1,205	381
November	98,720	33.67	2,932	63.63	1,551	879
December	125,360	36.09	3,474	71.02	1,765	2,148
Total	1,134,582	459.94		833.23		14,349
Average	94,549	38.33	2,509	69.44	1,388	1,196

7.1.2 Comments:

7.2 Energy Related Processes and Equipment

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

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

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7.2.2 Comments: 7.3 Future Energy Related Equipment 7.3.1 What energy efficient equipment or practices do you have planned for the future for your treatment facility? None	
8. Biogas Generation 8.1 Do you generate/produce biogas at your facility? ☐ No ☒ Yes If Yes, how is the biogas used (Check all that apply): ☒ Flared Off ☒ Building Heat ☒ Process Heat ☐ Generate Electricity ☐ Other: 	
9. Energy Efficiency Study 9.1 Has an Energy Study been performed for your treatment facility? ☒ No ☐ Yes ☐ Entire facility Year: By Whom: Describe and Comment: ☐ Part of the facility Year: By Whom: Describe and Comment: 	

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

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Sanitary Sewer Collection Systems

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

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

- ☒ Yes
- ☐ No

If No, explain:

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

- ☒ Yes
- ☐ No (30 points)
- ☐ N/A

If No or N/A, explain:

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

☒ Goals [NR 210.23 (4)(a)]

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

Prevent SSO's, mainline backup, Rehabilitation or replacement of laterals and mainline sewer.

Did you accomplish them?

- ☒ Yes
- ☐ No

If No, explain:

☒ Organization [NR 210.23 (4) (b)] ☐ ☐

Does this chapter of your CMOM include:

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

☒ Legal Authority [NR 210.23 (4) (c)]

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

Sewer use Ordinance

If you have a Sewer Use Ordinance or other similar document, when was it last reviewed and revised? (MM/DD/YYYY) 2017-05-09

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

- ☒ Private property inflow and infiltration
 - ☒ New sewer and building sewer design, construction, installation, testing and inspection
 - ☒ Rehabilitated sewer and lift station installation, testing and inspection
 - ☒ Sewage flows satellite system and large private users are monitored and controlled, as necessary
 - ☒ Fat, oil and grease control
 - ☒ Enforcement procedures for sewer use non-compliance
 - ☒ Operation and Maintenance [NR 210.23 (4) (d)]
- Does your operation and maintenance program and equipment include the following:
- ☒ Equipment and replacement part inventories
 - ☒ Up-to-date sewer system map
 - ☒ A management system (computer database and/or file system) for collection system information for O&M activities, investigation and rehabilitation

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- ☒ A description of routine operation and maintenance activities (see question 2 below)
- ☒ Capacity assessment program
- ☒ Basement back assessment and correction
- ☒ Regular O&M training

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

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

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

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

Does your emergency response capability include:

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

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

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

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

0

2. Operation and Maintenance

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

Cleaning	1.4	% of system/year
Root removal	0	% of system/year
Flow monitoring	0	% of system/year
Smoke testing	0	% of system/year
Sewer line televising	1.6	% of system/year
Manhole inspections	9.2	% of system/year
Lift station O&M	2	# per L.S./year
Manhole rehabilitation	0.3	% of manholes rehabbed
Mainline rehabilitation	0	% of sewer lines rehabbed
Private sewer inspections	5	% of system/year
Private sewer I/I removal	0	% of private services

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River or water crossings % of pipe crossings evaluated or maintained

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

3. Performance Indicators

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

28.09	Total actual amount of precipitation last year in inches
34.2	Annual average precipitation (for your location)
42.5	Miles of sanitary sewer
1	Number of lift stations
0	Number of lift station failures
0	Number of sewer pipe failures
0	Number of basement backup occurrences
0	Number of complaints
1.16	Average daily flow in MGD (if available)
1.9	Peak monthly flow in MGD (if available)
	Peak hourly flow in MGD (if available)

3.2 Performance ratios for the past year:

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

4. Overflows

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

Date	Location	Cause	Estimated Volume
None reported			

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

5. Infiltration / Inflow (I/I)

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

☐ Yes

☒ No

If Yes, please describe:

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

☐ Yes

☒ No

If Yes, please describe:

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:
8/12/2021 2020

5.3 Explain any infiltration/inflow (I/I) changes this year from previous years: Repaired 7 Laterals, televised 132 laterals 5.4 What is being done to address infiltration/inflow in your collection system? Utility continue to address I&I by replacing old mainline, manhole repair or replacement as needed. Replacing private laterals that are found to be failing through lateral inspection.	
---	--

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

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:
8/12/2021 **2020**

Grading Summary

WPDES No: 0021806

SECTIONS	LETTER GRADE	GRADE POINTS	WEIGHTING FACTORS	SECTION POINTS
Influent	A	4	3	12
BOD/CBOD	A	4	10	40
TSS	A	4	5	20
Ammonia	A	4	5	20
Phosphorus	A	4	3	12
Biosolids	A	4	5	20
Staffing/PM	A	4	1	4
OpCert	A	4	1	4
Financial	A	4	1	4
Collection	A	4	3	12
TOTALS			37	148
GRADE POINT AVERAGE (GPA) = 4.00				

Notes:

A = Voluntary Range (Response Optional)

B = Voluntary Range (Response Optional)

C = Recommendation Range (Response Required)

D = Action Range (Response Required)

F = Action Range (Response Required)

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:
8/12/2021 2020

Resolution or Owner's Statement

Name of Governing
Body or Owner:

Village of Jackson

Date of Resolution or
Action Taken:

2021-08-10

Resolution Number:

21-16

Date of Submittal:

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

Influent Flow and Loadings: Grade = A

Effluent Quality: BOD: Grade = A

Effluent Quality: TSS: Grade = A

Effluent Quality: Ammonia: Grade = A

Effluent Quality: Phosphorus: Grade = A

Biosolids Quality and Management: Grade = A

Staffing: Grade = A

Operator Certification: Grade = A

Financial Management: Grade = A

Collection Systems: Grade = A

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

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

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

G.P.A. = 4.00

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:
8/12/2021 2020

DNR Response to Resolution or Owner's Statement

Name of Governing
Body or Owner:

Village of Jackson

Date of Resolution or
Action Taken:

2021-08-10

Resolution Number:

21-16

Date of Submittal:

8/12/2021

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

Influent Flow and Loadings: Grade = A

Permittee Response:

DNR Response:

Effluent Quality: BOD: Grade = A

Permittee Response:

DNR Response:

Effluent Quality: TSS: Grade = A

Permittee Response:

DNR Response:

Effluent Quality: Ammonia: Grade = A

Permittee Response:

DNR Response:

Effluent Quality: Phosphorus: Grade = A

Permittee Response:

DNR Response:

Biosolids Quality and Management: Grade = A

Permittee Response:

DNR Response:

Staffing: Grade = A

Compliance Maintenance Annual Report

Jackson (Village) Wastewater Treatment Plant

Last Updated: Reporting For:
8/12/2021 2020

Permittee Response:

DNR Response:

Operator Certification: Grade = A

Permittee Response:

DNR Response:

Financial Management: Grade = A

Permittee Response:

DNR Response:

Collection Systems: Grade = A

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

Permittee Response:

DNR Response:

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

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

G.P.A. = 4

Permittee Response:

DNR G.P.A. Response:

DNR CMAR Overall Response:

Thank you for completing the 2020 CMAR for the Village of Jackson.

Based on the grading for 2020 and the requirements in ch. NR 208, Wis. Adm. Code, no further action is required.

DNR Reviewer: Lent, Nicholas

Address: 1027 W Saint Paul Ave, Milwaukee, WI 53212

Phone:

Date: 8/23/2021

Appendix L

Cost Evaluations

Village of Jackson
Jackson Facilities Plan
Facilities Plan Capital Costs
9/20/22

Base Scope - All Projects

1	05-Site Work	\$	2,352,500
2	STR. 10 - Service Building	\$	1,523,100
3	STR. 15 - Influent Screening Building	\$	410,900
4	STR. 20 - Pretreatment Building	\$	761,200
5	STR. 30 - Aeration Basins	\$	780,500
6	STR. 31 - RBC Tanks	\$	50,000
7	STR. 32 - Selector Basins	\$	961,600
8	STR. 35 - Aeration Control Building	\$	26,700
9	STR. 40 - Secondary Clarifiers #1 & #2	\$	109,000
10	STR. 45 - Secondary Clarifiers #3 & #4	\$	1,215,800
11	STR. 46 - Secondary Clarifier #5	\$	868,100
12	STR. 50 - Secondary Sludge Building	\$	1,002,500
13	STR. 55 - RAS Pumping Station	\$	48,000
14	STR. 60 - Tertiary Filter Building	\$	2,094,100
15	STR. 65 - Blower Building	\$	330,400
16	STR. 70 - Disinfection Tank	\$	579,500
17	STR. 75 - Gravity Thickener	\$	30,000
18	STR. 81 - Sludge Drying Beds	\$	40,000
19	STR. 82 - Sludge Processing Building	\$	1,787,200
20	STR. 85 - Sludge Storage Tank	\$	80,000
21	STR. 90 - Sludge Pumping Building	\$	317,700
22	STR. 95 - Storage Garage	\$	698,500
Construction Subtotal		\$	16,067,300
Additional Contractor Costs		\$	2,410,100
Electrical Costs		\$	4,016,900
Total Construction Cost		\$	22,494,300
Additional Design and Management Costs			
	Contingencies	\$	2,249,500
	Engineering, Admin, Legal	\$	2,474,400
	Resident Observation	\$	899,800
Cost Subtotal		\$	5,623,700
Total Project Cost		\$	28,118,000

Additional Scope - Per Alternative		Alt. #1	Alt. #2	Alt. #3
1	05 - Site Work	\$ 24,800	\$ 339,500	\$ 36,800
2	STR. 20 - Existing Waste Station	\$ 326,600	\$ 20,000	\$ 326,600
3	STR. 22 - Waste Receiving Station	\$ -	\$ 495,700	\$ -
4	STR. 25 - Existing Septage Tanks	\$ 124,000	\$ 70,000	\$ 124,000
5	STR. 25 - New Primary Clarifiers	\$ -	\$ 1,190,500	\$ -
6	STR. 80 - Anaerobic Digesters / Building	\$ 4,110,600	\$ 4,110,600	\$ -
7	STR. 80 - New Aerobic Digesters	\$ -	\$ -	\$ 1,651,800
Construction Subtotal		\$ 4,586,000	\$ 6,226,300	\$ 2,139,200
Additional Contractor Costs		\$ 1,146,500	\$ 1,556,600	\$ 534,800
Electrical Costs		\$ 687,900	\$ 934,000	\$ 320,900
Total Construction Cost		\$ 6,420,400	\$ 8,716,900	\$ 2,994,900
Additional Design and Management Costs				
	Contingencies	\$ 642,100	\$ 871,700	\$ 299,500
	Engineering, Admin, Legal	\$ 706,300	\$ 958,900	\$ 329,500
	Resident Observation	\$ 256,900	\$ 348,700	\$ 119,800
Cost Subtotal		\$ 963,200	\$ 1,307,600	\$ 449,300
Total Alternative Scope Cost		\$ 8,025,700	\$ 10,896,200	\$ 3,743,700
Added Base Scope Cost		\$ 28,118,000	\$ 28,118,000	\$ 28,118,000
Total Alternative Cost		\$ 36,143,700	\$ 39,014,200	\$ 31,861,700

Village of Jackson
Jackson Facilities Plan
 Facilities Plan Capital Costs
 Proposed Project Phasing
 9/20/22

Phase 1 - Administrative, Storage, Tertiary Treatment	Alt. 1	Alt. 2	Alt. 3
05 - Site Work (Assume 30% of Base Scope)	\$ 705,750	\$ 705,750	\$ 705,750
STR. 10 - Service Building	\$ 1,523,100	\$ 1,523,100	\$ 1,523,100
STR. 60 - Tertiary Filter Building	\$ 2,094,100	\$ 2,094,100	\$ 2,094,100
STR. 70 - Disinfection Tank	\$ 579,500	\$ 579,500	\$ 579,500
STR. 95 - Storage Garage	\$ 698,500	\$ 698,500	\$ 698,500
Construction Subtotal	\$ 5,601,000	\$ 5,601,000	\$ 5,601,000
Additional Contractor Costs	\$ 840,200	\$ 840,200	\$ 840,200
Electrical Costs	\$ 1,400,300	\$ 1,400,300	\$ 1,400,300
Total Construction Cost	\$ 7,841,500	\$ 7,841,500	\$ 7,841,500
Additional Design and Management Costs			
Contingencies	\$ 784,200	\$ 784,200	\$ 784,200
Engineering, Admin, Legal	\$ 862,600	\$ 862,600	\$ 862,600
Resident Observation	\$ 313,700	\$ 313,700	\$ 313,700
Cost Subtotal	\$ 1,960,500	\$ 1,960,500	\$ 1,960,500
Total Phase Costs:	\$ 9,802,000	\$ 9,802,000	\$ 9,802,000

Phase 2A - Process Upgrade		Alt. 1	Alt. 2	Alt. 3
05 - Site Work (Assume 50% of Base Scope)	\$	1,176,250	\$ 1,176,250	\$ 1,176,250
05 - Additional Site Work	\$	24,800	\$ 339,500	\$ 36,800
STR. 15 - Influent Screening Building	\$	410,900	\$ 410,900	\$ 410,900
STR. 20 - Pretreatment Building	\$	761,200	\$ 761,200	\$ 761,200
STR. 20 - Existing Waste Station	\$	326,600	\$ 20,000	\$ 326,600
STR. 22 - Waste Receiving Station	\$	-	\$ 495,700	\$ -
STR. 25 - Existing Septage Tanks	\$	124,000	\$ 70,000	\$ 124,000
STR. 25 - New Primary Clarifiers	\$	-	\$ 1,190,500	\$ -
STR. 30 - Aeration Basins	\$	780,500	\$ 780,500	\$ 780,500
STR. 31 - RBC Tanks	\$	50,000	\$ 50,000	\$ 50,000
STR. 32 - Selector Basins	\$	961,600	\$ 961,600	\$ 961,600
STR. 35 - Aeration Control Building	\$	26,700	\$ 26,700	\$ 26,700
STR. 40 - Secondary Clarifiers #1 & #2	\$	109,000	\$ 109,000	\$ 109,000
STR. 45 - Secondary Clarifiers #3 & #4	\$	1,215,800	\$ 1,215,800	\$ 1,215,800
STR. 46 - Secondary Clarifier #5	\$	868,100	\$ 868,100	\$ 868,100
STR. 50 - Secondary Sludge Building	\$	1,002,500	\$ 1,002,500	\$ 1,002,500
STR. 55 - RAS Pumping Station	\$	48,000	\$ 48,000	\$ 48,000
STR. 65 - Blower Building	\$	330,400	\$ 330,400	\$ 330,400
Construction Subtotal	\$	8,216,400	\$ 9,856,700	\$ 8,228,400
Additional Contractor Costs	\$	1,232,500	\$ 1,478,600	\$ 1,234,300
Electrical Costs	\$	2,054,100	\$ 2,464,200	\$ 2,057,100
Total Construction Cost	\$	11,503,000	\$ 13,799,500	\$ 11,519,800
Additional Design and Management Costs				
Contingencies	\$	1,150,300	\$ 1,380,000	\$ 1,152,000
Engineering, Admin, Legal	\$	1,265,400	\$ 1,518,000	\$ 1,267,200
Resident Observation	\$	460,200	\$ 552,000	\$ 460,800
Cost Subtotal	\$	2,875,900	\$ 3,450,000	\$ 2,880,000
Total Phase Costs:	\$	14,378,900	\$ 17,249,500	\$ 14,399,800

Phase 2B - Solids Handling Upgrade	Alt. 1	Alt. 2	Alt. 3
05 - Site Work (Assume 20% of Base Scope)	\$ 470,500	\$ 470,500	\$ 470,500
STR. 75 - Gravity Thickener	\$ 30,000	\$ 30,000	\$ 30,000
STR. 81 - Sludge Drying Beds	\$ 40,000	\$ 40,000	\$ 40,000
STR. 82 - Sludge Processing Building	\$ 1,787,200	\$ 1,787,200	\$ 1,787,200
STR. 85 - Sludge Storage Tank	\$ 80,000	\$ 80,000	\$ 80,000
STR. 90 - Sludge Pumping Building	\$ 317,700	\$ 317,700	\$ 317,700
STR. 80 - Anaerobic Digesters / Building	\$ 4,110,600	\$ 4,110,600	\$ -
STR. 80 - New Aerobic Digesters	\$ -	\$ -	\$ 1,651,800
Construction Subtotal	\$ 6,836,000	\$ 6,836,000	\$ 4,377,200
Additional Contractor Costs	\$ 1,025,400	\$ 1,025,400	\$ 656,600
Electrical Costs	\$ 1,709,000	\$ 1,709,000	\$ 1,094,300
Total Construction Cost	\$ 9,570,400	\$ 9,570,400	\$ 6,128,100
Additional Design and Management Costs			
Contingencies	\$ 957,100	\$ 957,100	\$ 612,900
Engineering, Admin, Legal	\$ 1,052,800	\$ 1,052,800	\$ 674,100
Resident Observation	\$ 382,900	\$ 382,900	\$ 245,200
Cost Subtotal	\$ 2,392,800	\$ 2,392,800	\$ 1,532,200
Total Phase Costs:	\$ 11,963,200	\$ 11,963,200	\$ 7,660,300

Village of Jackson
Jackson Facilities Plan
 Facilities Plan Cost Estimate - Base Scope
 9/20/2022

	<u>Description</u>	<u>Qty</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>
1	05-Site Work						
	Asphalt demolition	1	LS	\$25,000	1.00	1.00	\$25,000
	Fence demolition	400	LF	\$10	1.00	1.00	\$4,000
	Erosion Control	1	LS	\$10,000	1.00	1.00	\$10,000
	Dewatering and Sheet piling	1	LS	\$50,000	1.00	1.00	\$50,000
	Site Piping	1	LS	\$1,751,000	1.00	1.00	\$1,751,000
	Natural Gas	1	LS	\$10,000	1.00	1.00	\$10,000
	Cable	1	LS	\$5,000	1.00	1.00	\$5,000
	Asphalt Paving	2500	SY	\$25	1.00	1.00	\$62,500
	Generator Pad	3	CY	\$550	1.00	3.00	\$4,950
	Sidewalks	5000	SF	\$10	1.00	1.00	\$48,000
	Site Grading	1	LS	\$50,000	1.00	1.00	\$50,000
	Seed, Fertilizer, Mulch	5000	SY	\$6	1.00	1.00	\$30,000
	Bollards	20	EA	\$1,000	1.00	1.00	\$20,000
	Generator / ATS	1	EA	\$250,000	1.00	1.00	\$250,000
	Automatic Gate	1	EA	\$20,000	1.00	1.00	\$20,000
	Fencing	400	LF	\$30	1.00	1.00	\$12,000
	Cost Subtotal						\$2,352,500
2	STR. 10 - Service Building						
	Demolition						
	Windows/Doors	15	EA	\$250	1.00	1.00	\$3,750
	Exterior Walls	700	SF	\$15	1.00	1.00	\$10,500
	Interior Walls	1500	SF	\$10	1.00	1.00	\$15,000
	Lab	0	LS	\$7,500	1.00	1.00	\$0
	Roofing	2800	SF	\$7	1.00	1.00	\$19,600
	Plumbing	2800	SF	\$3	1.00	1.00	\$8,400
	Generator	1	LS	\$5,000	1.00	1.00	\$5,000
	Asbestos Abatement	1	LS	\$20,000	1.00	1.00	\$20,000
	Renovation Construction						
	Architectural Ceiling	2800	SF	\$14	1.00	1.20	\$48,384
	Roofing	2800	SF	\$24	1.00	1.20	\$80,640
	Architectural	2800	SF	\$24	1.00	1.20	\$80,640
	Interior Walls - Wood Framed	1400	SF	\$10	1.00	1.20	\$16,800
	Flooring	2800	SF	\$8	1.00	1.20	\$26,880
	Louver / door masonry infill	400	SF	\$35	1.00	1.20	\$16,800
	Entry Doors	8	EA	\$4,000	1.00	1.20	\$38,400
	Overhead Doors	0	EA	\$15,000	1.00	1.20	\$0
	Windows	7	EA	\$1,500	1.00	1.20	\$12,600
	Building Construction - Wetwell / Drywell						
	Excavation	490	CY	\$30	1.00	2.00	\$29,400
	Structural Fill	150	CY	\$35	1.00	2.00	\$10,500
	Dewatering	1	LS	\$50,000	1.00	1.00	\$50,000
	Wall Cuts / Cores	3	EA	\$8,000	1.00	1.50	\$36,000
	Concrete						
	Circular walls	0	CY	\$810	1.00	1.50	\$0
	Straight walls	67	CY	\$720	1.00	1.50	\$72,360
	Slab on soil	22	CY	\$660	1.00	1.50	\$21,780
	Shored slab	10	CY	\$1,320	1.00	1.50	\$19,800
	Shored beams	2	CY	\$2,040	1.00	1.50	\$6,120
	Columns	0	CY	\$1,380	1.00	1.50	\$0
	Concrete fill	5	CY	\$480	1.00	1.50	\$3,600
	Misc concrete	5	CY	\$900	1.00	1.50	\$6,750
	Concrete Ties to Existing	40	LF	\$250	1.00	1.50	\$15,000
	Misc. Metals	0	LS	\$8,000	1.00	1.00	\$0
	Block Walls - Interior	0	SF	\$24	1.00	1.00	\$0
	Block Walls - Exterior	0	SF	\$42	1.00	1.00	\$0

Village of Jackson
Jackson Facilities Plan
 Facilities Plan Cost Estimate - Base Scope
 9/20/2022

	<u>Description</u>	<u>Qty</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>
	Concrete Plank Ceiling	0	SF	\$24	1.00	1.00	\$0
	Roofing	400	SF	\$24	1.00	1.00	\$9,600
	Architectural	0	SF	\$24	1.00	1.00	\$0
	Stairs and Railings	8	EA	\$1,000	1.00	1.00	\$8,000
	Aluminum Railing	20	LF	\$60	1.00	1.00	\$1,200
	Entry Doors	0	EA	\$3,000	1.00	1.00	\$0
	Overhead Doors	0	EA	\$7,500	1.00	1.00	\$0
	Windows	0	EA	\$1,500	1.00	1.00	\$0
	Equipment						
	RAW Pumps	4	EA	\$40,000	1.20	1.00	\$192,000
	Check Valves	4	EA	\$10,000	1.20	1.00	\$48,000
	Plug Valves	8	EA	\$8,000	1.20	1.00	\$76,800
	Sluice Gates	1	EA	\$8,000	1.20	1.00	\$9,600
	Pump VFDs	4	EA	\$20,000	1.20	1.00	\$96,000
	Locker room Furniture	1	LS	\$15,000	1.20	1.00	\$18,000
	Piping and Valves Modifications	1	LS	\$40,000	1.20	1.00	\$48,000
	Painting						
	Structure Surfaces	2800	SF	\$10	1.00	1.00	\$26,880
	Piping	0	SF	\$18	1.00	1.00	\$0
	HVAC (C1D1/damp)	1000	SF	\$75	1.00	1.50	\$112,500
	HVAC (standard)	2800	SF	\$45	1.00	1.00	\$126,000
	Plumbing (C1D1/damp)	1000	SF	\$23	1.00	1.50	\$33,750
	Plumbing (standard)	2800	SF	\$15	1.00	1.00	\$42,000
	Cost Subtotal						\$1,523,100
3	STR. 15 - Influent Screening Building						
	Demolition						
	Equipment Removal	1	LS	\$15,000	1.00	1.00	\$15,000
	Demoliton - Doors	1	LS	\$1,000	1.00	1.00	\$1,000
	Architectual						
	Overhead Door and Operator	1	EA	\$15,000	1.20	1.00	\$18,000
	Equipment						
	Mechanical Screen	1	EA	\$150,000	1.20	1.00	\$180,000
	Washer/Compactor	1	EA	\$75,000	1.20	1.00	\$90,000
	Painting						
	Structure Surfaces	2000	SF	\$10	1.00	1.00	\$20,000
	HVAC (C1D1/damp)	594	SF	\$75	1.00	1.50	\$66,825
	HVAC (standard)	0	SF	\$45	1.00	1.00	\$0
	Plumbing (C1D1/damp)	594	SF	\$23	1.00	1.50	\$20,048
	Plumbing (standard)	0	SF	\$15	1.00	1.00	\$0
	Cost Subtotal						\$410,900
4	STR. 20 - Pretreatment Building						
	Demolition						
	Equipment Removal	1	LS	\$10,000	1.00	1.00	\$10,000
	Demoliton / Abandon Grease	1	LS	\$30,000	1.00	1.00	\$30,000
	Roofing	828	SF	\$7	1.00	1.00	\$5,796
	Renovation Construction						
	Roofing	828	SF	\$24	1.00	1.00	\$19,872
	Architectural	828	SF	\$24	1.00	1.00	\$19,872
	Entry Doors	4	EA	\$4,000	1.00	1.00	\$16,000
	Building Construction - Grit Tank						
	Excavation	100	CY	\$36	1.00	2.00	\$7,200
	Structural Fill	50	CY	\$35	1.00	2.00	\$3,500
	Wall Cuts / Cores	2	EA	\$8,000	1.00	1.50	\$24,000
	Concrete						
	Circular walls	10	CY	\$810	1.50	2.00	\$24,300
	Straight walls	10	CY	\$720	1.00	2.00	\$14,400

Village of Jackson
Jackson Facilities Plan
Facilities Plan Cost Estimate - Base Scope
9/20/2022

<u>Description</u>	<u>Qty</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>
Slab on soil	5	CY	\$660	1.00	2.00	\$6,600
Shored slab	5	CY	\$1,320	1.00	2.00	\$13,200
Shored beams	0	CY	\$2,040	1.00	2.00	\$0
Columns	0	CY	\$1,150	1.00	2.00	\$0
Concrete fill	2	CY	\$480	1.00	2.00	\$1,920
Misc concrete	0	CY	\$900	1.00	2.00	\$0
Aluminum Grating	100	SF	\$50	1.00	2.00	\$10,000
Piping and Valves Modifications	1	LS	\$60,000	1.20	1.00	\$72,000
Equipment						
Grit Pump and Valves	2	EA	\$30,000	1.20	1.00	\$72,000
Grit Classifier	1	EA	\$50,000	1.20	1.00	\$60,000
Pista Grit Seperator	2	EA	\$75,000	1.20	1.00	\$180,000
Painting						
Piping	800	SF	\$18	1.00	1.00	\$14,400
Equipment	1	EA	\$5,000	1.00	1.00	\$5,000
Structure Surfaces	3000	SF	\$10	1.00	1.00	\$30,000
HVAC (C1D1/damp)	828	SF	\$75	1.00	1.50	\$93,150
HVAC (standard)	0	SF	\$45	1.00	1.00	\$0
Plumbing (C1D1/damp)	828	SF	\$23	1.00	1.50	\$27,945
Plumbing (standard)	0	SF	\$15	1.00	1.00	\$0
Cost Subtotal						\$761,200
5 STR. 30 - Aeration Basins						
Demolition						
Bridges	0	EA	\$10,000	1.00	1.00	\$0
Rotating Aerators	2	EA	\$15,000	1.00	1.00	\$30,000
Wall Cuts / Cores	4	EA	\$8,000	1.00	1.50	\$48,000
Building Construction						
Concrete						
Circular walls	84	CY	\$810	1.00	1.50	\$102,060
Straight walls	200	CY	\$720	1.00	1.50	\$216,000
Wall Ties to Existing Concrete	440	LF	\$250	1.00	1.00	\$110,000
Equipment						
Fine Membrane Diffusers	2	EA	\$60,000	1.20	1.00	\$144,000
Piping and Valves Modifications	2	LS	\$40,000	1.20	1.00	\$96,000
Painting						
Existing Bridges	2	EA	\$10,000	1.00	1.00	\$20,000
Piping	800	SF	\$18	1.00	1.00	\$14,400
Cost Subtotal						\$780,500
6 STR. 31 - RBC Tanks						
Demolition						
Demo structure	1	EA	\$50,000	1.00	1.00	\$50,000
Cost Subtotal						\$50,000
7 STR. 32 - Selector Basins						
Building Construction						
Excavation	2900	CY	\$36	1.20	1.50	\$187,920
Structural Fill	1200	CY	\$35	1.20	1.50	\$75,600
Dewatering - Selectors	1	CY	\$50,000	1.20	1.00	\$60,000
Concrete						
Circular walls	0	CY	\$810	1.00	1.00	\$0
Slab on soil	168	CY	\$660	1.00	1.00	\$110,880
Straight walls	266	CY	\$720	1.00	1.00	\$191,520
Shored slab	12	CY	\$1,320	1.00	1.00	\$15,840
Shored beams	6	CY	\$2,040	1.00	1.00	\$12,240
Columns	0	CY	\$1,380	1.00	1.00	\$0
Concrete fill	0	CY	\$480	1.00	1.00	\$0

Village of Jackson
Jackson Facilities Plan
 Facilities Plan Cost Estimate - Base Scope
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	<u>Description</u>	<u>Qty</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>
	Misc concrete	0	CY	\$900	1.00	1.00	\$0
	Stairs and Railings	16	EA	\$1,000	1.00	1.00	\$16,000
	Aluminum Railing	200	LF	\$60	1.00	1.00	\$12,000
	Aluminum Grating	0	SF	\$50	1.00	1.00	\$0
	Equipment						
	Plug Valves	8	EA	\$6,500	1.20	1.00	\$62,400
	Mud Valves	4	EA	\$4,500	1.20	1.00	\$21,600
	Mixers	4	EA	\$20,000	1.20	1.00	\$96,000
	Weir Gates	6	EA	\$10,000	1.20	1.00	\$72,000
	Recycle Pump	1	EA	\$20,000	1.20	1.00	\$24,000
	Painting						
	Piping	200	SF	\$18	1.00	1.00	\$3,600
	Cost Subtotal						\$961,600
8	STR. 35 - Aeration Control Building						
	Building Construction						
	Raise Floor	256	SF	\$80	1.00	1.00	\$20,480
	Painting						
	Structure Surfaces	640	SF	\$10	1.00	1.00	\$6,144
	Cost Subtotal						\$26,700
9	STR. 40 - Secondary Clarifiers #1 & #2						
	Demolition						
	Bridges	2	EA	\$5,000	1.00	1.00	\$10,000
	Equipment / piping	2	EA	\$10,000	1.00	1.00	\$20,000
	Walls only	2	EA	\$35,000	1.00	1.00	\$70,000
	Structural Fill	600	CY	\$15	1.00	1.00	\$9,000
	Cost Subtotal						\$109,000
10	STR. 45 - Secondary Clarifiers #3 & #4						
	Demolition						
	Bridges	2	EA	\$5,000	1.00	1.00	\$10,000
	Equipment / piping	2	EA	\$20,000	1.00	1.00	\$40,000
	Building Construction						
	Concrete						
	Circular walls	80	CY	\$810	1.00	1.50	\$97,200
	Straight walls	0	CY	\$720	1.00	1.50	\$0
	Shored slab	30	CY	\$1,320	1.00	1.50	\$59,400
	Wall Ties to Existing Concrete	408	LF	\$250	1.00	1.00	\$102,000
	Equipment						
	Algae covers - weirs and baffles	2	EA	\$60,000	1.20	1.00	\$144,000
	Clarifier Equipment	2	EA	\$200,000	1.40	1.00	\$560,000
	Weirs and Baffles	2	EA	\$30,000	1.20	1.00	\$72,000
	Piping and Valves Modifications	2	LS	\$10,000	1.20	1.00	\$24,000
	Painting						
	Piping	400	SF	\$18	1.00	1.00	\$7,200
	Clarifier Equipment	2	LS	\$50,000	1.00	1.00	\$100,000
	Cost Subtotal						\$1,215,800
11	STR. 46 - Secondary Clarifier #5						
	Building Construction						
	Excavation	2300	CY	\$36	1.00	1.00	\$82,800
	Structural Fill	400	CY	\$35	1.00	1.00	\$14,000
	Dewatering - Clarifier	1	CY	\$50,000	1.00	1.00	\$50,000
	Concrete						
	Circular walls	182	CY	\$810	1.00	1.00	\$147,420
	Slab on soil	213	CY	\$660	1.00	1.00	\$140,580
	Straight walls	0	CY	\$720	1.00	1.00	\$0

Village of Jackson
Jackson Facilities Plan
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	<u>Description</u>	<u>Qty</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>
	Shored slab	15	CY	\$1,320	1.00	1.50	\$29,700
	Equipment						
	Algae covers - weirs and baffles	1	EA	\$40,000	1.20	1.00	\$48,000
	Clarifier Equipment	1	EA	\$200,000	1.40	1.00	\$280,000
	Weirs and Baffles	1	EA	\$30,000	1.20	1.00	\$36,000
	Piping and Valves	1	LS	\$30,000	1.20	1.00	\$36,000
	Painting						
	Piping	200	SF	\$18	1.00	1.00	\$3,600
	Blast / Clarifier Equipment	1	LS	\$50,000	1.00	1.00	\$50,000
	Cost Subtotal						\$868,100
12	STR. 50 - Secondary Sludge Building						
	Demolition						
	Pumps	4	EA	\$5,000	1.00	1.00	\$20,000
	Compressors	2	EA	\$1,000	1.00	1.00	\$2,000
	Piping	1	LS	\$10,000	1.00	1.00	\$10,000
	Concrete Pads	6	EA	\$1,000	1.00	1.00	\$6,000
	Wall Cores	5	EA	\$1,500	1.00	1.00	\$7,500
	Equipment						
	RAS Pumps	4	EA	\$30,000	1.20	1.00	\$144,000
	WAS Pumps	2	EA	\$25,000	1.20	2.00	\$120,000
	Check Valves	6	EA	\$6,000	1.20	1.00	\$43,200
	Plug Valves	20	EA	\$4,500	1.20	1.00	\$108,000
	Flow meters	4	EA	\$6,000	1.20	1.00	\$28,800
	Piping and Valves	4	LS	\$60,000	1.20	1.00	\$288,000
	Building Construction						
	Masonry Walls	200	SF	\$24	1.00	2.00	\$9,600
	Doors	3	EA	\$4,000	1.00	1.00	\$12,000
	Concrete Pads	6	EA	\$600	1.00	2.00	\$7,200
	Painting						
	Structure Surfaces	3600	SF	\$10	1.00	1.00	\$34,560
	Piping	1000	SF	\$18	1.00	1.00	\$18,000
	HVAC (C1D1/damp)	798	SF	\$75	1.00	1.50	\$89,775
	HVAC (standard)	798	SF	\$45	1.00	1.00	\$35,910
	Plumbing (C1D1/damp)	0	SF	\$23	1.00	1.00	\$0
	Plumbing (standard)	798	SF	\$15	1.00	1.50	\$17,955
	Cost Subtotal						\$1,002,500
13	STR. 55 - RAS Pumping Station						
	Demolition						
	Pumps	4	EA	\$5,000	1.00	1.00	\$20,000
	Structure	1	LS	\$25,000	1.00	1.00	\$25,000
	Overhead Rail	1	LS	\$2,000	1.00	1.00	\$2,000
	Electric Lift	1	LS	\$1,000	1.00	1.00	\$1,000
	Cost Subtotal						\$48,000
14	STR. 60 - Tertiary Filter Building						
	Demolition						
	Chlorination Equipment	2	EA	\$5,000	1.00	1.00	\$10,000
	Chlorine Storage	2	EA	\$5,000	1.00	1.00	\$10,000
	Renovation Construction						
	Architectural Ceiling	0	SF	\$14	1.00	1.00	\$0
	Roofing	0	SF	\$24	1.00	1.00	\$0
	Architectural	3500	SF	\$24	1.00	1.00	\$84,000
	Flooring	0	SF	\$8	1.00	1.00	\$0
	Louver / door masonry infill	0	SF	\$35	1.00	1.00	\$0
	Entry Doors	4	EA	\$4,000	1.00	1.00	\$16,000
	Building Construction						

Village of Jackson
Jackson Facilities Plan
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<u>Description</u>	<u>Qty</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>
Excavation	700	CY	\$36	1.00	2.00	\$50,400
Structural Fill	200	CY	\$35	1.00	2.00	\$14,000
Dewatering - filter building	1	CY	\$15,000	1.00	1.00	\$15,000
Concrete						
Circular walls	0	CY	\$810	1.00	1.20	\$0
Straight walls	55	CY	\$720	1.00	1.20	\$47,520
Slab on soil	122	CY	\$660	1.00	1.20	\$96,624
Shored slab	10	CY	\$1,320	1.00	1.20	\$15,840
Shored beams	2	CY	\$2,040	1.00	1.20	\$4,896
Columns	0	CY	\$1,380	1.00	1.20	\$0
Concrete fill	0	CY	\$480	1.00	1.20	\$0
Misc concrete	5	CY	\$900	1.00	1.20	\$5,400
Misc. Metals	1	LS	\$8,000	1.00	1.20	\$9,600
Block Walls - Interior	0	SF	\$24	1.00	1.20	\$0
Block Walls - Exterior	1220	SF	\$42	1.00	1.20	\$61,488
Concrete Plank Ceiling	1584	SF	\$24	1.00	1.20	\$45,619
Roofing	1584	SF	\$24	1.00	1.20	\$45,619
Architectural	1584	SF	\$24	1.00	1.20	\$45,619
Stairs and Railings	20	EA	\$1,000	1.00	1.20	\$24,000
Aluminum Railing	150	LF	\$60	1.00	1.20	\$10,800
Aluminum Grating	800	SF	\$50	1.00	1.20	\$48,000
Entry Doors	2	EA	\$4,000	1.00	1.20	\$9,600
Overhead Doors	1	EA	\$7,500	1.00	1.20	\$9,000
Windows	2	EA	\$1,500	1.00	1.20	\$3,600
Equipment						
Alum pumps	2	EA	\$7,500	1.20	1.00	\$18,000
Floc pumps	2	EA	\$7,500	1.20	1.00	\$18,000
Floc Tank - poly	1	EA	\$12,000	1.20	1.00	\$14,400
Contact tank	0	EA	\$5,000	1.20	1.00	\$0
Tertiary Filters	2	EA	\$400,000	1.20	1.00	\$960,000
Gates	3	EA	\$10,000	1.20	1.00	\$36,000
Flash Mixers	3	EA	\$15,000	1.20	1.00	\$54,000
Chemical / Floc Piping	2	LS	\$15,000	1.20	1.00	\$36,000
Piping and Valves	1	LS	\$150,000	1.20	1.00	\$180,000
HVAC (C1D1/damp)	0	SF	\$75	1.00	1.00	\$0
HVAC (standard)	1584	SF	\$45	1.00	1.00	\$71,280
Plumbing (C1D1/damp)	0	SF	\$23	1.00	1.00	\$0
Plumbing (standard)	1584	SF	\$15	1.00	1.00	\$23,760
Cost Subtotal						\$2,094,100
15 STR. 65 - Blower Building						
Demolition						
Blowers	3	EA	\$5,000	1.00	1.00	\$15,000
Equipment						
Blowers - Large	1	EA	\$90,000	1.20	1.00	\$108,000
Blowers - Small	2	EA	\$15,000	1.20	1.00	\$36,000
Transfer switch	1	EA	\$40,000	1.20	1.00	\$48,000
Building Construction						
Overhead Doors	1	EA	\$10,000	1.20	1.00	\$12,000
Piping and Valves	1	LS	\$20,000	1.00	1.00	\$20,000
Painting						
Structure Surfaces	2016	SF	\$10	1.00	1.00	\$19,354
Piping	0	SF	\$15	1.00	1.00	\$0
HVAC (C1D1/damp)	0	SF	\$75	1.00	1.00	\$0
HVAC (standard)	1200	SF	\$45	1.00	1.00	\$54,000
Plumbing (C1D1/damp)	0	SF	\$23	1.00	1.00	\$0
Plumbing (standard)	1200	SF	\$15	1.00	1.00	\$18,000
Cost Subtotal						\$330,400

Village of Jackson
Jackson Facilities Plan
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	<u>Description</u>	<u>Qty</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>
16	STR. 70 - Disinfection Tank						
	Demolition						
	Chlorination and dechlorination equip	1	LS	\$5,000	1.00	1.00	\$5,000
	Wall Cut / Wall Cores	3	EA	\$8,000	1.00	1.00	\$24,000
	Wall Demolition	1	LS	\$15,000	1.00	1.00	\$15,000
	Building Construction						
	Channel Modifications	1	LS	\$40,000	1.20	1.00	\$48,000
	New Aluminum Grating	200	SF	\$50	1.00	1.50	\$15,000
	New Handrails	200	LF	\$35	1.00	1.50	\$10,500
	Effluent Pump Structure	1	LS	\$60,000	1.00	1.50	\$90,000
	Equipment						
	Flume	1	LS	\$10,000	1.20	1.00	\$12,000
	Effluent Pump	1	LS	\$50,000	1.20	1.00	\$60,000
	UV System	1	LS	\$250,000	1.20	1.00	\$300,000
	Cost Subtotal						\$579,500
17	STR. 75 - Gravity Thickener						
	Demolition						
	Equipment	1	EA	\$5,000	1.00	1.00	\$5,000
	Cover	1	EA	\$5,000	1.00	1.00	\$5,000
	Structure	1	EA	\$20,000	1.00	1.00	\$20,000
	Cost Subtotal						\$30,000
18	STR. 81 - Sludge Drying Beds						
	Demolition						
	Underground Piping	1	EA	\$15,000	1.00	1.00	\$15,000
	Remove Biosolids	1	EA	\$5,000	1.00	1.00	\$5,000
	Structure	1	EA	\$20,000	1.00	1.00	\$20,000
	Cost Subtotal						\$40,000
19	STR. 82 - Sludge Processing Building						
	Building Construction						
	Excavation	960	CY	\$36	1.00	1.00	\$34,560
	Structural Fill	320	CY	\$35	1.00	1.00	\$11,200
	Dewatering - Foundation	1	CY	\$50,000	1.00	1.00	\$50,000
	Concrete						
	Circular walls	0	CY	\$810	1.00	1.00	\$0
	Straight walls	72	CY	\$720	1.00	1.00	\$51,840
	Slab on soil	74	CY	\$660	1.00	1.00	\$48,840
	Shored slab	40	CY	\$1,320	1.00	1.00	\$52,800
	Shored beams	10	CY	\$2,040	1.00	1.00	\$20,400
	Columns	4	CY	\$1,380	1.00	1.00	\$5,520
	Concrete fill	0	CY	\$480	1.00	1.00	\$0
	Misc concrete	2	CY	\$900	1.00	1.00	\$1,800
	Misc. Metals	1	LS	\$8,000	1.00	1.00	\$8,000
	Block Walls - Interior	300	SF	\$24	1.00	1.00	\$7,200
	Block Walls - Exterior	1600	SF	\$42	1.00	1.00	\$67,200
	Concrete Plank Ceiling	1440	SF	\$24	1.00	1.00	\$34,560
	Roofing	1440	SF	\$24	1.00	1.00	\$34,560
	Architectural	1440	SF	\$24	1.00	1.00	\$34,560
	Stairs and Railings	15	EA	\$1,000	1.00	1.00	\$15,000
	Aluminum Railing	40	LF	\$60	1.00	1.00	\$2,400
	Entry Doors	4	EA	\$4,000	1.00	1.00	\$16,000
	Overhead Doors	1	EA	\$10,000	1.00	1.00	\$10,000
	Windows	3	EA	\$1,500	1.00	1.00	\$4,500
	Equipment						

Village of Jackson
Jackson Facilities Plan
 Facilities Plan Cost Estimate - Base Scope
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	<u>Description</u>	<u>Qty</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>
	Disk or Rotary Thickeners	2	EA	\$150,000	1.20	1.00	\$360,000
	Sludge Pumps	5	EA	\$25,000	1.20	1.00	\$150,000
	Polymer Feed / Blending Equipment	2	EA	\$50,000	1.20	1.00	\$120,000
	Flow Meters	2	EA	\$7,000	1.20	1.00	\$16,800
	Chemical / Flocc Piping	2	LS	\$15,000	1.20	1.00	\$36,000
	Piping and Valves	1	LS	\$300,000	1.20	1.00	\$360,000
	HVAC (C1D1/damp)	1440	SF	\$75	1.00	1.00	\$108,000
	HVAC (standard)	0	SF	\$45	1.00	1.00	\$0
	Plumbing (C1/D1/damp)	1440	SF	\$23	1.00	1.00	\$32,400
	Plumbing (standard)	0	SF	\$15	1.00	1.00	\$0
	Painting						
	Structure Surfaces	5000	SF	\$10	1.00	1.00	\$48,000
	Piping	2500	SF	\$18	1.00	1.00	\$45,000
	Cost Subtotal						\$1,787,200
20	STR. 85 - Sludge Storage Tank						
	Architectural						
	Stairs	80	EA	\$1,000	1.00	1.00	\$80,000
	Cost Subtotal						\$80,000
21	STR. 90 - Sludge Pumping Building						
	Demolition						
	Sludge Transfer Pumps	3	EA	\$5,000	1.00	1.00	\$15,000
	Check Valves	3	EA	\$1,000	1.00	1.00	\$3,000
	Equipment						
	Sludge Transfer Pumps	3	EA	\$40,000	1.20	1.00	\$144,000
	Check Valves	3	EA	\$8,000	1.20	1.00	\$28,800
	Gantry Crane	1	EA	\$5,000	1.20	1.00	\$6,000
	Gantry Beam	1	EA	\$15,000	1.20	1.00	\$18,000
	Concrete Pads	3	EA	\$600	1.20	2.00	\$4,320
	Building Construction						
	Ceiling	660	SF	\$12	1.00	1.00	\$7,920
	Block wall - plain	0	SF	\$24	1.00	1.00	\$0
	Concrete plank	0	SF	\$24	1.00	1.00	\$0
	Architectural	0	SF	\$24	1.00	1.00	\$0
	Painting						
	Structure Surfaces	1800	SF	\$10	1.00	1.00	\$17,280
	Piping	500	SF	\$18	1.00	1.00	\$9,000
	HVAC (C1D1/damp)	660	SF	\$75	1.00	1.00	\$49,500
	HVAC (standard)	0	SF	\$45	1.00	1.00	\$0
	Plumbing (C1/D1/damp)	660	SF	\$23	1.00	1.00	\$14,850
	Plumbing (standard)	0	SF	\$15	1.00	1.00	\$0
	Cost Subtotal						\$317,700
22	STR. 95 - Storage Garage						
	Renovation Construction						
	Architectural	4800	SF	\$24	1.00	1.20	\$138,240
	Flooring	4800	SF	\$8	1.00	1.20	\$46,080
	Louver / door masonry infill	0	SF	\$35	1.00	1.20	\$0
	Entry Doors	2	EA	\$4,000	1.00	1.20	\$9,600
	Building Construction						
	Excavation	175	CY	\$36	1.00	1.50	\$9,450
	Structural Fill	75	CY	\$30	1.00	1.50	\$3,375
	Concrete						
	Straight Walls	30	CY	\$600	1.00	1.00	\$18,000
	Slab on soil	45	CY	\$660	1.00	1.00	\$29,700
	Architectural						
	Doors and Windows	4	EA	\$5,000	1.20	1.00	\$24,000

Village of Jackson
Jackson Facilities Plan
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<u>Description</u>	<u>Qty</u>	<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>
Overhead Doors	2	EA	\$15,000	1.20	1.00	\$36,000
Wood Framed Structure	2400	SF	\$120	1.00	1.00	\$288,000
HVAC (standard)	2400	SF	\$25	1.00	1.00	\$60,000
Plumbing (standard)	2400	SF	\$15	1.00	1.00	\$36,000
Cost Subtotal						\$698,500
Construction Subtotal						\$16,067,300
Additional Contractor Costs			15%			\$2,410,100
Electrical Costs			25%			\$4,016,900
Total Construction Cost						\$22,494,300
Additional Design and Management Costs						
Contingencies			10%			\$2,249,500
Engineering, Admin, Legal			11%			\$2,474,400
Resident Observation			4%			\$899,800
Cost Subtotal						\$5,623,700
Total Project Cost						\$28,118,000

Village of Jackson

Jackson Facilities Plan

Facilities Plan Cost Estimate - Alternate Scope

9/20/2022

	<u>Description</u>	<u>Quantity</u>			<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>		
		<u>Alt. 1</u>	<u>Alt. 2</u>	<u>Alt. 3</u>					<u>Alt. 1</u>	<u>Alt. 2</u>	<u>Alt. 3</u>
1	05-Site Work										
	Erosion Control	1	1	1	LS	\$10,000	1.00	1.00	\$10,000	\$10,000	\$10,000
	Dewatering and Sheet piling	1	1	1	LS	\$0	1.00	1.00	\$0	\$0	\$0
	Site Piping								\$0	\$0	\$0
	Primary Sludge Suction		1		LS	\$48,750	1.00	1.00	\$0	\$48,750	\$0
	Primary Sludge Discharge		1		LS	\$64,500	1.00	1.00	\$0	\$64,500	\$0
	Primary Clarifier Feed		1		LS	\$66,250	1.00	1.00	\$0	\$66,250	\$0
	Primary Clarifier Discharge		1		LS	\$106,000	1.00	1.00	\$0	\$106,000	\$0
	Waste Receiving		1		LS	\$12,375	1.00	1.00	\$0	\$12,375	\$0
	Aeration Piping			1	LS	\$12,000	1.00	1.00	\$0	\$0	\$12,000
	Asphalt Paving	0	200	0	SY	\$84	1.00	1.00	\$0	\$16,800	\$0
	Sidewalks	500	500	500	SF	\$10	1.00	1.00	\$4,800	\$4,800	\$4,800
	Site Grading	1	1	1	LS	\$10,000	1.00	1.00	\$10,000	\$10,000	\$10,000
	Seed, Fertilizer, Mulch	0	0	0	SY	\$6	1.00	1.00	\$0	\$0	\$0
	Landscaping	0	0	0	SF	\$12	1.00	1.00	\$0	\$0	\$0
	Fencing	0	0	0	LF	\$30	1.00	1.00	\$0	\$0	\$0
	Cost Subtotal								\$24,800	\$339,500	\$36,800
2	STR 22 - Existing Waste Station										
	Demolition										
	Remove Structure	0	1	0	LS	\$20,000	1.00	1.00	\$0	\$20,000	\$0
	Building Construction										
	Excavation	90	0	90	CY	\$36	1.00	2.00	\$6,480	\$0	\$6,480
	Structural Fill	60	0	60	CY	\$30	1.00	2.00	\$3,600	\$0	\$3,600
	Concrete										
	Straight walls	18	0	18	CY	\$720	1.00	1.50	\$19,440	\$0	\$19,440
	Slab on soil	20	0	20	CY	\$660	1.00	1.50	\$19,800	\$0	\$19,800
	Concrete fill	0	0	0	CY	\$480	1.00	1.00	\$0	\$0	\$0
	Misc concrete	0	0	0	CY	\$900	1.00	1.00	\$0	\$0	\$0
	Block walls - split face (single wythe)	0	0	0	SF	\$36	1.00	1.00	\$0	\$0	\$0
	Block walls - split face (multi wythe)	1000	0	1000	SF	\$42	1.00	1.00	\$42,000	\$0	\$42,000
	Block wall - plain	0	0	0	SF	\$24	1.00	1.00	\$0	\$0	\$0
	Concrete plank	600	0	600	SF	\$24	1.00	1.00	\$14,400	\$0	\$14,400
	Architectural Ceilings	0	0	0	SF	\$14	1.00	1.00	\$0	\$0	\$0
	Roofing	600	0	600	SF	\$24	1.00	1.00	\$14,400	\$0	\$14,400
	Architectural	600	0	600	SF	\$24	1.00	1.00	\$14,400	\$0	\$14,400
	Doors and Windows	2	0	2	LS	\$4,000	1.00	1.00	\$8,000	\$0	\$8,000
	Misc. Metals	1	0	1	LS	\$8,000	1.00	1.00	\$8,000	\$0	\$8,000
	Stairs and Railings	0	0	0	EA	\$1,000	1.00	1.00	\$0	\$0	\$0
	Aluminum Railing	0	0	0	LF	\$60	1.00	1.00	\$0	\$0	\$0
	Equipment										
	Septage Screen	1	0	1	EA	\$75,000	1.20	1.00	\$90,000	\$0	\$90,000
	Piping and Valves (interior)	1	0	1	LS	\$20,000	1.00	1.00	\$20,000	\$0	\$20,000
	Painting										
	Structure Surfaces	600	0	600	SF	\$10	1.00	1.00	\$5,760	\$0	\$5,760
	Piping	100	0	100	SF	\$18	1.00	1.00	\$1,800	\$0	\$1,800
	Equipment	0	0	0	EA		1.00	1.00	\$0	\$0	\$0
	HVAC (C1D1/damp)	600	0	600	SF	\$75	1.00	1.00	\$45,000	\$0	\$45,000
	HVAC (standard)	0	0	0	SF	\$45	1.00	1.00	\$0	\$0	\$0
	Plumbing (C1D1/damp)	600	0	600	SF	\$23	1.00	1.00	\$13,500	\$0	\$13,500
	Plumbing (standard)	0	0	0	SF	\$15	1.00	1.00	\$0	\$0	\$0
	Cost Subtotal								\$326,600	\$20,000	\$326,600
3	STR 22 - New Waste Receiving										
	Building Construction										
	Excavation	0	250	0	CY	\$36	1.00	1.50	\$0	\$13,500	\$0
	Structural Fill	0	120	0	CY	\$30	1.00	1.50	\$0	\$5,400	\$0
	Concrete										
	Straight walls	0	95	0	CY	\$720	1.00	1.25	\$0	\$85,500	\$0
	Slab on soil	0	40	0	CY	\$660	1.00	1.25	\$0	\$33,000	\$0
	Shored slab	0	18	0	CY	\$1,320	1.00	1.25	\$0	\$29,700	\$0
	Shored beams	0	2	0	CY	\$2,040	1.00	1.25	\$0	\$5,100	\$0
	Columns	0	0	0	CY	\$1,380	1.00	1.00	\$0	\$0	\$0
	Concrete fill	0	5	0	CY	\$480	1.00	1.25	\$0	\$3,000	\$0
	Misc concrete	0	0	0	CY	\$900	1.00	1.00	\$0	\$0	\$0
	Block walls - split face (single wythe)	0	0	0	SF	\$36	1.00	1.00	\$0	\$0	\$0
	Block walls - split face (multi wythe)	0	600	0	SF	\$42	1.00	1.00	\$0	\$25,200	\$0

Village of Jackson

Jackson Facilities Plan

Facilities Plan Cost Estimate - Alternate Scope

9/20/2022

Description	Quantity			Units	Unit Cost	Install Factor	Site Const.	Installed Cost		
	Alt. 1	Alt. 2	Alt. 3					Alt. 1	Alt. 2	Alt. 3
Block wall - plain	0	0	0	SF	\$24	1.00	1.00	\$0	\$0	\$0
Concrete plank	0	600	0	SF	\$24	1.00	1.00	\$0	\$14,400	\$0
Architectural Ceilings	0	0	0	0	\$0	0.00	1.00	\$0	\$0	\$0
Roofing	0	600	0	SF	\$24	1.00	1.00	\$0	\$14,400	\$0
Architectural	0	600	0	SF	\$24	1.00	1.00	\$0	\$14,400	\$0
Doors and Windows	0	2	0	LS	\$4,000	1.00	1.00	\$0	\$8,000	\$0
Misc. Metals	0	1	0	LS	\$8,000	1.00	1.00	\$0	\$8,000	\$0
Stairs and Railings	0	0	0	EA	\$1,000	1.00	1.00	\$0	\$0	\$0
Aluminum Railing	0	0	0	LF	\$60	1.00	1.00	\$0	\$0	\$0
Equipment										
Septage Screen	0	1	0	EA	\$80,000	1.20	1.00	\$0	\$96,000	\$0
Aeration blower / diffusers	0	1	0	EA	\$15,000	1.20	1.00	\$0	\$18,000	\$0
Septage Pumps / Piping	0	2	0	EA	\$15,000	1.20	1.00	\$0	\$36,000	\$0
Piping and Valves (interior)	0	1	0	LS	\$20,000	1.00	1.00	\$0	\$20,000	\$0
Painting										
Structure Surfaces	0	600	0	SF	\$10	1.00	1.00	\$0	\$5,760	\$0
Piping	0	100	0	SF	\$18	1.00	1.00	\$0	\$1,800	\$0
Equipment	0	0	0	EA	\$10,000	1.00	1.00	\$0	\$0	\$0
HVAC (C1D1/damp)	0	600	0	SF	\$75	1.00	1.00	\$0	\$45,000	\$0
HVAC (standard)	0	0	0	SF	\$45	1.00	1.00	\$0	\$0	\$0
Plumbing (C1D1/damp)	0	600	0	SF	\$23	1.00	1.00	\$0	\$13,500	\$0
Plumbing (standard)	0	0	0	SF	\$15	1.00	1.00	\$0	\$0	\$0
Cost Subtotal								\$0	\$495,700	\$0
4 STR 25 - Existing Septage Tanks										
Demolition										
Tank Removal	0	2	0	EA	\$25,000	1.00	1.00	\$0	\$50,000	\$0
Blower / Diffuser Removal	2	2	2	EA	\$5,000	1.00	1.00	\$10,000	\$10,000	\$10,000
Bridge Removal	0	2	0	EA	\$5,000	1.00	1.00	\$0	\$10,000	\$0
Equipment										
Clarifier Drives Equipment	0	0	0	EA	\$60,000	1.20	1.00	\$0	\$0	\$0
Blower	2	0	2	EA	\$10,000	1.20	1.00	\$24,000	\$0	\$24,000
Diffusers	2	0	2	EA	\$15,000	1.20	1.00	\$36,000	\$0	\$36,000
Weirs and Baffles	0	0	0	EA	\$15,000	1.20	1.00	\$0	\$0	\$0
Piping and Valves (interior)	0	0	0	EA	\$10,000	1.00	1.00	\$0	\$0	\$0
Piping and Valves (Str. 20)	1	0	1	EA	\$15,000	1.00	1.00	\$15,000	\$0	\$15,000
Painting										
Bridge Structure	2	0	2	LS	\$15,000	1.00	1.00	\$30,000	\$0	\$30,000
Piping	500	0	500	SF	\$18	1.00	1.00	\$9,000	\$0	\$9,000
Equipment	0	0	0	LS	\$40,000	1.00	1.00	\$0	\$0	\$0
Cost Subtotal								\$124,000	\$70,000	\$124,000
5 STR 25 - New Primary Clarifiers										
Building Construction										
Dewatering	0	2	0	LS	\$50,000	1.00	1.00	\$0	\$100,000	\$0
Excavation	0	3810	0	CY	\$36	1.00	1.00	\$0	\$137,160	\$0
Structural Fill	0	1200	0	CY	\$30	1.00	1.00	\$0	\$36,000	\$0
Concrete										
Circular walls	0	256	0	CY	\$810	1.00	1.00	\$0	\$207,360	\$0
Straight walls	0	0	0	CY	\$720	1.00	1.00	\$0	\$0	\$0
Slab on soil	0	205	0	CY	\$660	1.00	1.00	\$0	\$135,300	\$0
Shored slab	0	25	0	CY	\$1,320	1.00	1.00	\$0	\$33,000	\$0
Shored beams	0	0	0	CY	\$2,040	1.00	1.00	\$0	\$0	\$0
Columns	0	0	0	CY	\$1,380	1.00	1.00	\$0	\$0	\$0
Concrete fill	0	0	0	CY	\$480	1.00	1.00	\$0	\$0	\$0
Misc concrete	0	0	0	CY	\$900	1.00	1.00	\$0	\$0	\$0
Stairs and Railings	0	8	0	EA	\$1,000	1.00	1.00	\$0	\$8,000	\$0
Aluminum Railing	0	210	0	LF	\$60	1.00	1.00	\$0	\$12,600	\$0
Equipment										
Clarifier Drives Equipment	0	2	0	EA	\$150,000	1.20	1.00	\$0	\$360,000	\$0
Weirs and Baffles	0	2	0	EA	\$20,000	1.20	1.00	\$0	\$48,000	\$0
Piping and Valves (interior)	0	2	0	EA	\$10,000	1.20	1.00	\$0	\$24,000	\$0
Painting										
Structure Surfaces	0	0	0	SF	\$10	1.00	1.00	\$0	\$0	\$0
Piping	0	500	0	SF	\$18	1.00	1.00	\$0	\$9,000	\$0
Equipment	0	2	0	LS	\$40,000	1.00	1.00	\$0	\$80,000	\$0
Cost Subtotal								\$0	\$1,190,500	\$0

Jackson Facilities Plan

Facilities Plan Cost Estimate - Alternate Scope

9/20/2022

	<u>Description</u>	<u>Quantity</u>			<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>		
		<u>Alt. 1</u>	<u>Alt. 2</u>	<u>Alt. 3</u>					<u>Alt. 1</u>	<u>Alt. 2</u>	<u>Alt. 3</u>
6	STR 80 - Anaerobic Digesters / Building										
	Demolition										
	Digester Covers	2	2		EA	\$15,000	1.00	1.00	\$30,000	\$30,000	\$0
	Doors	2	2		EA	\$1,000	1.00	1.00	\$2,000	\$2,000	\$0
	Pumps	4	4		EA	\$1,000	1.00	1.00	\$4,000	\$4,000	\$0
	Boiler	1	1		EA	\$8,000	1.00	1.00	\$8,000	\$8,000	\$0
	Gas Equipment	1	1		EA	\$10,000	1.00	1.00	\$10,000	\$10,000	\$0
	Digester Cleaning	2	2		EA	\$20,000	1.00	1.00	\$40,000	\$40,000	\$0
	Building Construction										
	Dewatering	1	1		LS	\$100,000	1.00	1.00	\$100,000	\$100,000	\$0
	Excavation	2200	2200		CY	\$36	1.00	1.50	\$118,800	\$118,800	\$0
	Structural Fill	600	600		CY	\$30	1.00	1.50	\$27,000	\$27,000	\$0
	Concrete										
	Circular walls	230	230		CY	\$810	1.00	1.00	\$186,300	\$186,300	\$0
	Straight walls	55	55		CY	\$720	1.00	1.00	\$39,600	\$39,600	\$0
	Slab on soil	130	130		CY	\$660	1.00	1.00	\$85,800	\$85,800	\$0
	Shored slab	20	20		CY	\$1,320	1.00	1.00	\$26,400	\$26,400	\$0
	Shored beams	5	5		CY	\$2,040	1.00	1.00	\$10,200	\$10,200	\$0
	Columns	2	2		CY	\$1,380	1.00	1.00	\$2,760	\$2,760	\$0
	Concrete fill	0	0		CY	\$480	1.00	1.00	\$0	\$0	\$0
	Misc concrete	2	2		CY	\$900	1.00	1.00	\$1,800	\$1,800	\$0
	Wall doweling / ties	90	90		LF	\$250	1.00	1.00	\$22,500	\$22,500	\$0
	Block walls - split face (single wythe)	0	0		SF	\$36	1.00	1.00	\$0	\$0	\$0
	Block walls - split face (multi wythe)	800	800		SF	\$42	1.00	1.00	\$33,600	\$33,600	\$0
	Block wall - plain	300	300		SF	\$24	1.00	1.00	\$7,200	\$7,200	\$0
	Concrete plank	700	700		SF	\$24	1.00	1.00	\$16,800	\$16,800	\$0
	Architectural Ceilings	0	0		0	\$14	0.00	1.00	\$0	\$0	\$0
	Roofing	700	700		SF	\$24	1.00	1.00	\$16,800	\$16,800	\$0
	Architectural	700	700		SF	\$24	1.00	1.00	\$16,800	\$16,800	\$0
	Doors and Windows	3	3		LS	\$4,000	1.00	1.00	\$12,000	\$12,000	\$0
	Misc. Metals	1	1		LS	\$8,000	1.00	1.00	\$8,000	\$8,000	\$0
	Stairs and Railings	20	20		EA	\$1,000	1.00	1.00	\$20,000	\$20,000	\$0
	Aluminum Railing	60	60		LF	\$60	1.00	1.00	\$3,600	\$3,600	\$0
	Equipment										
	35' Dia. Floating Cover	1	1		EA	\$180,000	1.20	1.00	\$216,000	\$216,000	\$0
	35' Dia. Gas Holder Cover	1	1		EA	\$200,000	1.20	1.00	\$240,000	\$240,000	\$0
	55' Dia. Floating Cover	1	1		EA	\$220,000	1.20	1.00	\$264,000	\$264,000	\$0
	Boiler / Heat Exchanger	3	3		EA	\$150,000	1.20	1.00	\$540,000	\$540,000	\$0
	Gas Handling Equipment	1	1		EA	\$150,000	1.20	1.00	\$180,000	\$180,000	\$0
	Gas Flare	1	1		EA	\$45,000	1.20	1.00	\$54,000	\$54,000	\$0
	Sludge Pumps	3	3		EA	\$30,000	1.20	1.00	\$108,000	\$108,000	\$0
	Recirculation Pumps	5	5		EA	\$25,000	1.20	1.00	\$150,000	\$150,000	\$0
	Digester Mixing System	1	1		EA	\$175,000	1.20	1.00	\$210,000	\$210,000	\$0
	Cover Insulation	3	3		EA	\$40,000	1.20	1.00	\$144,000	\$144,000	\$0
	Piping and Valves (interior, ex. sludge)	1	1		LS	\$50,000	1.20	1.00	\$60,000	\$60,000	\$0
	Piping and Valves (interior, gas)	1	1		LS	\$30,000	1.20	1.00	\$36,000	\$36,000	\$0
	Piping and Valves (interior, NPW)	1	1		LS	\$15,000	1.20	1.00	\$18,000	\$18,000	\$0
	Piping and Valves (interior, Boiler)	3	3		LS	\$15,000	1.20	1.00	\$54,000	\$54,000	\$0
	Piping and Valves (interior, new sludge)	1	1		LS	\$200,000	1.00	1.00	\$200,000	\$200,000	\$0
	Painting										
	Structure Surfaces	3740	3740		SF	\$10	1.00	1.00	\$35,904	\$35,904	\$0
	Piping	2000	2000		SF	\$18	1.00	1.00	\$36,000	\$36,000	\$0
	Digester Covers - 35'	2	2		EA	\$100,000	1.00	1.00	\$200,000	\$200,000	\$0
	Digester Covers - 55'	1	1		EA	\$150,000	1.00	1.00	\$150,000	\$150,000	\$0
	HVAC (C1D1/damp)	3740	3740		SF	\$75	1.00	1.00	\$280,500	\$280,500	\$0
	HVAC (standard)	0	0		SF	\$45	1.00	1.00	\$0	\$0	\$0
	Plumbing (C1D1/damp)	3740	3740		SF	\$23	1.00	1.00	\$84,150	\$84,150	\$0
	Plumbing (standard)	0	0		SF	\$15	1.00	1.00	\$0	\$0	\$0
	Cost Subtotal								\$4,110,600	\$4,110,600	\$0
7	STR. 80 - New Aerobic Digesters										
	Demolition										
	Digester Covers			2	EA	\$25,000	1.00	1.00	\$0	\$0	\$50,000
	Doors			2	EA	\$1,000	1.00	1.00	\$0	\$0	\$2,000
	Pumps			4	EA	\$1,000	1.00	1.00	\$0	\$0	\$4,000
	Boiler			1	EA	\$8,000	1.00	1.00	\$0	\$0	\$8,000
	Gas Equipment			1	EA	\$10,000	1.00	1.00	\$0	\$0	\$10,000
	Mixing Equipment			2	EA	\$8,000	1.00	1.00	\$0	\$0	\$16,000

Village of Jackson

Jackson Facilities Plan

Facilities Plan Cost Estimate - Alternate Scope

9/20/2022

<u>Description</u>	<u>Quantity</u>			<u>Units</u>	<u>Unit Cost</u>	<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>		
	<u>Alt. 1</u>	<u>Alt. 2</u>	<u>Alt. 3</u>					<u>Alt. 1</u>	<u>Alt. 2</u>	<u>Alt. 3</u>
Digester Cleaning			2	EA	\$25,000	1.00	1.00	\$0	\$0	\$50,000
Building Construction										
Dewatering			1	LS	\$50,000	1.00	1.00	\$0	\$0	\$50,000
Excavation			870	CY	\$36	1.00	2.00	\$0	\$0	\$62,640
Structural Fill			250	CY	\$30	1.00	2.00	\$0	\$0	\$15,000
Concrete										
Circular walls			167	CY	\$810	1.00	1.00	\$0	\$0	\$135,270
Straight walls			0	CY	\$720	1.00	1.00	\$0	\$0	\$0
Slab on soil			92	CY	\$660	1.00	1.00	\$0	\$0	\$60,720
Shored slab			0	CY	\$1,320	1.00	1.00	\$0	\$0	\$0
Shored beams			0	CY	\$2,040	1.00	1.00	\$0	\$0	\$0
Columns			0	CY	\$1,380	1.00	1.00	\$0	\$0	\$0
Concrete fill			0	CY	\$480	1.00	1.00	\$0	\$0	\$0
Misc concrete			0	CY	\$900	1.00	1.00	\$0	\$0	\$0
Block walls - split face (single wythe)			0	SF	\$36	1.00	1.00	\$0	\$0	\$0
Block walls - split face (multi wythe)			0	SF	\$42	1.00	1.00	\$0	\$0	\$0
Block wall - plain			0	SF	\$24	1.00	1.00	\$0	\$0	\$0
Concrete plank			0	SF	\$24	1.00	1.00	\$0	\$0	\$0
Architectural Ceilings			0	0	\$0	0.00	1.00	\$0	\$0	\$0
Roofing			0	SF	\$24	1.00	1.00	\$0	\$0	\$0
Architectural			0	SF	\$24	1.00	1.00	\$0	\$0	\$0
Doors and Windows			2	LS	\$4,000	1.00	1.00	\$0	\$0	\$8,000
Misc. Metals			0	LS	\$24	1.00	1.00	\$0	\$0	\$0
Stairs and Railings			0	EA	\$1,000	1.00	1.00	\$0	\$0	\$0
Aluminum Railing			0	LF	\$60	1.00	1.00	\$0	\$0	\$0
Equipment										
35' dia. fixed covers			2	EA	\$50,000	1.20	1.00	\$0	\$0	\$120,000
40' dia. fixed cover			1	EA	\$60,000	1.20	1.00	\$0	\$0	\$72,000
Sludge Pumps			4	EA	\$25,000	1.20	1.00	\$0	\$0	\$120,000
Digester Blowers			3	EA	\$75,000	1.20	1.00	\$0	\$0	\$270,000
Aeration Diffusers			3	EA	\$40,000	1.20	1.00	\$0	\$0	\$144,000
Piping and Valves (interior, ex. sludge)			1	LS	\$50,000	1.20	1.00	\$0	\$0	\$60,000
Piping and Valves (interior, APH)			3	LS	\$30,000	1.20	1.00	\$0	\$0	\$108,000
Piping and Valves (interior, sludge)			1	LS	\$100,000	1.20	1.00	\$0	\$0	\$120,000
Piping and Valves (interior, NPW)			1	LS	\$15,000	1.20	1.00	\$0	\$0	\$18,000
Painting										
Structure Surfaces			1870	SF	\$10	1.00	1.00	\$0	\$0	\$17,952
Piping			1000	SF	\$18	1.00	1.00	\$0	\$0	\$18,000
Equipment			0	EA	\$10,000	1.00	1.00	\$0	\$0	\$0
HVAC (C1D1/damp)			0	SF	\$75	1.00	1.00	\$0	\$0	\$0
HVAC (standard)			1870	SF	\$45	1.00	1.00	\$0	\$0	\$84,150
Plumbing (C1D1/damp)			0	SF	\$23	1.00	1.00	\$0	\$0	\$0
Plumbing (standard)			1870	SF	\$15	1.00	1.00	\$0	\$0	\$28,050
Cost Subtotal								\$0	\$0	\$1,651,800
Construction Subtotal								\$4,586,000	\$6,226,300	\$2,139,200
Electrical					25%			\$1,146,500	\$1,556,600	\$534,800
Additional Contractor Costs					15%			\$687,900	\$934,000	\$320,900
Total Construction Cost								\$6,420,400	\$8,716,900	\$2,994,900
Additional Design and Management Costs										
Contingencies					10%			\$642,100	\$871,700	\$299,500
Engineering, Admin, Legal					11%			\$706,300	\$958,900	\$329,500
Resident Observation					4%			\$256,900	\$348,700	\$119,800
Cost Subtotal								\$963,200	\$1,307,600	\$449,300
Total Project Cost								\$8,025,700	\$10,896,200	\$3,743,700

Village of Jackson
WWTP Facilities Planning
O&M Cost Analysis of Alternatives

Unit costs

Alum	\$0.75 /gal	Nat. Gas	\$1.18 /therm
Polymer	\$7.50 /lb	Electricity	\$0.099 /KWH
Water	.001. /gal	Inflation	2% /year

							Alternative #1	Alternative #2		Alternative #3		
		2019 Actual	2020 Actual	2021 Actual	2025 Value	2045 Design Value	2025 Startup	2045 Design	2025 Startup	2045 Design	2025 Startup	2045 Design
	O&M Quantities											
	Influent Flow and Loads											
	Annual Average Flow (MGD)	1.357	1.249	1.096		2.046	0.966	2.046	0.966	2.046	0.966	2.046
	Design/Sustained Flow (MGD)	1.582	1.466	1.357		2.619	1.245	2.619	1.245	2.619	1.245	2.619
	BOD Load (lbs/day)	2,541	2,411	2,647		4,399	2,700	4,399	2,700	4,399	2,700	4,399
	TSS Load (lbs/day)	3,248	2,910	2,902		5,388	2,729	5,388	2,729	5,388	2,729	5,388
	NH3N Load (lbs/day)	213	215	207		110	204	110	204	110	204	110
	Phosphorus Load (lbs/day)	63	63	66	68	200	68	200	68	200	68	200
	Chemical Feed Quantities											
	Alum Required (gal/day)	101.5	123.4	125.0	123.4	70.0	50.0	100.0	50.0	100.0	50.0	100.0
	Chemical Sludge (lbs/day) ¹	472.5	472.5	495.0	510.0		675	2,000	675	2,000	675	2,000
	Building Operation											
	Building Square Feet - Heated (Elect)	0	0	0			0	0	0	0	0	0
	Building Square Feet - Heated (Gas)	12,488	12,488	12,488			17,792	17,792	17,792	17,792	17,072	17,072
	Building Square Feet - Heated (Garage)	5,400	5,400	5,400			5,400	5,400	5,400	5,400	5,400	5,400
	Building Square Feet - Lighting (All)	17,888	17,888	17,888			17,888	23,192	23,192	23,192	22,472	22,472
	O&M Costs											
	Personnel	\$ 332,513	347,586	350,222			410,222	470,222	410,222	470,222	410,222	470,222
	Alum Cost (\$/year)	\$ 27,821	\$ 21,592	\$ 35,929	\$ 33,791		\$ 13,688	\$ 27,375	\$ 13,688	\$ 27,375	\$ 13,688	\$ 27,375
	Polymer - Sludge Dewatering (\$/year)	0	0	0			25,000	50,000	25,000	50,000	\$ 25,000	\$ 50,000
Sludge Disposal Costs (\$/year) ²	65,406	63,350	\$72,235			\$33,565	\$61,062	\$74,017	\$128,287	\$74,017	\$128,287	
Natural Gas usage (\$/year)	\$ 20,000	\$ 20,000	\$ 17,326	\$ 17,326		\$ 22,463	\$ 22,463	\$ 22,463	\$ 22,463	\$ 21,766	\$ 21,766	
Electricity Usage (KWH)						1,313,961	2,099,281	1,320,564	2,109,136	1,147,298	2,000,946	
Base						1,188,896	1,974,217	1,195,499	1,984,072	1,024,756	1,878,404	
General Electric Use						125,065	125,065	125,065	125,065	122,542	122,542	
Electricity Usage (\$/year)	\$ 109,210	\$ 108,989	\$ 120,813	\$ 124,475		\$ 128,186	\$ 204,799	\$ 128,830	\$ 205,760	\$ 111,927	\$ 195,206	
1 chemical sludge production: assumes 75% of current P is removed by chemical and produces 10:1 sludge, used to back into sludge disposal unit price.												
2 Sludge Disposal Costs: based on thickening sludge from 2.0% to 4.5% average												
O&M Adder to Base Budget Estimate												

		Actual 2019	Actual 2020	Budget 2021	Alternative #1		Alternative #2		Alternative #3	
Expenses	Type				Startup	Design	Startup	Design	Startup	Design
Supervision-Labor	Personnel	\$332,513	\$347,586	\$350,222	\$ 410,222	\$ 470,222	\$ 410,222	\$ 470,222	\$ 410,222	\$ 470,222
Diggers Hotline Wages		\$4,373	\$5,861	\$6,575	\$ 6,500	\$ 7,500	\$ 6,500	\$ 7,500	\$ 6,500	\$ 7,500
Chlorine		\$3,074	\$2,559	\$2,198	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Aluminum Sulfate		\$27,821	\$21,593	\$35,929	\$ 13,688	\$ 27,375	\$ 13,688	\$ 27,375	\$ 13,688	\$ 27,375
Polymer		\$5,288	\$5,468	\$4,500	\$ 25,000	\$ 50,000	\$ 25,000	\$ 50,000	\$ 25,000	\$ 50,000
Sodium Bisulfate		\$2,676	\$2,453	\$3,051	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Other Chemicals		\$303	\$415	\$343	\$ 400	\$ 400	\$ 400	\$ 400	\$ 400	\$ 400
Lab Time / Supplies		\$7,917	\$10,996	\$8,740	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000	\$ 9,000
Operational Supplies		\$7,768	\$5,171	\$6,311	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000
Transportation		\$4,237	\$3,034	\$9,359	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
Utilities		\$129,210	\$128,898	\$140,813	\$ 128,186	\$ 204,799	\$ 128,830	\$ 205,760	\$ 111,927	\$ 195,206
Uniforms / Safety Equip.		\$3,396	\$1,903	\$2,048	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000
Sludge Testing		\$98	\$704	\$29	\$ 200	\$ 200	\$ 200	\$ 200	\$ 200	\$ 200
Colleciton system maint		\$31,487	\$79,305	\$31,585	\$ 35,000	\$ 35,000	\$ 35,000	\$ 35,000	\$ 35,000	\$ 35,000
Equipment Maintenance		\$38,890	\$44,818	\$87,602	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000	\$ 50,000
Building / grounds maintenance		\$65,813	\$102,293	\$83,586	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
joint metering costs		\$37,803	\$38,745	\$39,231	\$ 39,000	\$ 39,000	\$ 39,000	\$ 39,000	\$ 39,000	\$ 39,000
Administrative wages		\$35,019	\$36,660	\$43,158	\$ 43,000	\$ 43,000	\$ 43,000	\$ 43,000	\$ 43,000	\$ 43,000
Office supplies		\$227	\$405	\$112	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100
Accounting / Billing wages		\$30,354	\$30,458	\$32,811	\$ 32,000	\$ 32,000	\$ 32,000	\$ 32,000	\$ 32,000	\$ 32,000
Property / liability insurance		\$66,270	\$63,002	\$70,482	\$ 70,000	\$ 70,000	\$ 70,000	\$ 70,000	\$ 70,000	\$ 70,000
Audit & accounting fees		\$8,650	\$8,700	\$1,200	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000	\$ 80,000
meter calibration		\$0	\$0	\$350	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
sludge hauling		\$65,406	\$63,350	\$72,235	\$ 33,565	\$ 61,062	\$ 74,017	\$ 128,287	\$ 74,017	\$ 128,287
industrial monitoring		\$23,243	\$10,012	\$8,172	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000
cell / telephones		\$1,987	\$1,960	\$1,893	\$ 1,900	\$ 1,900	\$ 1,900	\$ 1,900	\$ 1,900	\$ 1,900
SCADA systems		\$662	\$6,407	\$3,845	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000
Postage		\$3,796	\$3,754	\$5,176	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
Metal & Bioessay testing		\$6,918	\$6,658	\$14,310	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000	\$ 8,000
Education / travel / dues		\$4,861	\$2,589	\$4,257	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000	\$ 4,000
DNR Environmental Fees		\$9,467	\$9,242	\$9,613	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000	\$ 10,000
Emergency response board		\$0	\$405	\$405	\$ 400	\$ 400	\$ 400	\$ 400	\$ 400	\$ 400
GASB 68 & 75 Net expenses		\$0	\$268	-\$43,201	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Amortize debt		\$0	\$0	\$0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
LT debt principle and interest		\$0	\$0	\$0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Replacement fund		\$76,117	\$96,959	\$10,122	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Contingency		\$3,912	\$0	\$28	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Computer software		\$7,012	\$6,285	\$6,271	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000	\$ 6,000
Tools		\$3,032	\$1,339	\$1,998	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000	\$ 2,000
thermal bonding		\$0	\$1,733	\$0	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
various studies		\$14,961	\$23,479	\$29,720	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Total		\$1,064,561	\$1,175,467	\$1,085,079	\$1,140,161	\$1,343,958	\$1,181,256	\$1,412,145	\$1,164,353	\$1,401,590

Village of Jackson
WWTP Facilities Planning
Replacement Fund Calculation

Base Replacement Costs					
Interest Rate for Calculation		3.125%			
Inflation Rate for Future Equipment Cost		0.000%			
Description	Purchase Cost	Quantity	Equip Life	Installation Factor	Annual Fund Quantity Fund \$
5 Site					
Generator	\$250,000	1	20	1.2	\$11,023
10 Service Building					
Raw Pumps	\$40,000	4	20	1.2	\$7,055
Raw Pump VFDs	\$20,000	4	20	1.2	\$3,528
15 Influent Screening					
Mechanical Screen	\$150,000	1	20	1.2	\$6,614
Screening Washer	\$75,000	1	20	1.2	\$3,307
20 Pretreatment Building					
Grit Pumps	\$30,000	2	20	1.2	\$2,646
Grit Classifier	\$50,000	1	20	1.2	\$2,205
Pista Grit Separator	\$75,000	2	20	1.2	\$6,614
30 Aeration Basins					
Fine Bubble Diffuser	\$60,000	2	20	1.2	\$5,291
32 Selector Basins					
Mixers	\$20,000	4	20	1.2	\$3,528
Recycle pump	\$20,000	1	20	1.2	\$882
45 Final Clarifiers					
Algae schedules	\$30,000	3	20	1.2	\$3,968
Clarifier equipment	\$200,000	3	20	1.2	\$26,456
Weirs & baffles	\$30,000	3	20	1.2	\$3,968
50 RAS Building					
RAS Pumps	\$30,000	4	20	1.2	\$5,291
WAS Pumps	\$25,000	2	20	1.2	\$2,205
Flow Meters	\$6,000	4	20	1.2	\$1,058
60 Tertiary Building					
Chemical Pumps	\$7,500	4	20	1.2	\$1,323
Tertiary Filters	\$400,000	2	20	1.2	\$35,275
Flash Mixers	\$15,000	3	20	1.2	\$1,984
65 Blower Building					
Blowers - large	\$90,000	1	20	1.2	\$3,968
Blowers - small	\$15,000	2	20	1.2	\$1,323

Village of Jackson
WWTP Facilities Planning
Replacement Fund Calculation

Transfer switch	\$40,000	1	20	1.2	\$1,764
70 Disinfection Tank					
UV System	\$250,000	1	20	1.2	\$11,023
82 Sludge Processing Building					
Disk thickener	\$150,000	2	20	1.2	\$13,228
Sludge Pump	\$25,000	5	20	1.2	\$5,512
Polymer system	\$50,000	2	20	1.2	\$4,409
Flow Meter	\$7,000	2	20	1.2	\$617
90 Sludge Pumping Building					
Sludge Pumps	\$40,000	3	20	1.2	\$5,291
Total Annual Replacement Fund					\$181,358

Waste Receiving Station

Interest Rate for Calculation
Inflation Rate for Future Equipment Cost

3.125%
0.000%

Description	Purchase Cost	Alternative 1	Alternative 2	Alternative 3	Equip Life	Installation Factor	Alternative 1 Fund \$	Annual Fund Alternative 2 Fund \$	Alternative 3 Fund \$
22 Waste Receiving									
Screen	\$75,000	1	1	1	20	1.2	\$3,307	\$3,307	\$3,307
Blower	\$10,000	1	1	1	20	1.2	\$441	\$441	\$441
Aeration	\$15,000	1	1	1	20	1.2	\$661	\$661	\$661
Total Annual Replacement Fund							\$4,409	\$4,409	\$4,409

New Primary Clarifiers

Interest Rate for Calculation
Inflation Rate for Future Equipment Cost

3.125%
0.000%

Description	Purchase Cost	Alternative 1	Alternative 2	Alternative 3	Equip Life	Installation Factor	Alternative 1 Fund \$	Annual Fund Alternative 2 Fund \$	Alternative 3 Fund \$
25 New Primary Clarifiers									
Clarifier Drives	\$150,000	0	2	0	20	1.2	\$0	\$13,228	\$0
Weirs and Baffles	\$20,000	0	2	0	20	1.2	\$0	\$1,764	\$0
Total Annual Replacement Fund							\$0	\$14,992	\$0

Village of Jackson
WWTP Facilities Planning
Replacement Fund Calculation

Anaerobic Digesters

Interest Rate for Calculation
Inflation Rate for Future Equipment Cost

3.125%
0.000%

Description	Purchase Cost	Alternative 1	Alternative 2	Alternative 3	Equip Life	Installation Factor	Alternative 1 Fund \$	Annual Fund Alternative 2 Fund \$	Alternative 3 Fund \$
80 Anaerobic Digesters									
35' dia. floating cover	\$180,000	1	1	0	40	1.2	\$2,784	\$2,784	\$0
35' gas holder cover	\$200,000	1	1	0	40	1.2	\$3,094	\$3,094	\$0
55' dia. floating cover	\$220,000	1	1	0	40	1.2	\$3,403	\$3,403	\$0
boiler / heat exchanger	\$150,000	3	3	0	40	1.2	\$6,961	\$6,961	\$0
gas handling equipment	\$150,000	1	1	0	20	1.2	\$6,614	\$6,614	\$0
gas flare	\$45,000	1	1	0	20	1.2	\$1,984	\$1,984	\$0
sludge pumps	\$30,000	3	3	0	20	1.2	\$3,968	\$3,968	\$0
recirculation pumps	\$25,000	5	5	0	20	1.2	\$5,512	\$5,512	\$0
digester mixing system	\$175,000	1	1	0	20	1.2	\$7,716	\$7,716	\$0
Total Annual Replacement Fund							\$22,857	\$22,857	\$0

Aerobic Digester

Interest Rate for Calculation
Inflation Rate for Future Equipment Cost

3.125%
0.000%

Description	Purchase Cost	Alternative 1	Alternative 2	Alternative 3	Equip Life	Installation Factor	Alternative 1 Fund \$	Annual Fund Alternative 2 Fund \$	Alternative 3 Fund \$
80 Aerobic Digesters									
35' dia. fixed cover	\$50,000			2	20	1.2	\$0	\$0	\$4,409
40' dia. fixed cover	\$60,000			1	20	1.2	\$0	\$0	\$2,646
sludge pumps	\$25,000			4	20	1.2	\$0	\$0	\$4,409
Digester blowers	\$75,000			3	20	1.2	\$0	\$0	\$9,921
Aeration Diffuser	\$40,000			3	20	1.2	\$0	\$0	\$5,291
Total Annual Replacement Fund							\$0	\$0	\$7,055

Village of Jackson
 WWTP Facilities Planning
Replacement Fund Calculation

	Total Replacement Costs		
	Alt. #1	Alt. #2	Alt. #3
Base	\$ 181,358	\$ 181,358	\$ 181,358
Waste Receiving	\$ 4,409	\$ 4,409	\$ 4,409
New Primary Clarifiers	\$ -	\$ 14,992	\$ -
Anaerobic Digestion	\$ 22,857	\$ 22,857	\$ -
Aerobic Digestion	\$ -	\$ -	\$ 7,055
Total Annual Replacement	\$ 208,624	\$ 223,616	\$ 192,823

Village of Jackson
WWTP Facilities P.W.

Discount Rate 3.125%

Number of Years 20

Interest 0.000%

Alternative #1					
Year	Capital Cost	O&M	Replacement	Total	PW
0	\$35,857,100			\$35,857,100	\$35,857,100
1		\$1,140,161	\$208,624	\$1,348,785	\$1,307,912
2		\$1,160,540	\$208,624	\$1,369,164	\$1,287,442
3		\$1,170,730	\$208,624	\$1,379,354	\$1,257,720
4		\$1,180,920	\$208,624	\$1,389,544	\$1,228,617
5		\$1,191,110	\$208,624	\$1,399,734	\$1,200,123
6		\$1,201,300	\$208,624	\$1,409,924	\$1,172,227
7		\$1,211,490	\$208,624	\$1,420,114	\$1,144,921
8		\$1,221,679	\$208,624	\$1,430,303	\$1,118,192
9		\$1,231,869	\$208,624	\$1,440,493	\$1,092,033
10		\$1,242,059	\$208,624	\$1,450,683	\$1,066,432
11		\$1,252,249	\$208,624	\$1,460,873	\$1,041,379
12		\$1,262,439	\$208,624	\$1,471,063	\$1,016,866
13		\$1,272,629	\$208,624	\$1,481,253	\$992,882
14		\$1,282,818	\$208,624	\$1,491,443	\$969,418
15		\$1,293,008	\$208,624	\$1,501,632	\$946,464
16		\$1,303,198	\$208,624	\$1,511,822	\$924,011
17		\$1,313,388	\$208,624	\$1,522,012	\$902,050
18		\$1,323,578	\$208,624	\$1,532,202	\$880,572
19		\$1,333,768	\$208,624	\$1,542,392	\$859,566
20		\$1,343,958	\$208,624	\$1,552,582	\$839,026
Total Present Value:					\$56,265,928

Alternative #2					
Year	Capital Cost	O&M	Replacement	Total	PW
0	\$38,625,200			\$38,625,200	\$38,625,200
1		\$1,181,256	\$223,616	\$1,404,872	\$1,362,300
2		\$1,208,455	\$223,616	\$1,432,071	\$1,346,594
3		\$1,222,054	\$223,616	\$1,445,670	\$1,318,188
4		\$1,235,653	\$223,616	\$1,459,269	\$1,290,267
5		\$1,249,252	\$223,616	\$1,472,868	\$1,262,828
6		\$1,262,852	\$223,616	\$1,486,468	\$1,235,867
7		\$1,276,451	\$223,616	\$1,500,067	\$1,209,380
8		\$1,290,050	\$223,616	\$1,513,666	\$1,183,364
9		\$1,303,649	\$223,616	\$1,527,265	\$1,157,814
10		\$1,317,248	\$223,616	\$1,540,864	\$1,132,726
11		\$1,330,848	\$223,616	\$1,554,464	\$1,108,095
12		\$1,344,447	\$223,616	\$1,568,063	\$1,083,917
13		\$1,358,046	\$223,616	\$1,581,662	\$1,060,186
14		\$1,371,645	\$223,616	\$1,595,261	\$1,036,899
15		\$1,385,244	\$223,616	\$1,608,861	\$1,014,049
16		\$1,398,844	\$223,616	\$1,622,460	\$991,632
17		\$1,412,443	\$223,616	\$1,636,059	\$969,642
18		\$1,426,042	\$223,616	\$1,649,658	\$948,075
19		\$1,439,641	\$223,616	\$1,663,257	\$926,924
20		\$1,412,145	\$223,616	\$1,635,761	\$883,976
Total Present Value:					\$61,147,923

Village of Jackson
WWTP Facilities P.W.

Discount Rate 3.125%

Number of Years 20

Interest 0.000%

Alternative #3					
Year	Capital Cost	O&M	Replacement	Total	PW
0	\$31,728,100			\$31,728,100	\$31,728,100
1		\$1,164,353	\$192,823	\$1,357,176	\$1,316,049
2		\$1,188,077	\$192,823	\$1,380,899	\$1,298,476
3		\$1,199,939	\$192,823	\$1,392,761	\$1,269,945
4		\$1,211,800	\$192,823	\$1,404,623	\$1,241,949
5		\$1,223,662	\$192,823	\$1,416,485	\$1,214,485
6		\$1,235,524	\$192,823	\$1,428,347	\$1,187,544
7		\$1,247,386	\$192,823	\$1,440,209	\$1,161,121
8		\$1,259,248	\$192,823	\$1,452,070	\$1,135,209
9		\$1,271,110	\$192,823	\$1,463,932	\$1,109,802
10		\$1,282,972	\$192,823	\$1,475,794	\$1,084,891
11		\$1,294,833	\$192,823	\$1,487,656	\$1,060,471
12		\$1,306,695	\$192,823	\$1,499,518	\$1,036,535
13		\$1,318,557	\$192,823	\$1,511,380	\$1,013,076
14		\$1,330,419	\$192,823	\$1,523,242	\$990,087
15		\$1,342,281	\$192,823	\$1,535,103	\$967,561
16		\$1,354,143	\$192,823	\$1,546,965	\$945,490
17		\$1,366,005	\$192,823	\$1,558,827	\$923,869
18		\$1,377,866	\$192,823	\$1,570,689	\$902,691
19		\$1,389,728	\$192,823	\$1,582,551	\$881,947
20		\$1,401,590	\$192,823	\$1,594,413	\$861,631
Total Present Value:					\$53,330,931

	Alternative #1	Alternative #2	Alternative #3
Capital Cost	\$35,857,100	\$38,625,200	\$31,728,100
Avg. O&M	\$1,246,700	\$1,321,400	\$1,288,400
Replacement	\$208,700	\$223,700	\$192,900
Total PW	\$56,266,000	\$61,148,000	\$53,331,000
> than Min.	5.50%	14.66%	0.00%

Appendix M

Design Data Models for Alternatives

Jackson WWTF

Alternative 3 - Expansion with Aerobic Digestion

STRUCTURE SCHEDULE	
10	SERVICE BUILDING
15	INFLUENT SCREENING BUILDING
20	PRETREATMENT BUILDING
22	WASTE RECEIVING STATION
25	SEPTAGE TANKS (PRIMARY CLARIFIERS)
30	AERATION BASINS
31	RBC TANKS
35	AERATION CONTROL BUILDING
40	SECONDARY CLARIFIERS #1 & #2
45	SECONDARY CLARIFIERS #3 & #4
50	SECONDARY SLUDGE BUILDING
55	RAS PUMPING STATION
60	TERTIARY FILTER BUILDING
65	BLOWER BUILDING
70	DISINFECTION TANK
75	GRAVITY THICKENER
80	ANAEROBIC DIGESTERS AND BUILDING
81	SLUDGE DRYING BEDS
85	SLUDGE STORAGE TANK
90	SLUDGE PUMPING BUILDING
95	STORAGE GARAGE

NEW WASTE RECEIVING BUILDING

NEW 65' DIA FINAL CLARIFIER

NEW SELECTOR BASINS

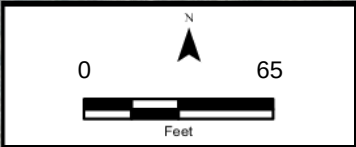
NEW FILTERS AND FLOC TANK

CONVERT EX. ANAEROBIC DIGESTERS

NEW 40' DIA AEROBIC DIGESTER

NEW SLUDGE PROCESSING BUILDING

STORAGE GARAGE EXPANSION



Jackson WWTF
Alternative 2 - Expansion with Primary Clarifiers
Anaerobic Digestion

STRUCTURE SCHEDULE	
10	SERVICE BUILDING
15	INFLUENT SCREENING BUILDING
20	PRETREATMENT BUILDING
22	WASTE RECEIVING STATION
25	SEPTAGE TANKS (PRIMARY CLARIFIERS)
30	AERATION BASINS
31	RBC TANKS
35	AERATION CONTROL BUILDING
40	SECONDARY CLARIFIERS #1 & #2
45	SECONDARY CLARIFIERS #3 & #4
50	SECONDARY SLUDGE BUILDING
55	RAS PUMPING STATION
60	TERTIARY FILTER BUILDING
65	BLOWER BUILDING
70	DISINFECTION TANK
75	GRAVITY THICKENER
80	ANAEROBIC DIGESTERS AND BUILDING
81	SLUDGE DRYING BEDS
85	SLUDGE STORAGE TANK
90	SLUDGE PUMPING BUILDING
95	STORAGE GARAGE

NEW 50' DIA PRIMARY CLARIFIERS

NEW 65' DIA FINAL CLARIFIER

NEW WASTE RECEIVING BUILDING

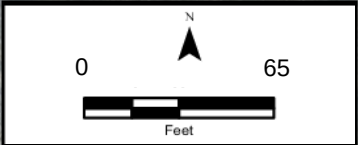
NEW SELECTOR BASINS

NEW FILTERS AND FLOC TANK

NEW 55' DIA ANAEROBIC DIGESTER AND BUILDING EXPANSION

NEW SLUDGE PROCESSING BUILDING

STORAGE GARAGE EXPANSION



Jackson WWTF

Alternative 1 - Expansion with Anaerobic Digestion

STRUCTURE SCHEDULE	
10	SERVICE BUILDING
15	INFLUENT SCREENING BUILDING
20	PRETREATMENT BUILDING
22	WASTE RECEIVING STATION
25	SEPTAGE TANKS (PRIMARY CLARIFIERS)
30	AERATION BASINS
31	RBC TANKS
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90	SLUDGE PUMPING BUILDING
95	STORAGE GARAGE

NEW WASTE RECEIVING BUILDING

NEW 65' DIA FINAL CLARIFIER

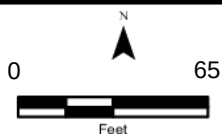
NEW SELECTOR BASINS

NEW FILTERS AND FLOC TANK

NEW 55' DIA ANAEROBIC DIGESTER AND BUILDING EXPANSION

NEW SLUDGE PROCESSING BUILDING

STORAGE GARAGE EXPANSION



Influent Loadings		Current Annual Average		Recycle	Current Max Month (Avg)		Recycle	Linear 2030 Annual Avg		Recycle	Design Annual Average		Recycle	Design Max Month		Recycle
Flow	mgd	1.227			1.589			1.637			2.046			2.619		
Peak Hour	mgd	7.192			7.192			7.192			7.192			7.192		
Recycle	gpd	184,842		177,753	228,869		227,062	233,179		231,476	282,353		281,141	348,012		346,486
BOD	lbs/day	3,316			3,316			3,477			4,399			5,235		
Recycle	lbs/day	153		145	194		191	198		195	243		240	304		301
TS	lbs/day	4,354			4,354			4,311			5,388			6,941		
Recycle	lbs/day	847		800	1,096		1,080	1,119		1,104	1,396		1,378	1,768		1,745
VSS	lbs/day	3,266			3,266			3,233			4,041			5,206		
Recycle	lbs/day	635		600	773		810	791		828	990		1,034	1,252		1,309
TKN	lbs/day	247			247			348			483			548		
Recycle	lbs/day	67		59	80		80	81		81	101		101	125		125
Total Influent Phosphorus	lbs/day	64			103			87			110			160		
Soluble	lbs/day	48		75%	77		75%	65		75%	83		75%	120		75%
Particulate	lbs/day	16			26			22			28			40		
Total Recycle Phosphorus	lbs/day	5			41			35			44			64		
Soluble	lbs/day	0		0.2	35		35.0	29		29.0	37		36.7	54		54.1
Particulate	lbs/day	5		4.6	6		6.1	6		6.2	8		7.8	10		9.9
Holding Tank																
Flow	mgd	0.000			0.000			0.000			0.000			0.000		
BOD	lbs/day	0			0			0			0			0		
TS	lbs/day	0			0			0			0			0		
VSS	lbs/day	0			0			0			0			0		
TKN	lbs/day	0			0			0			0			0		
Total Phosphorus	lbs/day	0			0			0			0			0		
Soluble	lbs/day	0		50%	0		50%	0		50%	0		50%	0		50%
Particulate	lbs/day	0			0			0			0			0		
Waste to Headworks, Digester, or P-Release	H or D or P	H			H			H			H			H		
Septage																
Flow	mgd	0.000			0.000			0.000			0.000			0.000		
BOD	lbs/day	0			0			0			0			0		
TS	lbs/day	0			0			0			0			0		
VSS	lbs/day	0			0			0			0			0		
TKN	lbs/day	0			0			0			0			0		
Total Phosphorus	lbs/day	0			0			0			0			0		
Soluble	lbs/day	0		50%	0		50%	0		50%	0		50%	0		50%
Particulate	lbs/day	0			0			0			0			0		
Waste to Headworks, Digester, Thickener, or F	H, D, T, or P	H			H			H			H			H		
Total Influent with Recycle																
Influent																
Flow	MGD	1.412	980	gpm	1.818	1262	gpm	1.870	1298	gpm	2.328	1617	gpm	2.967	2060	gpm
BOD	lbs/day	153	13	mg/L	3510	232	mg/L	3675	236	mg/L	4642	239	mg/L	5539	224	mg/L
TSS	lbs/day	847	72	mg/L	5450	359	mg/L	5430	348	mg/L	6784	349	mg/L	8709	352	mg/L
VSS	lbs/day	635	54	mg/L	4038	266	mg/L	4024	258	mg/L	5031	259	mg/L	6457	261	mg/L
TKN	lbs/day	67	6	mg/L	327	22	mg/L	429	28	mg/L	584	30	mg/L	673	27	mg/L
Total Phosphorus	lbs/day	69	6	mg/L	144	9	mg/L	122	8	mg/L	154	8	mg/L	224	9	mg/L
Soluble	lbs/day	48	4	mg/L	112	7	mg/L	94	6	mg/L	119	6	mg/L	174	7	mg/L
Particulate	lbs/day	21	2	mg/L	32	2	mg/L	28	2	mg/L	35	2	mg/L	50	2	mg/L
Biological Treatment Parameters																
Desired MLSS	mg/L	2,500			2,500			2,500			2,500			2,500		
RAS Concentration	mg/L	7,500			7,500			7,500			7,500			7,500		
Average RAS Flowrate (Total)	MGD	0.706	50%		0.909	50%		0.935	50%		1.164	50%		1.484	50%	
	gpm	490			631			649			808			1,030		
Desired Sludge Age (MCRT)	days	10			10			10			10			10		

Selector Basins																
Influent																
Flow	MGD	1.412	980	gpm	1.818	1262	gpm	1.870	1298	gpm	2.328	1617	gpm	2.967	2060	gpm
BOD	lbs/day	153	13	mg/L	3,510	232	mg/L	3,675	236	mg/L	4,642	239	mg/L	5,539	224	mg/L
TSS	lbs/day	847	72	mg/L	5,450	359	mg/L	5,430	348	mg/L	6,784	349	mg/L	8,709	352	mg/L
VSS	lbs/day	635	54	mg/L	4,038	266	mg/L	4,024	258	mg/L	5,031	259	mg/L	6,457	261	mg/L
TKN	lbs/day	67	6	mg/L	327	22	mg/L	429	28	mg/L	584	30	mg/L	673	27	mg/L
Total Phosphorus	lbs/day	69	6	mg/L	144	9	mg/L	122	8	mg/L	154	8	mg/L	224	9	mg/L
Soluble P	lbs/day	48	4.1	mg/L	112	7.4	mg/L	94	6.0	mg/L	119	6.1	mg/L	174	7.0	mg/L
Particulate P	lbs/day	21	1.7	mg/L	32	2.1	mg/L	28	1.8	mg/L	35	1.8	mg/L	50	2.0	mg/L
Biological	lbs/day	0			0			0			0			0		
Inert	lbs/day	21			32			28			35			50		
RAS																
Flow	MGD	0.706			0.909			0.935			1.164			1.484		
BOD	lbs/day	59	10	mg/L	76	10	mg/L	78	10	mg/L	97	10	mg/L	124	10	mg/L
TS	lbs/day	44,155			56,854			58,474			72,819			92,793		
VS	%	75%			75%			75%			75%			75%		
VS	lbs/day	33,117			42,640			43,856			54,614			69,595		
TKN	lbs/day	6	1	mg/L	8	1	mg/L	8	1	mg/L	10	1	mg/L	12	1	mg/L
Nitrate/Nitrite	lbs/day	20			60			91			130			147		
Total P (biological and RAS water)	lbs/day	441	75	mg/L	2,203	291	mg/L	1,883	241	mg/L	2,361	243	mg/L	3,518	284	mg/L
Soluble P	lbs/day	3	0.5	mg/L	4	0.5	mg/L	4	0.5	mg/L	5	0.5	mg/L	6	0.5	mg/L
Particulate P	lbs/day	438			2,200			1,879			2,356			3,512		
Biological		3			1,687			1,419			1,782			2,683		
Inert		435			513			460			574			829		
Anoxic Recycle																
	gpm	450			125			175			200			250		
Dimensions Each Basin																
Length	ft	35.0			35.0			35.0			35.0			35.0		
Width	ft	35.0			35.0			35.0			35.0			35.0		
SWD	ft	16.00			16.00			16.00			16.00			16.00		
Basin Volume	gal	146,608			146,608			146,608			146,608			146,608		
Anoxic Basins																
Basins Online	#	2			2			2			2			2		
Influent Flow	MGD	1.354			1.089			1.187			1.452			1.844		
Detention Time	hrs	5.2			6.5			5.9			4.8			3.8		
Denite Rate	lbs/lbVSS/d	0.040			0.040			0.040			0.040			0.040		
Active Biomass	lbs	12,745	NO ₃ Removed		13,689	NO ₃ Removed		13,652	NO ₃ Removed		13,657	NO ₃ Removed		13,665	NO ₃ Removed	
Denitrification/Nitrate Removal	lbs/day	20	YES		60	YES		91	YES		130	YES		147	YES	
BOD Supplied (Recycle)	lbs/day	65			237			337			391			458		
BOD Removal	lbs/day	65			203			311			391			458		
Anaerobic Basins																
Basins Online	#	2			2			2			2			2		
Influent Flow	MGD	2.118			2.727			2.805			3.493			4.451		
Detention Time	hrs	3.3			2.6			2.5			2.0			1.6		
Effluent w/ RAS																
Flow	mgd	2.118			2.727			2.805			3.493			4.451		
BOD	lbs/day	147			3,382			3,442			4,348			5,205		
TSS	lbs/day	45,002			62,304			63,904			79,603			101,502		
VSS	lbs/day	33,752			46,679			47,880			59,645			76,052		
TKN	lbs/day	73			335			437			593			686		
Total Phosphorus	lbs/day	510			2,347			2,005			2,515			3,742		
Soluble P	lbs/day	51			116			98			124			180		
Particulate P	lbs/day	459			2,231			1,907			2,391			3,562		
Biological	lbs/day	3			1,687			1,419			1,782			2,683		
Inert	lbs/day	455			545			488			609			878		

Aeration Basins																
Influent																
Flow	MGD	2.118	1,471	gpm	2.727	1894	gpm	2.805	1948	gpm	3.493	2425	gpm	4.451	3091	gpm
Flow (no RAS)	MGD	1.412	980	gpm	1.818	1262	gpm	1.870	1298	gpm	2.328	1617	gpm	2.967	2060	gpm
BOD	lbs/day	147	8	mg/L	3,382	149	mg/L	3,442	147	mg/L	4,348	149	mg/L	5,205	140	mg/L
BOD (no RAS)	lbs/day	88	7	mg/L	3,307	218	mg/L	3,364	216	mg/L	4,251	219	mg/L	5,081	205	mg/L
TSS	lbs/day	45,002	2,548	mg/L	62,304	2,740	mg/L	63,904	2,732	mg/L	79,603	2,733	mg/L	101,502	2,735	mg/L
TSS (no RAS)	lbs/day	847	72	mg/L	5,450	359	mg/L	5,430	348	mg/L	6,784	349	mg/L	8,709	352	mg/L
VSS	lbs/day	33,752	1,911	mg/L	46,679	2,053	mg/L	47,880	2,047	mg/L	59,645	2,048	mg/L	76,052	2,049	mg/L
VSS (no RAS)	lbs/day	635	54	mg/L	4,038	266	mg/L	4,024	258	mg/L	5,031	259	mg/L	6,457	261	mg/L
TKN	lbs/day	73	6	mg/L	335	22	mg/L	437	28	mg/L	593	31	mg/L	686	28	mg/L
Total Phosphorus	lbs/day	510	43	mg/L	2,347	155	mg/L	2,005	129	mg/L	2,515	130	mg/L	3,742	151	mg/L
Soluble P	lbs/day	51	4	mg/L	116	8	mg/L	98	6	mg/L	124	6	mg/L	180	7	mg/L
Particulate P	lbs/day	459	39	mg/L	2,231	147	mg/L	1,907	122	mg/L	2,391	123	mg/L	3,562	144	mg/L
Total Phosphorus (no RAS)	lbs/day	69	5.84	mg/L	144	9.50	mg/L	122	7.84	mg/L	154	8	mg/L	224	9	mg/L
Soluble P	lbs/day	48	4.09	mg/L	112	7.40	mg/L	94	6.04	mg/L	119	6	mg/L	174	7	mg/L
Particulate P	lbs/day	21	1.75	mg/L	32	2.10	mg/L	28	1.79	mg/L	35	2	mg/L	50	2	mg/L
Number of Basins Operational		2			2			2			2			2		
Diameter	ft	78			78			78			78			78		
Area	ft	4,778			4,778			4,778			4,778			4,778		
SWD	ft	14.0			14.0			14.0			14.0			14.0		
Total Aeration Volume	gallons	1,000,780			1,000,780			1,000,780			1,000,780			1,000,780		
	kcf	134			134			134			134			134		
Operating Parameters																
Est WAS (Cell Yield)	lbs/day	407			3,526			3,560			4,473			5,589		
EST WAS (Aeration Volume)	lbs/day	2,089			2,089			2,089			2,089			2,089		
Est WAS (max)	gpd	33,404			56,374			56,915			71,503			89,345		
Influent Soluble P Load	lbs/day	48			112			94			119			174		
Phosphorus Removed Biologically	lbs/day	6	4%	% of BOD	135	4%	% of BOD	138	4%	% of BOD	174	4%	% of BOD	208	4%	% of BOD
BOD Loading Rate	lbs/kcf	1			25			26			33			39		
F/M Ratio		0.01			0.22			0.22			0.28			0.33		
Detention Time	hours	17			13			13			10			8		
AOR	lbs/day	499			5,260			5,795			7,513			8,880		
Phosphorus not removed biologically	lbs/day	42			0			0			0			0		
Final Clarifiers Splitter																
Clarifiers On-Line	#	2	w/ras		2	w/ras		2	w/ras		3	w/ras		3	w/ras	
Flow to Each Clarifier	gpd	705,921	1,058,881		908,934	1,363,401		934,839	1,402,259		776,118	1,164,176		989,004	1,483,506	
Final Clarifiers																
Number of Round		2			2			2			3			3		
Diameter	ft	65			65			65			65			65		
Surface Area per Clarifier	sf	3,318			3,318			3,318			3,318			3,318	Pk Hr	
Surface Overflow Rate	gpd/sf	213			274			282			234			298	722	
Solids Loading Rate	lbs/h/sf	0.28			0.36			0.37			0.30			0.39		
Weir Overflow Rate	gpd/f	3,457			4,451			4,578			3,801			4,843		
Scum Produced (per clarifier)	gpd	1,000			1,000			1,000			1,000			1,000		
WAS																
Flow	gpd	33,404			56,374			56,915			71,503			89,345		
BOD	lbs/day	3	10	mg/L	5	10	mg/L	5	10	mg/L	6	10	mg/L	7	10	mg/L
TSS	lbs/day	2,089	0.75%		3,526	0.75%		3,560	0.75%		4,473	0.75%		5,589	0.75%	
VSS	lbs/day	1,567	75%		2,645	75%		2,670	75%		3,354	75%		4,191	75%	
TKN	lbs/day	0	1	mg/L	0	1	mg/L	0	1	mg/L	1	1	mg/L	1	1	mg/L
Total Phosphorus	lbs/day	21			137			115			145			212		
Soluble P	lbs/day	0.14	0.5	mg/L	0.24	0.5	mg/L	0.24	0.5	mg/L	0.30	0.5	mg/L	0.37	0.5	mg/L
Particulate P	lbs/day	21			136			114			145			211		
Biological	lbs/day	0			105			86			109			162		
Inert	lbs/day	21			32			28			35			50		
Chemical Sludge																
Flow	gpd	6,767			0			0			0			0		
BOD	lbs/day	0.6	10	mg/L	0.0	10	mg/L	0.0	10	mg/L	0.0	10	mg/L	0.0	10	mg/L
TS	lbs/day	423	10	lb/lb P	0	10	lb/lb P	0	10	lb/lb P	0	10	lb/lb P	0	10	lb/lb P
VS	lbs/day	0	0%		0	0%		0	0%		0	0%		0	0%	
TKN	lbs/day	0.1	1	mg/L	0.0	1	mg/L	0.0	1	mg/L	0.0	1	mg/L	0.0	1	mg/L
Total Phosphorus	lbs/day	42			0			0			0			0		
Soluble P	lbs/day	0			0			0			0			0		
Particulate P	lbs/day	42			0	100%		0	100%		0	100%		0	100%	

Effluent																	
Flow	mgd	1.372			1.818			1.870			2.328			2.967			
BOD	lbs/day	114	10	mg/L	152	10	mg/L	156	10	mg/L	194	10	mg/L	247	10	mg/L	
TSS	lbs/day	114	10	mg/L	152	10	mg/L	156	10	mg/L	194	10	mg/L	247	10	mg/L	
VSS	lbs/day	86			114			117			146			186			
TKN	lbs/day	11	1	mg/L	15	1	mg/L	16	1	mg/L	19	1	mg/L	25	1	mg/L	
Total Phosphorus	lbs/day	6	0.5	mg/L	8	0.5	mg/L	8	0.5	mg/L	10	0.5	mg/L	12	0.5	mg/L	
Soluble P	lbs/day	6	0.5		8	0.5		8	0.5		10	0.5		12	0.5		
Particulate P	lbs/day	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0		

Tertiary Filtration																	
Influent																	
Flow	mgd	1.372			1.818			1.870			2.328			2.967			
BOD	lbs/day	114	10	mg/L	152	10	mg/L	156	10	mg/L	194	10	mg/L	247	10	mg/L	
TSS	lbs/day	114	10	mg/L	152	10	mg/L	156	10	mg/L	194	10	mg/L	247	10	mg/L	
VSS	lbs/day	86			114			117			146			186			
TKN	lbs/day	11	1	mg/L	15	1	mg/L	16	1	mg/L	19	1	mg/L	25	1	mg/L	
Total Phosphorus	lbs/day	6	0.500	mg/L	8	0.500	mg/L	8	0.500	mg/L	10	0.500	mg/L	12	0.500	mg/L	
Soluble P	lbs/day	6			8			8			10			12			
Particulate P	lbs/day	0			0			0			0			0			
Rapid Mix Tank																	
Length	ft	6.50			7			7			7			7			
Width	ft	6.50			7			7			7			7			
SWD	ft	6.50			7			7			7			7			
Volume	gal	2,054			2,054			2,054			2,054			2,054			
Detention Time	min	2.16			1.63			1.58			1.27			1.00			
Flocculation Tank and Coagulation Tank same size																	
Length	ft	11.00			11			11			11			11			
Width	ft	11.00			11			11			11			11			
SWD	ft	11.25			11			11			11			11			
Volume	cf	10,182			10,182			10,182			10,182			10,182			
Detention Time	min	10.69			8.07			7.84			6.30			4.94			
Coagulant Dose	mg/L	40.0			40.0			40.0			40.0			40.0			
Polymer Dose	mg/L	1.5			1.5			1.5			1.5			1.5			
Number of Units	#	3.0			2.0			2.0			2.0			2.0			
Filtering Surface Area	sqft	391.1			391.1			391.1			391.1			391.1			
Filtration Rate	gpm/sqft	0.8			1.6			1.7			2.1			2.6			
Backwash Water																	
Flow	mgd	0.103	7.5%		0.136	7.5%		0.140	7.5%		0.175	7.5%		0.223	7.5%		
BOD	lbs/day	92	107	mg/L	121	107	mg/L	125	107	mg/L	155	107	mg/L	198	107	mg/L	
TSS	lbs/day	543	633	mg/L	720	633	mg/L	741	633	mg/L	922	633	mg/L	1,175	633	mg/L	
VSS	lbs/day	408			540			556			692			882			
TKN	lbs/day	11	13	mg/L	15	13	mg/L	16	13	mg/L	19	13	mg/L	25	13	mg/L	
Total Phosphorus	lbs/day	5	5.3	mg/L	6	5.3	mg/L	6	5.3	mg/L	8	5.3	mg/L	10	5.3	mg/L	
Soluble P	lbs/day	0			0			0			0			0			
Particulate P	lbs/day	5	100%		6	100%		6	100%		8	100%		10	100%		
Effluent																	
Flow	mgd	1.372			1.818			1.870			2.328			2.967			
BOD	lbs/day	23	2	mg/L	30	2	mg/L	31	2	mg/L	39	2	mg/L	49	2	mg/L	
TSS	lbs/day	46	4	mg/L	61	4	mg/L	62	4	mg/L	78	4	mg/L	99	4	mg/L	
VSS	lbs/day	34			45			47			58			74			
TKN	lbs/day	0	0	mg/L	0	0	mg/L	0	0	mg/L	0	0	mg/L	0	0	mg/L	
Total Phosphorus	lbs/day	1	0.1	mg/L	1.52	0.1	mg/L	1.56	0.1	mg/L	1.94	0.1	mg/L	2.47	0.1	mg/L	
Soluble P	lbs/day	1															
Particulate P	lbs/day	0															

WAS Thickening													
Thickener Feed													
Flow	gpd	40,171			56,374			56,915			71,503		89,345
BOD	lbs/day	3			5			5			6		7
TSS	lbs/day	2,513	0.750%		3,526	0.750%		3,560	0.750%		4,473	0.750%	5,589
VSS	lbs/day	1,567			2,645			2,670			3,354		4,191
TKN	lbs/day	0			0			0			1		1
Total Phosphorus	lbs/day	63			137			115			145		212
Soluble P	lbs/day	0			0			0			0		0
Particulate P	lbs/day	63			136			114			145		211
Biological	lbs/day	0			105			86			109		162
Inert	lbs/day	63			32			28			35		50
Scheduled Downtime	days	2			2			2			2		2
Days per Week of Thickening	days	5			5			5			5		5
Hours of Operation per Op-Day	hrs	7			7			7			7		7
Number of Thickening Units	#	1			1			1			1		1
Thickener Feed Flow Rate													
Flow	gpm	134			188			190			238		298
Solids Load	lbs/hr	503			705			712			895		1,118
Volatile Fraction	lbs/hr	432	86%		607	86%		612	86%		769	86%	961
Total P	lbs/hr	13			27			23			29		42
Soluble P	lbs/hr	0.0			0.0			0.0			0.1		0.1
Particulate P	lbs/hr	12.6			27.3			22.9			28.9		42.3
Assumed Discharge Solids Percent	%	4%			4%			4%			4%		4%
Assumed Solids Removal	%	95%			95%			95%			95%		95%
Wash Water	gpm	40			40			40			40		40
TWAS per Operation Day													
Flow	gpd	7,155			10,042			10,138			12,737		15,915
BOD	lbs	3			5			5			6		7
TSS	lbs	2,387			3,350			3,382			4,249		5,309
VSS	lbs	1,790			2,512			2,537			3,187		3,982
TKN	lbs	0			0			0			1		1
Total Phosphorus	lbs	60			130			109			137		201
Soluble P	lbs	0			0			0			0		0
Particulate P	lbs	60			130			109			137		201
Biological	lbs	0			99			82			104		154
Inert	lbs	60			30			27			34		47
Filtrate													
Flow	gpd	66,615			79,933			80,377			92,367		107,031
BOD	lbs	28	50	mg/L	33	50	mg/L	34	50	mg/L	39	50	mg/L
TSS	lbs	126			176			178			224		279
VSS	lbs	94			132			134			168		210
TKN	lbs	8	15	mg/L	10	15	mg/L	10	15	mg/L	12	15	mg/L
Total Phosphorus	lbs	3			7			6			8		11
Soluble P	lbs	0			0			0			0		0
Particulate P	lbs	3			7			6			7		11
Biological	lbs	0			5			4			5		8
Inert	lbs	3			2			1			2		2
Thickened Sludge Storage													
Maximum Storage Time	days	2			2			2			2		2
Volume Required	gals	10,222			14,345			14,483			18,195		22,735

Anaerobic Sludge Digestion

Digester Feed												
Flow	gpd	7,155			10,042			10,138			12,737	15,915
BOD	lbs/day	3			5			5			6	7
TSS	lbs/day	2,387	4.00%		3,350	4.00%		3,382	4.00%		4,249	5,309
VSS	lbs/day	1,790			2,512			2,537			3,187	3,982
TKN	lbs/day	0			0			0			1	1
Total Phosphorus	lbs/day	60			130			109			137	201
Soluble P	lbs/day	0			0			0			0	0
Particulate P	lbs/day	60			130			109			137	201
Biological	lbs/day	0			99			82			104	154
Inert	lbs/day	60			30			27			34	47
Anaerobic Digester												
Number of Units Operational		2			2			2			2	2
Tank Diameter	ft	35			35			35			35	35
Bottom Cone Depth	ft	2.450	14.0%	%slope	2.450			2.450			2.450	2.450
Digester Surface Area	sf	962			962			962			962	962
SWD	ft	25.00	25.00		25.00			25.00			25.00	25.00
Active Height	ft	14.00	25.00		17.00			17.00			21.00	25.00
Storage Height	ft	11.00			8.00			8.00			4.00	0.00
Additional Digesters												
Tank Diameter	ft	52			52			52			52	52
Bottom Cone Depth	ft	3.640	14.0%	%slope	3.640	14.0%	%slope	3.640	14.0%	%slope	3.640	3.640
Digester Surface Area	sf	2,124			2,124			2,124			2,124	2,124
SWD	ft	25.00			25.00			25.00			25.00	25.00
Active Height	ft	22.00			1.00			5.00			23.00	1.00
Storage Height	ft	3.00			24.00			20.00			2.00	24.00
Active Digester Volume	kcf	50	371,585	gal	50	371,585	gal	50	371,585	gal	50	105
Active Digester Volume in Use	kcf	29	213,259	gal	34	256,439	gal	34	256,439	gal	42	54
Storage Volume Available	kcf	21	158,325		15	115,146		15	115,146		8	51
Days of Storage Available	days	22			11			11			5	24
Biological P Release												
	%	40%			40%			40%			40%	40%
Loading Rate												
	lbsVS/kcf	63			73			74			76	73
Detention Time												
	days	30			26			25			25	26
VS Destruction												
	%	50%	895	lbs VS/day	50%	1,256	lbs VS/day	50%	1,268	lbs VS/day	50%	1,991
Gas Production												
	CF/day	13,427	15	CF/lbVSS	18,843	15	CF/lbVSS	19,024	15	CF/lbVSS	23,900	29,864
Decant												
Volume	gpd	0			0			0			0	0
BOD	lbs/day	0	50	mg/L	0	50	mg/L	0	50	mg/L	0	50
TS	lbs/day	0	1,000	mg/L	0	1,000	mg/L	0	1,000	mg/L	0	1,000
TKN	lbs/day	0	50	mg/L	0	50	mg/L	0	50	mg/L	0	50
Phos	lbs/day	0	20	mg/L	0	20	mg/L	0	20	mg/L	0	20
Digested Sludge												
Flow	gpd	7,155			10,042			10,138			12,737	15,915
BOD	lbs/day	3			5			5			6	7
TSS	lbs/day	1,492	2.50%		2,094	2.50%		2,114	2.50%		2,656	3,318
VSS	lbs/day	895			1,256			1,268			1,593	1,991
Volatile Fraction	%	60%			60%			60%			60%	60%
TKN	lbs/day	0			0			0			1	1
Total Phosphorus	lbs/day	60			130			109			137	201
Soluble P	lbs/day	0			40			33			42	61
Particulate P	lbs/day	60			90			76			96	140
Biological	lbs/day	0			60			49			62	92
Inert	lbs/day	60			30			27			34	47

Sludge Storage						
Biosolids						
Gallons per Operating Week	gal	25,037	35,136	35,473	44,566	55,686
Storage Required						
180 Days	gallons	643,812	903,507	912,170	1,145,978	1,431,932
2 Weeks	gallons	50,074	70,273	70,947	89,132	111,372
Existing Storage Tank						
Quantity	#	1	1	1	1	1
Solids Tank Diameter	ft	120.25	120.25	120.25	120.25	120.25
Solids Max SWD	ft	18.00	18.00	18.00	18.00	18.00
Bottom Cone Depth (1/12 Tank Radius)	ft	5.01	5.01	5.01	5.01	5.01
Volume	kcf	223	223	223	223	223
	gallons	1,670,972	1,670,972	1,670,972	1,670,972	1,670,972
New Storage Tank						
Quantity	#	0	0	0	0	0
Solids Tank Diameter	ft	60.00	60.00	60.00	60.00	60.00
Solids Max SWD	ft	18.00	18.00	18.00	18.00	18.00
Bottom Cone Depth (1/12 Tank Radius)	ft	2.50	2.50	2.50	2.50	2.50
Volume	kcf	0	0	0	0	0
	gallons	0	0	0	0	0
180 Days of Storage?		YES	YES	YES	YES	YES

Influent Loadings		Current Annual Average		Recycle	Current Max Month (Avg)		Recycle	Linear 2030 Annual Avg		Recycle	Design Annual Average		Recycle	Design Max Month		Recycle
Flow	mgd	1.227			1.589			1.637			2.046			2.619		
Peak Hour	mgd				7.192			7.192			7.192			7.192		
Recycle	gpd	185,160		185,191	221,624		221,624	223,091		223,091	266,035		266,037	330,106		330,108
BOD	lbs/day				3,316			3,477			4,399			5,235		
Recycle	lbs/day	154		154	206		206	207		207	251		251	319		319
TS	lbs/day				4,354			4,311			5,388			6,941		
Recycle	lbs/day	944		944	1,857		1,857	1,856		1,856	2,293		2,293	2,953		2,953
VSS	lbs/day				3,266			3,233			4,041			5,206		
Recycle	lbs/day	708		708	1,393		1,393	1,392		1,392	1,720		1,720	2,214		2,214
TKN	lbs/day				247			348			483			548		
Recycle	lbs/day	69		69	109		109	107		107	129		129	167		167
Total Influent Phosphorus	lbs/day	64			103			87			110			160		
Soluble	lbs/day	48		75%	77		75%	65		75%	83		75%	120		75%
Particulate	lbs/day	16			26			22			28			40		
Total Recycle Phosphorus	lbs/day	13			49			48			60			75		
Soluble	lbs/day	9		8.6	43		43.1	42		41.9	53		52.8	66		65.7
Particulate	lbs/day	5		4.5	6		6.0	6		6.1	8		7.6	10		9.7
Holding Tank																
Flow	mgd	0.000			0.000			0.000			0.000			0.000		
BOD	lbs/day	0			0			0			0			0		
TS	lbs/day	0			0			0			0			0		
VSS	lbs/day	0			0			0			0			0		
TKN	lbs/day	0			0			0			0			0		
Total Phosphorus	lbs/day	0			0			0			0			0		
Soluble	lbs/day	0		50%	0		50%	0		50%	0		50%	0		50%
Particulate	lbs/day	0			0			0			0			0		
Waste to Headworks, Digester, or P-Release	H or D or P	H			H			H			H			H		
Septage																
Flow	mgd	0.000			0.000			0.000			0.000			0.000		
BOD	lbs/day	0			0			0			0			0		
TS	lbs/day	0			0			0			0			0		
VSS	lbs/day	0			0			0			0			0		
TKN	lbs/day	0			0			0			0			0		
Total Phosphorus	lbs/day	0			0			0			0			0		
Soluble	lbs/day	0		50%	0		50%	0		50%	0		50%	0		50%
Particulate	lbs/day	0			0			0			0			0		
Waste to Headworks, Digester, Thickener, or F	H, D, T, or P	H			H			H			H			H		
Total Influent with Recycle																
Influent																
Flow	MGD	1.412	981	gpm	1.811	1257	gpm	1.860	1291	gpm	2.312	1606	gpm	2.949	2048	gpm
BOD	lbs/day	154	13	mg/L	3522	233	mg/L	3684	238	mg/L	4650	241	mg/L	5554	226	mg/L
TSS	lbs/day	944	80	mg/L	6211	411	mg/L	6166	398	mg/L	7681	398	mg/L	9894	402	mg/L
VSS	lbs/day	708	60	mg/L	4658	308	mg/L	4625	298	mg/L	5761	299	mg/L	7420	302	mg/L
TKN	lbs/day	69	6	mg/L	356	24	mg/L	455	29	mg/L	612	32	mg/L	715	29	mg/L
Total Phosphorus	lbs/day	77	7	mg/L	152	10	mg/L	135	9	mg/L	170	9	mg/L	235	10	mg/L
Soluble	lbs/day	57	5	mg/L	120	8	mg/L	107	7	mg/L	135	7	mg/L	186	8	mg/L
Particulate	lbs/day	21	2	mg/L	32	2	mg/L	28	2	mg/L	35	2	mg/L	50	2	mg/L

Primary Clarifiers							
Influent							
Flow	MGD	1.412	1.811	1.860	2.312	2.949	
BOD	lbs/day	154	3,522	3,684	4,650	5,554	
TSS	lbs/day	944	6,211	6,166	7,681	9,894	
VSS	lbs/day	708	4,658	4,625	5,761	7,420	
TKN	lbs/day	69	356	455	612	715	
Total Phosphorus	lbs/day	77	152	135	170	235	
Soluble P	lbs/day	57	120	107	135	186	
Particulate P	lbs/day	21	32	28	35	50	
Primary Clarifiers Splitter							
Ex Clarifier Gate Width	ft	2.0	2.0	2.0	2.0	2.0	PK HR
New Clarifier Gate Width	ft	0.0	0.0	0.0	0.0	0.0	7.192
Ex Clarifier On-line	#	2	2	2	2	2	2.0
New Clarifier On-Line	#	0	0	0	0	0	0.0
Flow to Ex clarifier(s)	gpd	1,412,160	1,810,624	1,859,591	2,312,035	2,949,106	0
Flow to New Clarifier	gpd	0	0	0	0	0	7,191,600
Number of Units Operational EXISTING		2	2	2	2	2	2
Diameter	ft	55	55	55	55	55	55
SWD	ft	8.00	8	8	8	8	8
Existing							
Surface Overflow Rate	gpd/sf	297	381	391	487	621	1,513
Weir Overflow Rate	gpd/ft	4,086	5,239	5,381	6,690	8,534	20,811
Hydraulic Retention Time	hrs	4.83	3.77	3.67	2.95	2.31	0.95
Number of Units Operational NEW		0	0	0	0	0	0
Diameter	ft	55	55	55	55	55	55
SWD	ft	8.00	8	8	8	8	8
Existing							
Surface Overflow Rate	gpd/sf	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Weir Overflow Rate	gpd/ft	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Hydraulic Retention Time	hrs	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
Removal Rates							
BOD	%	30%	30%	30%	30%	30%	30%
TS	%	60%	60%	60%	60%	60%	60%
TKN	%	20%	20%	20%	20%	20%	20%
Soluble P	%	0.47%	0.89%	0.87%	0.81%	0.77%	0.77%
Particulate	%	60%	60%	60%	60%	60%	60%
Estimated Solids Concentration	%	4%	4%	4%	4%	4%	4%
Volatile Solids Fraction	%	75%	75%	75%	75%	75%	75%
BOD Fermentation Reduction	%	0%	0%	0%	0%	0%	0%
Scum Produced (per clarifier)	gpd	2,500	2,500	2,500	2,500	2,500	
Primary Sludge							
Flow	gpd	6,698	16,171	16,090	18,815	22,794	
BOD	lbs/day	46	1,057	1,105	1,395	1,666	
TSS	lbs/day	566	3,727	3,700	4,609	5,936	
VSS	lbs/day	425	2,795	2,775	3,456	4,452	
TKN	lbs/day	14	71	91	122	143	
Total Phosphorus	lbs/day	13	20	18	22	31	
Soluble P	lbs/day	0.3	1.1	0.9	1.1	1.4	
Particulate P	lbs/day	12.3	19.0	16.7	21.1	29.8	
Destination (Gravity Thickener, or Digestion)	G or D	G	G	G	G	G	
Effluent							
Flow	MGD	1.405	1.794	1.844	2.293	2.926	
BOD	lbs/day	108	2,466	2,579	3,255	3,888	
TSS	lbs/day	378	2,484	2,466	3,072	3,957	
VSS	lbs/day	283	1,863	1,850	2,304	2,968	
TKN	lbs/day	55	285	364	490	572	
Total Phosphorus	lbs/day	65	132	117	148	204	
Soluble P	lbs/day	56	119	106	134	184	
Particulate P	lbs/day	8	13	11	14	20	
INERT							

Biological Treatment Parameters																
Desired MLSS	mg/L	2,500			2,500			2,500			2,500			2,500		
RAS Concentration	mg/L	7,500			7,500			7,500			7,500			7,500		
Average RAS Flowrate (Total)	MGD	0.706	50%		0.905	50%		0.930	50%		1.156	50%		1.475	50%	
	gpm	490			629			646			803			1,024		
Desired Sludge Age (MCRT)	days	10			10			10			10			10		
Selector Basins																
Influent																
Flow	MGD	1.405	976	gpm	1.794	1246	gpm	1.844	1280	gpm	2.293	1593	gpm	2.926	2032	gpm
BOD	lbs/day	108	9	mg/L	2,466	165	mg/L	2,579	168	mg/L	3,255	170	mg/L	3,888	159	mg/L
TSS	lbs/day	378	32	mg/L	2,484	166	mg/L	2,466	160	mg/L	3,072	161	mg/L	3,957	162	mg/L
VSS	lbs/day	283	24	mg/L	1,863	125	mg/L	1,850	120	mg/L	2,304	120	mg/L	2,968	122	mg/L
TKN	lbs/day	55	5	mg/L	285	19	mg/L	364	24	mg/L	490	26	mg/L	572	23	mg/L
Total Phosphorus	lbs/day	65	6	mg/L	132	9	mg/L	117	8	mg/L	148	8	mg/L	204	8	mg/L
Soluble P	lbs/day	56	4.8	mg/L	119	8.0	mg/L	106	6.9	mg/L	134	7.0	mg/L	184	7.5	mg/L
Particulate P	lbs/day	8	0.7	mg/L	13	0.8	mg/L	11	0.7	mg/L	14	0.7	mg/L	20	0.8	mg/L
Biological	lbs/day	0			0			0			0			0		
Inert	lbs/day	8			13			11			14			20		
RAS																
Flow	MGD	0.706			0.905			0.930			1.156			1.475		
BOD	lbs/day	59	10	mg/L	76	10	mg/L	78	10	mg/L	96	10	mg/L	123	10	mg/L
TS	lbs/day	44,165			56,627			58,159			72,309			92,233		
VS	%	75%			75%			75%			75%			75%		
VS	lbs/day	33,124			42,470			43,619			54,232			69,175		
TKN	lbs/day	6	1	mg/L	8	1	mg/L	8	1	mg/L	10	1	mg/L	12	1	mg/L
Nitrate/Nitrite	lbs/day	17			61			86			118			137		
Total P (biological and RAS water)	lbs/day	149	25	mg/L	2,680	355	mg/L	2,751	355	mg/L	3,713	385	mg/L	4,608	375	mg/L
Soluble P	lbs/day	3	0.5	mg/L	4	0.5	mg/L	4	0.5	mg/L	5	0.5	mg/L	6	0.5	mg/L
Particulate P	lbs/day	146			2,676			2,747			3,708			4,602		
Biological		-27			2,332			2,437			3,289			3,990		
Inert		174			344			311			418			611		
Anoxic Recycle	gpm	500			150			200			250			350		
Dimensions Each Basin																
Length	ft	35.0			35.0			35.0			35.0			35.0		
Width	ft	35.0			35.0			35.0			35.0			35.0		
SWD	ft	16.00			16.00			16.00			16.00			16.00		
Basin Volume	gal	146,608			146,608			146,608			146,608			146,608		
Anoxic Basins																
Basins Online	#	2			2			2			2			2		
Influent Flow	MGD	1.426			1.121			1.218			1.516			1.979		
Detention Time	hrs	4.9			6.3			5.8			4.6			3.6		
Denite Rate	lbs/lbVSS/d	0.040			0.040			0.040			0.040			0.040		
Active Biomass	lbs	12,612	NO ₃ Removed		13,054	NO ₃ Removed		13,035	NO ₃ Removed		13,036	NO ₃ Removed		13,042	NO ₃ Removed	
Denitrification/Nitrate Removal	lbs/day	17	YES		61	YES		86	YES		118	YES		137	YES	
BOD Supplied (Recycle)	lbs/day	57			203			276			350			459		
BOD Removal	lbs/day	57			203			276			350			459		
Anaerobic Basins																
Basins Online	#	2			2			2			2			2		
Influent Flow	MGD	2.112			2.700			2.773			3.449			4.401		
Detention Time	hrs	3.3			2.6			2.5			2.0			1.6		
Effluent w/ RAS																
Flow	mgd	2.112			2.700			2.773			3.449			4.401		
BOD	lbs/day	110			2,338			2,381			3,002			3,551		
TSS	lbs/day	44,543			59,112			60,625			75,381			96,191		
VSS	lbs/day	33,407			44,334			45,469			56,536			72,143		
TKN	lbs/day	61			293			372			499			584		
Total Phosphorus	lbs/day	214			2,812			2,869			3,861			4,812		
Soluble P	lbs/day	59			123			110			139			190		
Particulate P	lbs/day	154			2,689			2,759			3,722			4,622		
Biological	lbs/day	-27			2,332			2,437			3,289			3,990		
Inert	lbs/day	182			357			322			432			631		

Aeration Basins																	
Influent																	
Flow	MGD	2.112	1,466	gpm	2.700	1875	gpm	2.773	1926	gpm	3.449	2395	gpm	4,401	3056	gpm	
Flow (no RAS)	MGD	1.405	976	gpm	1.794	1246	gpm	1.844	1280	gpm	2,293	1593	gpm	2,926	2032	gpm	
BOD	lbs/day	110	6	mg/L	2,338	104	mg/L	2,381	103	mg/L	3,002	104	mg/L	3,551	97	mg/L	
BOD (no RAS)	lbs/day	51	4	mg/L	2,262	151	mg/L	2,303	150	mg/L	2,905	152	mg/L	3,428	140	mg/L	
TSS	lbs/day	44,543	2,529	mg/L	59,112	2,625	mg/L	60,625	2,621	mg/L	75,381	2,620	mg/L	96,191	2,621	mg/L	
TSS (no RAS)	lbs/day	378	32	mg/L	2,484	166	mg/L	2,466	160	mg/L	3,072	161	mg/L	3,957	162	mg/L	
VSS	lbs/day	33,407	1,897	mg/L	44,334	1,969	mg/L	45,469	1,966	mg/L	56,536	1,965	mg/L	72,143	1,966	mg/L	
VSS (no RAS)	lbs/day	283	24	mg/L	1,863	125	mg/L	1,850	120	mg/L	2,304	120	mg/L	2,968	122	mg/L	
TKN	lbs/day	61	5	mg/L	293	20	mg/L	372	24	mg/L	499	26	mg/L	584	24	mg/L	
Total Phosphorus	lbs/day	214	18	mg/L	2,812	188	mg/L	2,869	187	mg/L	3,861	202	mg/L	4,812	197	mg/L	
Soluble P	lbs/day	59	5	mg/L	123	8	mg/L	110	7	mg/L	139	7	mg/L	190	8	mg/L	
Particulate P	lbs/day	154	13	mg/L	2,689	180	mg/L	2,759	179	mg/L	3,722	195	mg/L	4,622	189	mg/L	
Total Phosphorus (no RAS)	lbs/day	65	5.51	mg/L	132	8.82	mg/L	117	7.63	mg/L	148	8	mg/L	204	8	mg/L	
Soluble P	lbs/day	56	4.81	mg/L	119	7.97	mg/L	106	6.91	mg/L	134	7	mg/L	184	8	mg/L	
Particulate P	lbs/day	8	0.70	mg/L	13	0.85	mg/L	11	0.73	mg/L	14	1	mg/L	20	1	mg/L	
Number of Basins Operational		2			2			2			2			2			
Diameter	ft	78			78			78			78			78			
Area	ft	4,778			4,778			4,778			4,778			4,778			
SWD	ft	14.0			14.0			14.0			14.0			14.0			
Total Aeration Volume	gallons	1,000,780			1,000,780			1,000,780			1,000,780			1,000,780			
	kcf	134			134			134			134			134			
Operating Parameters																	
Est WAS (Cell Yield)	lbs/day	203			1,909			1,934			2,429			3,002			
EST WAS (Aeration Volume)	lbs/day	2,089			2,089			2,089			2,089			2,089			
Est WAS (max)	gpd	33,404			33,404			33,404			38,840			47,992			
Influent Soluble P Load	lbs/day	56			119			106			134			184			
Phosphorus Removed Biologically	lbs/day	4	4%	% of BOD	94	4%	% of BOD	95	4%	% of BOD	120	4%	% of BOD	142	4%	% of BOD	
BOD Loading Rate	lbs/kcf	1			17			18			22			27			
F/M Ratio		0.01			0.15			0.15			0.19			0.23			
Detention Time	hours	17			13			13			10			8			
AOR	lbs/day	400			3,918			4,329			5,599			6,593			
Phosphorus not removed biologically	lbs/day	52			26			11			14			42			
Final Clarifiers Splitter																	
Clarifiers On-Line	#	2	w/ras		2	w/ras		2	w/ras		3	w/ras		3	w/ras		
Flow to Each Clarifier	gpd	702,731	1,055,771		897,227	1,349,883		921,751	1,386,648		764,407	1,149,746		975,437	1,466,955		
Final Clarifiers																	
Number of Round		2			2			2			3			3			
Diameter	ft	65			65			65			65			65			
Surface Area per Clarifier	sf	3,318			3,318			3,318			3,318			3,318	Pk Hr		
Surface Overflow Rate	gpd/sf	212			270			278			230			294	722		
Solids Loading Rate	lbs/h/sf	0.28			0.35			0.36			0.30			0.38			
Weir Overflow Rate	gpd/f	3,441			4,394			4,514			3,743			4,777			
Scum Produced (per clarifier)	gpd	1,000			1,000			1,000			1,000			1,000			
WAS																	
Flow	gpd	33,404			33,404			33,404			38,840			47,992			
BOD	lbs/day	3	10	mg/L	3	10	mg/L	3	10	mg/L	3	10	mg/L	4	10	mg/L	
TSS	lbs/day	2,089	0.75%		2,089	0.75%		2,089	0.75%		2,429	0.75%		3,002	0.75%		
VSS	lbs/day	1,567	75%		1,567	75%		1,567	75%		1,822	75%		2,251	75%		
TKN	lbs/day	0	1	mg/L	0	1	mg/L	0	1	mg/L	0	1	mg/L	0	1	mg/L	
Total Phosphorus	lbs/day	7			99			99			125			150			
Soluble P	lbs/day	0.14	0.5	mg/L	0.14	0.5	mg/L	0.14	0.5	mg/L	0.16	0.5	mg/L	0.20	0.5	mg/L	
Particulate P	lbs/day	7			99			99			125			150			
Biological	lbs/day	-1			86			88			111			130			
Inert	lbs/day	8			13			11			14			20			
Chemical Sludge																	
Flow	gpd	8,305			4,124			1,755			2,252			6,747			
BOD	lbs/day	0.7	10	mg/L	0.3	10	mg/L	0.1	10	mg/L	0.2	10	mg/L	0.6	10	mg/L	
TS	lbs/day	519	10	lb/lb P	258	10	lb/lb P	110	10	lb/lb P	141	10	lb/lb P	422	10	lb/lb P	
VS	lbs/day	0	0%		0	0%		0	0%		0	0%		0	0%		
TKN	lbs/day	0.1	1	mg/L	0.0	1	mg/L	0.0	1	mg/L	0.0	1	mg/L	0.1	1	mg/L	
Total Phosphorus	lbs/day	52			26			11			14			42			
Soluble P	lbs/day	0			0			0			0			0			
Particulate P	lbs/day	52			26	100%		11	100%		14	100%		42	100%		

Effluent																
Flow	mgd	1.364			1.790			1.842			2.291			2.920		
BOD	lbs/day	114	10	mg/L	149	10	mg/L	154	10	mg/L	191	10	mg/L	243	10	mg/L
TSS	lbs/day	114	10	mg/L	149	10	mg/L	154	10	mg/L	191	10	mg/L	243	10	mg/L
VSS	lbs/day	85			112			115			143			183		
TKN	lbs/day	11	1	mg/L	15	1	mg/L	15	1	mg/L	19	1	mg/L	24	1	mg/L
Total Phosphorus	lbs/day	6	0.5	mg/L	7	0.5	mg/L	8	0.5	mg/L	10	0.5	mg/L	12	0.5	mg/L
Soluble P	lbs/day	6	0.5		7	0.5		8	0.5		10	0.5		12	0.5	
Particulate P	lbs/day	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0	

Tertiary Filtration																
Influent																
Flow	mgd	1.364			1.790			1.842			2.291			2.920		
BOD	lbs/day	114	10	mg/L	149	10	mg/L	154	10	mg/L	191	10	mg/L	243	10	mg/L
TSS	lbs/day	114	10	mg/L	149	10	mg/L	154	10	mg/L	191	10	mg/L	243	10	mg/L
VSS	lbs/day	85			112			115			143			183		
TKN	lbs/day	11	1	mg/L	15	1	mg/L	15	1	mg/L	19	1	mg/L	24	1	mg/L
Total Phosphorus	lbs/day	6	0.500	mg/L	7	0.500	mg/L	8	0.500	mg/L	10	0.500	mg/L	12	0.500	mg/L
Soluble P	lbs/day	6			7			8			10			12		
Particulate P	lbs/day	0			0			0			0			0		
Rapid Mix Tank																
Length	ft	6.50			7			7			7			7		
Width	ft	6.50			7			7			7			7		
SWD	ft	6.50			7			7			7			7		
Volume	gal	2,054			2,054			2,054			2,054			2,054		
Detention Time	min	2.17			1.65			1.61			1.29			1.01		
Flocculation Tank and Coagulation Tank same size																
Length	ft	11.00			11			11			11			11		
Width	ft	11.00			11			11			11			11		
SWD	ft	11.25			11			11			11			11		
Volume	cf	10,182			10,182			10,182			10,182			10,182		
Detention Time	min	10.75			8.19			7.96			6.40			5.02		
Coagulant Dose	mg/L	40.0			40.0			40.0			40.0			40.0		
Polymer Dose	mg/L	1.5			1.5			1.5			1.5			1.5		
Number of Units	#	3.0			2.0			2.0			2.0			2.0		
Filtering Surface Area	sqft	391.1			391.1			391.1			391.1			391.1		
Filtration Rate	gpm/sqft	0.8			1.6			1.6			2.0			2.6		
Backwash Water																
Flow	mgd	0.102	7.5%		0.134	7.5%		0.138	7.5%		0.172	7.5%		0.219	7.5%	
BOD	lbs/day	91	107	mg/L	119	107	mg/L	123	107	mg/L	153	107	mg/L	195	107	mg/L
TSS	lbs/day	540	633	mg/L	709	633	mg/L	730	633	mg/L	908	633	mg/L	1,157	633	mg/L
VSS	lbs/day	405			532			547			681			867		
TKN	lbs/day	11	13	mg/L	15	13	mg/L	15	13	mg/L	19	13	mg/L	24	13	mg/L
Total Phosphorus	lbs/day	5	5.3	mg/L	6	5.3	mg/L	6	5.3	mg/L	8	5.3	mg/L	10	5.3	mg/L
Soluble P	lbs/day	0			0			0			0			0		
Particulate P	lbs/day	5	100%		6	100%		6	100%		8	100%		10	100%	
Effluent																
Flow	mgd	1.364			1.790			1.842			2.291			2.920		
BOD	lbs/day	23	2	mg/L	30	2	mg/L	31	2	mg/L	38	2	mg/L	49	2	mg/L
TSS	lbs/day	45	4	mg/L	60	4	mg/L	61	4	mg/L	76	4	mg/L	97	4	mg/L
VSS	lbs/day	34			45			46			57			73		
TKN	lbs/day	0	0	mg/L	0	0	mg/L	0	0	mg/L	0	0	mg/L	0	0	mg/L
Total Phosphorus	lbs/day	1	0.1	mg/L	1.49	0.1	mg/L	1.54	0.1	mg/L	1.91	0.1	mg/L	2.43	0.1	mg/L
Soluble P	lbs/day	1														
Particulate P	lbs/day	0														

Primary Sludge - Gravity Thickener													
Thickener Feed													
Flow	gpd	6,698			16,171			16,090			18,815		22,794
BOD	lbs/day	46			1,057			1,105			1,395		1,666
TS	lbs/day	566	1.014%		3,727	2.763%		3,700	2.757%		4,609	2.937%	5,936
VS	lbs/day	425			2,795			2,775			3,456		4,452
TKN	lbs/day	14			71			91			122		143
Total Phosphorus	lbs/day	13			20			18			22		31
Soluble P	lbs/day	0			1			1			1		1
Particulate P	lbs/day	12			19			17			21		30
Scheduled Downtime	days	0			0			0			0		0
Days per Week of Thickening	days	7			7			7			7		7
Hours of Operation per Op-Day	hrs	24			24			24			24		24
Number of Thickening Units	#	1			1			1			1		1
Thickener Feed Flow Rate													
Solids Load	lbs/hr	24			155			154			192		247
Volatile Fraction	lbs/hr	20	86%		134	86%		133	86%		165	86%	213
Total P	lbs/hr	1			1			1			1		1
Soluble P	lbs/hr	0.0			0.0			0.0			0.0		0.1
Particulate P	lbs/hr	0.5			0.8			0.7			0.9		1.2
Assumed Discharge Solids Percent	%	4%			4%			4%			4%		4%
Assumed Solids Removal	%	80%			80%			80%			80%		80%
PWAS per Operation Day													
Flow	gpd	1,358			8,937			8,872			11,052		14,235
BOD	lbs	46			1,057			1,105			1,395		1,666
TSS	lbs	453			2,981			2,960			3,687		4,749
VSS	lbs	340	75%		2,236	75%		2,220	75%		2,765	75%	3,562
TKN	lbs	14			71			91			122		143
Total Phosphorus	lbs	10			15			14			17		24
Soluble P	lbs	0			0			0			0		0
Particulate P	lbs	10			15			13			17		24
Decant													
Flow	gpd	5,340			7,234			7,218			7,763		8,559
BOD	lbs	2	50	mg/L	3	50	mg/L	3	50	mg/L	3	50	mg/L
TSS	lbs	113			745			740			922		1,187
VSS	lbs	85			559			555			691		890
TKN	lbs	1	15	mg/L	1	15	mg/L	1	15	mg/L	1	15	mg/L
Total Phosphorus	lbs	3			5			4			5		7
Soluble P	lbs	0			1			1			1		1
Particulate P	lbs	2			4			3			4		6

WAS Thickening												
Thickener Feed												
Flow	gpd	41,709		37,528		35,159		41,092		54,739		
BOD	lbs/day	3		3		3		3		5		
TSS	lbs/day	2,609	0.750%	2,347	0.750%	2,199	0.750%	2,570	0.750%	3,424	0.750%	
VSS	lbs/day	1,567		1,567		1,567		1,822		2,251		
TKN	lbs/day	0		0		0		0		0		
Total Phosphorus	lbs/day	59		125		110		139		192		
Soluble P	lbs/day	0		0		0		0		0		
Particulate P	lbs/day	59		125		110		139		192		
Biological	lbs/day	-1		86		88		111		130		
Inert	lbs/day	60		38		22		28		62		
Scheduled Downtime	days	2		2		2		2		2		
Days per Week of Thickening	days	5		5		5		5		5		
Hours of Operation per Op-Day	hrs	7		7		7		7		7		
Number of Thickening Units	#	1		1		1		1		1		
Thickener Feed Flow Rate												
Solids Load	lbs/hr	522		469		440		514		685		
Volatile Fraction	lbs/hr	449	86%	404	86%	378	86%	442	86%	589	86%	
Total P	lbs/hr	12		25		22		28		38		
Soluble P	lbs/hr	0.0		0.0		0.0		0.0		0.0		
Particulate P	lbs/hr	11.8		24.9		21.9		27.7		38.4		
Assumed Discharge Solids Percent	%	4%		4%		4%		4%		4%		
Assumed Solids Removal	%	95%		95%		95%		95%		95%		
Wash Water	gpm	40		40		40		40		40		
TWAS per Operation Day												
Flow	gpd	7,429		6,685		6,263		7,319		9,750		
BOD	lbs	3		3		3		3		5		
TSS	lbs	2,478		2,230		2,089		2,442		3,253		
VSS	lbs	1,859		1,672		1,567		1,831		2,440		
TKN	lbs	0		0		0		0		0		
Total Phosphorus	lbs	56		118		104		132		182		
Soluble P	lbs	0		0		0		0		0		
Particulate P	lbs	56		118		104		132		182		
Biological	lbs	-1		82		83		105		123		
Inert	lbs	57		37		21		27		59		
Filtrate												
Flow	gpd	67,879		64,443		62,496		67,372		78,589		
BOD	lbs	28	50 mg/L	27	50 mg/L	26	50 mg/L	28	50 mg/L	33	50 mg/L	
TSS	lbs	130		117		110		129		171		
VSS	lbs	98		88		82		96		128		
TKN	lbs	8	15 mg/L	8	15 mg/L	8	15 mg/L	8	15 mg/L	10	15 mg/L	
Total Phosphorus	lbs	3		6		6		7		10		
Soluble P	lbs	0		0		0		0		0		
Particulate P	lbs	3		6		5		7		10		
Biological	lbs	0		4		4		6		6		
Inert	lbs	3		2		1		1		3		
Thickened Sludge Storage												
Maximum Storage Time	days	2		2		2		2		2		
Volume Required	gals	10,613		9,549		8,947		10,456		13,929		

Anaerobic Sludge Digestion

Digester Feed												
Flow	gpd	8,787			15,621			15,135			18,371	23,986
BOD	lbs/day	50			1,060			1,108			1,398	1,671
TSS	lbs/day	2,931	4.00%		5,211	4.00%		5,049	4.00%		6,129	8,002
VSS	lbs/day	2,199			3,908			3,787			4,596	6,001
TKN	lbs/day	14			72			91			123	143
Total Phosphorus	lbs/day	66			134			118			149	207
Soluble P	lbs/day	0			0			0			0	0
Particulate P	lbs/day	66			134			118			149	206
Biological	lbs/day	-1			82			83			105	123
Inert	lbs/day	57			37			21			27	59
Anaerobic Digester												
Number of Units Operational		2			2			2			2	2
Tank Diameter	ft	35			35			35			35	35
Bottom Cone Depth	ft	2.450	14.0%	%slope	2.450	14.0%	%slope	2.450	14.0%	%slope	2.450	2.450
Digester Surface Area	sf	962			962			962			962	962
SWD	ft	25.00	25.00		25.00			25.00			25.00	25.00
Active Height	ft	14.00	25.00		25.00			25.00			25.00	25.00
Storage Height	ft	11.00			0.00			0.00			0.00	0.00
Additional Digesters												
Tank Diameter	ft	52			52			52			52	52
Bottom Cone Depth	ft	3.640	14.0%	%slope	3.640	14.0%	%slope	3.640	14.0%	%slope	3.640	3.640
Digester Surface Area	sf	2,124			2,124			2,124			2,124	2,124
SWD	ft	25.00			25.00			25.00			25.00	25.00
Active Height	ft	22.00			1.00			1.00			3.00	10.50
Storage Height	ft	3.00			24.00			24.00			22.00	14.50
Active Digester Volume	kcf	50	371,585	gal	105	787,994	gal	105	787,994	gal	105	787,994
Active Digester Volume in Use	kcf	29	213,259	gal	54	406,744	gal	54	406,744	gal	59	557,656
Storage Volume Available	kcf	21	158,325	gal	51	381,250	gal	51	381,250	gal	47	349,479
Days of Storage Available	days	18			24			25			19	10
Biological P Release												
	%	40%			40%			40%			40%	40%
Loading Rate												
	lbsVS/kcf	77			72			70			78	80
Detention Time												
	days	24			26			27			24	23
VS Destruction												
	%	50%	1,099	lbs VS/day	50%	1,954	lbs VS/day	50%	1,893	lbs VS/day	50%	3,001
Gas Production												
	CF/day	16,490	15	CF/lbVSS	29,313	15	CF/lbVSS	28,400	15	CF/lbVSS	34,473	45,009
Decant												
Volume	gpd	0			0			0			0	0
BOD	lbs/day	0	50	mg/L	0	50	mg/L	0	50	mg/L	0	50
TS	lbs/day	0	1,000	mg/L	0	1,000	mg/L	0	1,000	mg/L	0	1,000
TKN	lbs/day	0	50	mg/L	0	50	mg/L	0	50	mg/L	0	50
Phos	lbs/day	0	20	mg/L	0	20	mg/L	0	20	mg/L	0	20
Digested Sludge												
Flow	gpd	8,787			15,621			15,135			18,371	23,986
BOD	lbs/day	50			1,060			1,108			1,398	1,671
TSS	lbs/day	1,832	2.50%		3,257	2.50%		3,156	2.50%		3,830	5,001
VSS	lbs/day	1,099			1,954			1,893			2,298	3,001
Volatile Fraction	%	60%			60%			60%			60%	60%
TKN	lbs/day	14			72			91			123	143
Total Phosphorus	lbs/day	66			134			118			149	207
Soluble P	lbs/day	9			48			47			59	74
Particulate P	lbs/day	56			86			71			90	133
Biological	lbs/day	-1			49			50			63	74
Inert	lbs/day	57			37			21			27	59

Sludge Dewatering

Feed Sludge													
Flow	gpd	8,787			15,621			15,135			18,371		23,986
BOD	lbs/day	50			1,060			1,108			1,398		1,671
TSS	lbs/day	1,832	2.50%		3,257	2.50%		3,156	2.50%		3,830	2.50%	5,001
VSS	lbs/day	1,099			1,954			1,893			2,298		3,001
Volatile Fraction	%	60%			60%			60%			60%		60%
TKN	lbs/day	14			72			91			123		143
Total Phosphorus	lbs/day	66			134			118			149		207
Soluble P	lbs/day	9			48			47			59		74
Particulate P	lbs/day	56			86			71			90		133
Biological	lbs/day	-1			49			50			63		74
Inert	lbs/day	57			37			21			27		59
Assumed Wash Water Flow													
Cake Solids Concentration	%	5%			5%			5%			5%		5%
Capture Efficiency	%	95%			95%			95%			95%		95%
Operation													
Number of Units		1			1			1			1		1
Operating Days per Week	days	4			4			4			4		4
Operating Hours per Day	hrs	7			7			7			7		7
Dewatering Feed (per unit)													
Flow	gpm	37			65			63			77		100
TS	lbs/hr	458			814			789			958		1,250
Cake Discharge (per unit)													
Production	cf/hr	147			261			253			307		401
TSS	lbs/hr	435			774			749			910		1,188
VSS	lbs/hr	261			464			450			546		713
Cake Sludge (7-day week)													
Production	cf	4,111	30,748	gal	7,307	54,659	gal	7,080	52,957	gal	8,594	64,282	gal
BOD	lbs	31			1,027			1,077			1,360		1,621
TSS	lbs	12,184			21,659			20,985			25,472		33,257
VSS	lbs	7,310			12,995			12,591			15,283		19,954
TKN	lbs	-13			23			44			65		68
Total Phosphorus	lbs	408			738			636			803		1,142
Soluble P	lbs	33			168			164			207		257
Particulate P	lbs	375			569			472			597		885
Biological	lbs	-5			326			332			419		492
Inert	lbs	380			243			140			178		392
Cake Sludge (Operating Day)													
Production	cf	1,028	7,687	gal	1,827	13,665	gal	1,770	13,239	gal	2,148	16,070	gal
BOD	lbs	8			257			269			340		405
TSS	lbs	3,046			5,415			5,246			6,368		8,314
VSS	lbs	1,828			3,249			3,148			3,821		4,989
TKN	lbs	-3			6			11			16		17
Total Phosphorus	lbs	102			184			159			201		285
Soluble P	lbs	8			42			41			52		64
Particulate P	lbs	94			142			118			149		221
Biological	lbs	-1			82			83			105		123
Inert	lbs	95			61			35			44		98
Centrate (7-day week)													
Wash Water	gpd	9,600			9,600			9,600			9,600		9,600
Flow	gpd	4,395			7,813			7,569			9,188		11,996
BOD	lbs/day	18	500	mg/L	33	500	mg/L	32	500	mg/L	38	500	mg/L
TSS	lbs/day	92			163			158			192		250
VSS	lbs/day	55	750	mg/L	98			95			115		150
TKN	lbs/day	27	750	mg/L	49	750	mg/L	47	750	mg/L	57	750	mg/L
Total Phosphorus	lbs/day	8			28			27			34		43
Soluble P	lbs/day	5			24			23			30		37
Particulate P	lbs/day	3			4			4			4		7
Biological	lbs/day	0			2			2			3		4
Inert	lbs/day	3			2			1			1		3

Centrate (Operating Day)						
Flow	gpd	7,691	13,672	13,246	16,079	20,993
BOD	lbs/day	32	57	55	67	88
TSS	lbs/day	160	285	276	335	438
VSS	lbs/day	96	171	166	201	263
TKN	lbs/day	48	86	83	101	131
Total Phosphorus	lbs/day	13	50	47	60	76
Soluble P	lbs/day	8	42	41	52	64
Particulate P	lbs/day	5	7	6	8	12
Biological	lbs/day	0	4	4	6	6
Inert	lbs/day	5	3	2	2	5

Sludge Storage						
Biosolids						
Gallons per Operating Week	gal	30,748	54,659	52,957	64,282	83,927
Storage Required						
180 Days	gallons	790,652	1,405,525	1,361,759	1,652,959	2,158,135
2 Weeks	gallons	61,495	109,319	105,915	128,563	167,855
Existing Storage Tank						
Quantity	#	1	1	1	1	1
Solids Tank Diameter	ft	120.25	120.25	120.25	120.25	120.25
Solids Max SWD	ft	18.00	18.00	18.00	18.00	18.00
Bottom Cone Depth (1/12 Tank Radius)	ft	5.01	5.01	5.01	5.01	5.01
Volume	kcf	223	223	223	223	223
	gallons	1,670,972	1,670,972	1,670,972	1,670,972	1,670,972
New Storage Tank						
Quantity	#	0	0	0	0	1
Solids Tank Diameter	ft	65.00	65.00	65.00	65.00	65.00
Solids Max SWD	ft	19.00	19.00	19.00	19.00	19.00
Bottom Cone Depth (1/12 Tank Radius)	ft	2.71	2.71	2.71	2.71	2.71
Volume	kcf	0	0	0	0	66
	gallons	0	0	0	0	494,006
180 Days of Storage?		YES	YES	YES	YES	YES

Influent Loadings		Current Annual Average		Recycle	Current Max Month (Avg)		Recycle	Linear 2030 Annual Avg		Recycle	Design Annual Average		Recycle	Design Max Month		Recycle
Flow	mgd	1.227			1.589			1.637			2.046			2.619		
Peak Hour	mgd	7.192			7.192			7.192			7.192			7.192		
Recycle	gpd	176,444		175,803	224,880		224,111	229,264		228,512	278,068		277,788	342,287		341,898
BOD	lbs/day	3,316			3,477			4,399			5,235			6,941		
Recycle	lbs/day	139		139	182		182	186		185	227		229	283		286
TS	lbs/day	4,354			4,311			5,388			6,941			8,941		
Recycle	lbs/day	824		823	1,123		1,120	1,148		1,144	1,440		1,422	1,829		1,807
VSS	lbs/day	3,266			3,233			4,041			5,206			6,941		
Recycle	lbs/day	618		618	845		840	863		858	1,084		1,067	1,378		1,355
TKN	lbs/day	247			348			483			548			748		
Recycle	lbs/day	51		51	66		66	67		67	81		85	98		103
Total Influent Phosphorus	lbs/day	64			103			87			110			160		
Soluble	lbs/day	48		75%	77		75%	65		75%	83		75%	120		75%
Particulate	lbs/day	16			26			22			28			40		
Total Recycle Phosphorus	lbs/day	5			6			6			8			10		
Soluble	lbs/day	0		0.1	0		0.2	0		0.2	0		0.3	0		0.4
Particulate	lbs/day	5		4.5	6		6.1	6		6.2	8		7.8	10		9.9
Holding Tank																
Flow	mgd	0.000			0.000			0.000			0.000			0.000		
BOD	lbs/day	0			0			0			0			0		
TS	lbs/day	0			0			0			0			0		
VSS	lbs/day	0			0			0			0			0		
TKN	lbs/day	0			0			0			0			0		
Total Phosphorus	lbs/day	0			0			0			0			0		
Soluble	lbs/day	0		50%	0		50%	0		50%	0		50%	0		50%
Particulate	lbs/day	0			0			0			0			0		
Waste to Headworks, Digester, or P-Release	H or D or P	H			H			H			H			H		
Septage																
Flow	mgd	0.000			0.000			0.000			0.000			0.000		
BOD	lbs/day	0			0			0			0			0		
TS	lbs/day	0			0			0			0			0		
VSS	lbs/day	0			0			0			0			0		
TKN	lbs/day	0			0			0			0			0		
Total Phosphorus	lbs/day	0			0			0			0			0		
Soluble	lbs/day	0		50%	0		50%	0		50%	0		50%	0		50%
Particulate	lbs/day	0			0			0			0			0		
Waste to Headworks, Digester, Thickener, or F	H, D, T, or P	H			H			H			H			H		
Total Influent with Recycle																
Influent																
Flow	MGD	1.403	975	gpm	1.814	1260	gpm	1.866	1296	gpm	2.324	1614	gpm	2.961	2056	gpm
BOD	lbs/day	139	12	mg/L	3498	231	mg/L	3663	235	mg/L	4626	239	mg/L	5518	223	mg/L
TSS	lbs/day	824	70	mg/L	5477	362	mg/L	5458	351	mg/L	6828	352	mg/L	8770	355	mg/L
VSS	lbs/day	618	53	mg/L	4110	272	mg/L	4096	263	mg/L	5125	264	mg/L	6584	267	mg/L
TKN	lbs/day	51	4	mg/L	313	21	mg/L	415	27	mg/L	564	29	mg/L	646	26	mg/L
Total Phosphorus	lbs/day	69	6	mg/L	109	7	mg/L	93	6	mg/L	118	6	mg/L	170	7	mg/L
Soluble	lbs/day	48	4	mg/L	77	5	mg/L	65	4	mg/L	83	4	mg/L	120	5	mg/L
Particulate	lbs/day	21	2	mg/L	32	2	mg/L	28	2	mg/L	35	2	mg/L	50	2	mg/L
Biological Treatment Parameters																
Desired MLSS	mg/L	2,500			2,500			2,500			2,500			2,500		
RAS Concentration	mg/L	7,500			7,500			7,500			7,500			7,500		
Average RAS Flowrate (Total)	MGD	0.702	50%		0.907	50%		0.933	50%		1.162	50%		1.481	50%	
	gpm	487			630			648			807			1,028		
Desired Sludge Age (MCRT)	days	10			10			10			10			10		

Selector Basins																
Influent																
Flow	MGD	1.403	975	gpm	1.814	1260	gpm	1.866	1296	gpm	2.324	1614	gpm	2.961	2056	gpm
BOD	lbs/day	139	12	mg/L	3,498	231	mg/L	3,663	235	mg/L	4,626	239	mg/L	5,518	223	mg/L
TSS	lbs/day	824	70	mg/L	5,477	362	mg/L	5,458	351	mg/L	6,828	352	mg/L	8,770	355	mg/L
VSS	lbs/day	618	53	mg/L	4,110	272	mg/L	4,096	263	mg/L	5,125	264	mg/L	6,584	267	mg/L
TKN	lbs/day	51	4	mg/L	313	21	mg/L	415	27	mg/L	564	29	mg/L	646	26	mg/L
Total Phosphorus	lbs/day	69	6	mg/L	109	7	mg/L	93	6	mg/L	118	6	mg/L	170	7	mg/L
Soluble P	lbs/day	48	4.1	mg/L	77	5.1	mg/L	65	4.2	mg/L	83	4.3	mg/L	120	4.9	mg/L
Particulate P	lbs/day	21	1.8	mg/L	32	2.1	mg/L	28	1.8	mg/L	35	1.8	mg/L	50	2.0	mg/L
Biological	lbs/day	0			0			0			0			0		
Inert	lbs/day	21			32			28			35			50		
RAS																
Flow	MGD	0.702			0.907			0.933			1.162			1.481		
BOD	lbs/day	59	10	mg/L	76	10	mg/L	78	10	mg/L	97	10	mg/L	123	10	mg/L
TS	lbs/day	43,893			56,729			58,352			72,685			92,614		
VS	%	75%			75%			75%			75%			75%		
VS	lbs/day	32,920			42,547			43,764			54,514			69,461		
TKN	lbs/day	6	1	mg/L	8	1	mg/L	8	1	mg/L	10	1	mg/L	12	1	mg/L
Nitrate/Nitrite	lbs/day	15			55			87			123			138		
Total P (biological and RAS water)	lbs/day	439	75	mg/L	1,655	219	mg/L	1,421	183	mg/L	1,782	184	mg/L	2,648	214	mg/L
Soluble P	lbs/day	3	0.5	mg/L	4	0.5	mg/L	4	0.5	mg/L	5	0.5	mg/L	6	0.5	mg/L
Particulate P	lbs/day	436			1,651			1,417			1,777			2,641		
Biological		4			1,135			954			1,199			1,807		
Inert		432			516			463			578			834		
Anoxic Recycle	gpm	450			125			175			200			250		
Dimensions Each Basin																
Length	ft	35.0			35.0			35.0			35.0			35.0		
Width	ft	35.0			35.0			35.0			35.0			35.0		
SWD	ft	16.00			16.00			16.00			16.00			16.00		
Basin Volume	gal	146,608			146,608			146,608			146,608			146,608		
Anoxic Basins																
Basins Online	#	2			2			2			2			2		
Influent Flow	MGD	1.350			1.087			1.185			1.450			1.841		
Detention Time	hrs	5.2			6.5			5.9			4.9			3.8		
Denite Rate	lbs/lbVSS/d	0.040			0.040			0.040			0.040			0.040		
Active Biomass	lbs	12,740	NO ₃ Removed		13,713	NO ₃ Removed		13,675	NO ₃ Removed		13,681	NO ₃ Removed		13,690	NO ₃ Removed	
Denitrification/Nitrate Removal	lbs/day	15	YES		55	YES		87	YES		123	YES		138	YES	
BOD Supplied (Recycle)	lbs/day	61			236			337			390			457		
BOD Removal	lbs/day	51			188			296			390			457		
Anaerobic Basins																
Basins Online	#	2			2			2			2			2		
Influent Flow	MGD	2.105			2.721			2.799			3.486			4.442		
Detention Time	hrs	3.3			2.6			2.5			2.0			1.6		
Effluent w/ RAS																
Flow	mgd	2.105			2.721			2.799			3.486			4.442		
BOD	lbs/day	147			3,386			3,445			4,333			5,184		
TSS	lbs/day	44,717			62,206			63,810			79,513			101,385		
VSS	lbs/day	33,538			46,657			47,860			59,639			76,044		
TKN	lbs/day	57			321			423			574			659		
Total Phosphorus	lbs/day	508			1,764			1,514			1,900			2,818		
Soluble P	lbs/day	51			81			69			88			127		
Particulate P	lbs/day	457			1,683			1,445			1,812			2,691		
Biological	lbs/day	4			1,135			954			1,199			1,807		
Inert	lbs/day	452			548			491			613			884		

Aeration Basins																
Influent																
Flow	MGD	2.105	1,462	gpm	2.721	1889	gpm	2.799	1944	gpm	3.486	2421	gpm	4,442	3085	gpm
Flow (no RAS)	MGD	1.403	975	gpm	1.814	1260	gpm	1.866	1296	gpm	2,324	1614	gpm	2,961	2056	gpm
BOD	lbs/day	147	8	mg/L	3,386	149	mg/L	3,445	148	mg/L	4,333	149	mg/L	5,184	140	mg/L
BOD (no RAS)	lbs/day	89	8	mg/L	3,310	219	mg/L	3,367	216	mg/L	4,236	219	mg/L	5,061	205	mg/L
TSS	lbs/day	44,717	2,547	mg/L	62,206	2,741	mg/L	63,810	2,734	mg/L	79,513	2,735	mg/L	101,385	2,737	mg/L
TSS (no RAS)	lbs/day	824	70	mg/L	5,477	362	mg/L	5,458	351	mg/L	6,828	352	mg/L	8,770	355	mg/L
VSS	lbs/day	33,538	1,910	mg/L	46,657	2,056	mg/L	47,860	2,050	mg/L	59,639	2,051	mg/L	76,044	2,053	mg/L
VSS (no RAS)	lbs/day	618	53	mg/L	4,110	272	mg/L	4,096	263	mg/L	5,125	264	mg/L	6,584	267	mg/L
TKN	lbs/day	57	5	mg/L	321	21	mg/L	423	27	mg/L	574	30	mg/L	659	27	mg/L
Total Phosphorus	lbs/day	508	43	mg/L	1,764	117	mg/L	1,514	97	mg/L	1,900	98	mg/L	2,818	114	mg/L
Soluble P	lbs/day	51	4	mg/L	81	5	mg/L	69	4	mg/L	88	5	mg/L	127	5	mg/L
Particulate P	lbs/day	457	39	mg/L	1,683	111	mg/L	1,445	93	mg/L	1,812	94	mg/L	2,691	109	mg/L
Total Phosphorus (no RAS)	lbs/day	69	5.87	mg/L	109	7.22	mg/L	93	6.01	mg/L	118	6	mg/L	170	7	mg/L
Soluble P	lbs/day	48	4.11	mg/L	77	5.12	mg/L	65	4.21	mg/L	83	4	mg/L	120	5	mg/L
Particulate P	lbs/day	21	1.76	mg/L	32	2.10	mg/L	28	1.80	mg/L	35	2	mg/L	50	2	mg/L
Number of Basins Operational		2			2			2			2			2		
Diameter	ft	78			78			78			78			78		
Area	ft	4,778			4,778			4,778			4,778			4,778		
SWD	ft	14.0			14.0			14.0			14.0			14.0		
Total Aeration Volume	gallons	1,000,780			1,000,780			1,000,780			1,000,780			1,000,780		
	kcf	134			134			134			134			134		
Operating Parameters																
Est WAS (Cell Yield)	lbs/day	395			3,494			3,529			4,431			5,536		
EST WAS (Aeration Volume)	lbs/day	2,089			2,089			2,089			2,089			2,089		
Est WAS (max)	gpd	33,404			55,865			56,418			70,847			88,509		
Influent Soluble P Load	lbs/day	48			77			65			83			120		
Phosphorus Removed Biologically	lbs/day	6	4%	% of BOD	135	4%	% of BOD	138	4%	% of BOD	173	4%	% of BOD	207	4%	% of BOD
BOD Loading Rate	lbs/kcf	1			25			26			32			39		
F/M Ratio		0.01			0.22			0.22			0.28			0.33		
Detention Time	hours	17			13			13			10			8		
AOR	lbs/day	422			5,199			5,734			7,405			8,733		
Phosphorus not removed biologically	lbs/day	42			0			0			0			0		
Final Clarifiers Splitter																
Clarifiers On-Line	#	2	w/ras		2	w/ras		2	w/ras		3	w/ras		3	w/ras	
Flow to Each Clarifier	gpd	701,722	1,052,583		906,940	1,360,410		932,882	1,399,323		774,689	1,162,034		987,096	1,480,644	
Final Clarifiers																
Number of Round		2			2			2			3			3		
Diameter	ft	65			65			65			65			65		
Surface Area per Clarifier	sf	3,318			3,318			3,318			3,318			3,318	Pk Hr	
Surface Overflow Rate	gpd/sf	211			273			281			233			297	722	
Solids Loading Rate	lbs/h/sf	0.28			0.36			0.37			0.30			0.39		
Weir Overflow Rate	gpd/f	3,436			4,441			4,568			3,794			4,834		
Scum Produced (per clarifier)	gpd	1,000			1,000			1,000			1,000			1,000		
WAS																
Flow	gpd	33,404			55,865			56,418			70,847			88,509		
BOD	lbs/day	3	10	mg/L	5	10	mg/L	5	10	mg/L	6	10	mg/L	7	10	mg/L
TSS	lbs/day	2,089	0.75%		3,494	0.75%		3,529	0.75%		4,431	0.75%		5,536	0.75%	
VSS	lbs/day	1,567	75%		2,621	75%		2,647	75%		3,324	75%		4,152	75%	
TKN	lbs/day	0	1	mg/L	0	1	mg/L	0	1	mg/L	1	1	mg/L	1	1	mg/L
Total Phosphorus	lbs/day	21			102			86			109			158		
Soluble P	lbs/day	0.14	0.5	mg/L	0.23	0.5	mg/L	0.24	0.5	mg/L	0.30	0.5	mg/L	0.37	0.5	mg/L
Particulate P	lbs/day	21			102			86			108			158		
Biological	lbs/day	0			70			58			73			108		
Inert	lbs/day	21			32			28			35			50		
Chemical Sludge																
Flow	gpd	6,753			0			0			0			0		
BOD	lbs/day	0.6	10	mg/L	0.0	10	mg/L	0.0	10	mg/L	0.0	10	mg/L	0.0	10	mg/L
TS	lbs/day	422	10	lb/lb P	0	10	lb/lb P	0	10	lb/lb P	0	10	lb/lb P	0	10	lb/lb P
VS	lbs/day	0	0%		0	0%		0	0%		0	0%		0	0%	
TKN	lbs/day	0.1	1	mg/L	0.0	1	mg/L	0.0	1	mg/L	0.0	1	mg/L	0.0	1	mg/L
Total Phosphorus	lbs/day	42			0			0			0			0		
Soluble P	lbs/day	0			0			0			0			0		
Particulate P	lbs/day	42			0	100%		0	100%		0	100%		0	100%	

Effluent																	
Flow	mgd	1.363			1.814			1.866			2.324			2.961			
BOD	lbs/day	114	10	mg/L	151	10	mg/L	156	10	mg/L	194	10	mg/L	247	10	mg/L	
TSS	lbs/day	114	10	mg/L	151	10	mg/L	156	10	mg/L	194	10	mg/L	247	10	mg/L	
VSS	lbs/day	85			113			117			145			185			
TKN	lbs/day	11	1	mg/L	15	1	mg/L	16	1	mg/L	19	1	mg/L	25	1	mg/L	
Total Phosphorus	lbs/day	6	0.5	mg/L	8	0.5	mg/L	8	0.5	mg/L	10	0.5	mg/L	12	0.5	mg/L	
Soluble P	lbs/day	6	0.5		8	0.5		8	0.5		10	0.5		12	0.5		
Particulate P	lbs/day	0	0.0		0	0.0		0	0.0		0	0.0		0	0.0		

Tertiary Filtration																	
Influent																	
Flow	mgd	1.363			1.814			1.866			2.324			2.961			
BOD	lbs/day	114	10	mg/L	151	10	mg/L	156	10	mg/L	194	10	mg/L	247	10	mg/L	
TSS	lbs/day	114	10	mg/L	151	10	mg/L	156	10	mg/L	194	10	mg/L	247	10	mg/L	
VSS	lbs/day	85			113			117			145			185			
TKN	lbs/day	11	1	mg/L	15	1	mg/L	16	1	mg/L	19	1	mg/L	25	1	mg/L	
Total Phosphorus	lbs/day	6	0.500	mg/L	8	0.500	mg/L	8	0.500	mg/L	10	0.500	mg/L	12	0.500	mg/L	
Soluble P	lbs/day	6			8			8			10			12			
Particulate P	lbs/day	0			0			0			0			0			
Rapid Mix Tank																	
Length	ft	6.50			7			7			7			7			
Width	ft	6.50			7			7			7			7			
SWD	ft	6.50			7			7			7			7			
Volume	gal	2,054			2,054			2,054			2,054			2,054			
Detention Time	min	2.17			1.63			1.59			1.27			1.00			
Flocculation Tank and Coagulation Tank same size																	
Length	ft	11.00			11			11			11			11			
Width	ft	11.00			11			11			11			11			
SWD	ft	11.25			11			11			11			11			
Volume	cf	10,182			10,182			10,182			10,182			10,182			
Detention Time	min	10.76			8.08			7.86			6.31			4.95			
Coagulant Dose	mg/L	40.0			40.0			40.0			40.0			40.0			
Polymer Dose	mg/L	1.5			1.5			1.5			1.5			1.5			
Number of Units	#	3.0			2.0			2.0			2.0			2.0			
Filtering Surface Area	sqft	391.1			391.1			391.1			391.1			391.1			
Filtration Rate	gpm/sqft	0.8			1.6			1.7			2.1			2.6			
Backwash Water																	
Flow	mgd	0.102	7.5%		0.136	7.5%		0.140	7.5%		0.174	7.5%		0.222	7.5%		
BOD	lbs/day	91	107	mg/L	121	107	mg/L	124	107	mg/L	155	107	mg/L	198	107	mg/L	
TSS	lbs/day	540	633	mg/L	719	633	mg/L	739	633	mg/L	921	633	mg/L	1,173	633	mg/L	
VSS	lbs/day	405			539			554			691			880			
TKN	lbs/day	11	13	mg/L	15	13	mg/L	16	13	mg/L	19	13	mg/L	25	13	mg/L	
Total Phosphorus	lbs/day	5	5.3	mg/L	6	5.3	mg/L	6	5.3	mg/L	8	5.3	mg/L	10	5.3	mg/L	
Soluble P	lbs/day	0			0			0			0			0			
Particulate P	lbs/day	5	100%		6	100%		6	100%		8	100%		10	100%		
Effluent																	
Flow	mgd	1.363			1.814			1.866			2.324			2.961			
BOD	lbs/day	23	2	mg/L	30	2	mg/L	31	2	mg/L	39	2	mg/L	49	2	mg/L	
TSS	lbs/day	45	4	mg/L	61	4	mg/L	62	4	mg/L	78	4	mg/L	99	4	mg/L	
VSS	lbs/day	34			45			47			58			74			
TKN	lbs/day	0	0	mg/L	0	0	mg/L	0	0	mg/L	0	0	mg/L	0	0	mg/L	
Total Phosphorus	lbs/day	1	0.1	mg/L	1.51	0.1	mg/L	1.56	0.1	mg/L	1.94	0.1	mg/L	2.47	0.1	mg/L	
Soluble P	lbs/day	1															
Particulate P	lbs/day	0															

WAS Thickening												
Thickener Feed												
Flow	gpd	40,157			55,865			56,418			70,847	88,509
BOD	lbs/day	3			5			5			6	7
TSS	lbs/day	2,512	0.750%		3,494	0.750%		3,529	0.750%		4,431	5,536
VSS	lbs/day	1,567			2,621			2,647			3,324	4,152
TKN	lbs/day	0			0			0			1	1
Total Phosphorus	lbs/day	63			102			86			109	158
Soluble P	lbs/day	0			0			0			0	0
Particulate P	lbs/day	63			102			86			108	158
Biological	lbs/day	0			70			58			73	108
Inert	lbs/day	63			32			28			35	50
Scheduled Downtime	days	2			2			2			2	2
Days per Week of Thickening	days	5			5			5			5	5
Hours of Operation per Op-Day	hrs	7			7			7			7	7
Number of Thickening Units	#	1			1			1			1	1
Thickener Feed Flow Rate												
Solids Load	gpm	134			186			188			236	295
Solids Load	lbs/hr	502			699			706			886	1,107
Volatile Fraction	lbs/hr	432	86%		601	86%		607	86%		762	952
Total P	lbs/hr	13			20			17			22	32
Soluble P	lbs/hr	0.0			0.0			0.0			0.1	0.1
Particulate P	lbs/hr	12.6			20.3			17.1			21.7	31.6
Assumed Discharge Solids Percent	%	4%			4%			4%			4%	4%
Assumed Solids Removal	%	95%			95%			95%			95%	95%
Wash Water	gpm	40			40			40			40	40
TWAS per Operation Day												
Flow	gpd	7,153			9,951			10,049			12,620	15,766
BOD	lbs	3			5			5			6	7
TSS	lbs	2,386			3,320			3,352			4,210	5,259
VSS	lbs	1,790			2,490			2,514			3,157	3,945
TKN	lbs	0			0			0			1	1
Total Phosphorus	lbs	60			97			81			103	150
Soluble P	lbs	0			0			0			0	0
Particulate P	lbs	60			97			81			103	150
Biological	lbs	0			66			55			69	103
Inert	lbs	60			30			27			33	47
Filtrate												
Flow	gpd	66,604			79,514			79,968			91,827	106,343
BOD	lbs	28	50	mg/L	33	50	mg/L	33	50	mg/L	38	44
TSS	lbs	126			175			176			222	277
VSS	lbs	94			131			132			166	208
TKN	lbs	8	15	mg/L	10	15	mg/L	10	15	mg/L	11	13
Total Phosphorus	lbs	3			5			5			6	8
Soluble P	lbs	0			0			0			0	0
Particulate P	lbs	3			5			4			5	8
Biological	lbs	0			3			3			4	5
Inert	lbs	3			2			1			2	2
Thickened Sludge Storage												
Maximum Storage Time	days	2			2			2			2	2
Volume Required	gals	10,219			14,216			14,356			18,028	22,522

Aerobic Sludge Digestion														
Digester Feed														
Flow	gpd	7,153				9,951				10,049			12,620	15,766
BOD	lbs/day	3				5				5			6	7
TSS	lbs/day	2,386	4.00%			3,320	4.00%			3,352	4.00%		4,210	5,259
VSS	lbs/day	1,790				2,490				2,514			3,157	3,945
TKN	lbs/day	0				0				0			1	1
Total Phosphorus	lbs/day	60				97				81			103	150
Soluble P	lbs/day	0				0				0			0	0
Particulate P	lbs/day	60				97				81			103	150
Biological	lbs/day	0				66				55			69	103
Inert	lbs/day	60				30				27			33	47
Aerobic Digester														
Number of Units Operational														
Tank Diameter	ft	35				35				35			35	35
Bottom Cone Depth	ft	2.450	14.0%	%slope		2.450	14.0%	%slope		2.450	14.0%	%slope	2.450	2.450
Digester Surface Area	sf	962				962				962			962	962
SWD		25				25				25			25	25
Summer	ft	25.00				25.00				25.00			25.00	25.00
Storage		0				0				0			0	0
Winter	ft	25.00				25.00				25.00			25.00	25.00
Storage	ft	0.00				0.00				0.00			0.00	0.00
Additional Digesters														
Tank Diameter	ft	40				40				40			40	40
Bottom Cone Depth	ft	2.800	14.0%	%slope		2.800	14.0%	%slope		2.800	14.0%	%slope	2.800	2.800
Digester Surface Area	sf	1,257				1,257				1,257			1,257	1,257
SWD		25				25				25			25	25
Summer	ft	25.00				25.00				25.00			25.00	25.00
Storage		0.00				0.00				0.00			0.00	0.00
Winter	ft	25.00				25.00				25.00			25.00	25.00
Storage	ft	0.00				0.00				0.00			0.00	0.00
Total Summer Volume	kcf	49.7		371,585	gal	49.7		371,585	gal	49.7		371,585	gal	82.3
Total Winter Volume	kcf	49.7		371,585	gal	49.7		371,585	gal	49.7		371,585	gal	82.3
Sludge Temperatures														
Summer	°F	60.00	16	°C		60.00	16	°C		60.00	16	°C	60.00	60.00
Winter	°F	35.00	2	°C		35.00	2	°C		35.00	2	°C	35.00	35.00
Loading Rate														
Summer	lbsVS/kcf	36.0				50.1				50.6			38.4	47.9
Winter	lbsVS/kcf	36.0				50.1				50.6			38.4	47.9
Detention Time without Decant														
Summer	days	51.9				37.3				37.0			48.8	39.0
Winter	days	51.9				37.3				37.0			48.8	39.0
Detention Time with Decant														
Summer	days	51.9				37.3				37.0			48.8	39.0
Winter	days	51.9				37.3				37.0			48.8	39.0
VS Destruction														
Summer	%	43%		775 lbs VS/day		40%		1000 lbs VS/day		40%		1007 lbs VS/day	43%	1349 lbs VS/day
Winter	%	22%		390 lbs VS/day		19%		464 lbs VS/day		19%		466 lbs VS/day	21%	670 lbs VS/day
Average Annual Destruction	%	33%		583 lbs VS/day		29%		732 lbs VS/day		29%		737 lbs VS/day	32%	1009 lbs VS/day
Biological P-Release														
	%	0%				0%				0%			0%	0%
Decant														
Volume	gpd	0				0				0			0	0
BOD	lbs/day	0		50 mg/L		0		50 mg/L		0		50 mg/L	0	50 mg/L
TS	lbs/day	0		1,000 mg/L		0		1,000 mg/L		0		1,000 mg/L	0	1,000 mg/L
TKN	lbs/day	0		50 mg/L		0		50 mg/L		0		50 mg/L	0	50 mg/L
Phos	lbs/day	0		20 mg/L		0		20 mg/L		0		20 mg/L	0	20 mg/L
Digested Sludge														
Flow	gpd	7,153				9,951				10,049			12,620	15,766
BOD	lbs/day	3				5				5			6	7
TSS	lbs/day	1,803	3.02%			2,588	3.12%			2,616	3.12%		3,201	4,083
VSS	lbs/day	1,207				1,758				1,778			2,148	2,768
Volatile Fraction	%	67%				68%				68%			67%	68%
TKN	lbs/day	0				0				0			1	1
Total Phosphorus	lbs/day	60				97				81			103	150
Soluble P	lbs/day	0				0				0			0	0
Particulate P	lbs/day	60				97				81			103	150
Biological	lbs/day	0				66				55			69	103
Inert	lbs/day	60				30				27			33	47

Sludge Storage						
Biosolids						
Gallons per Operating Week	gal	30,264	43,429	43,899	53,715	68,525
Storage Required						
180 Days	gallons	778,206	1,116,753	1,128,838	1,381,245	1,762,068
2 Weeks	gallons	60,527	86,859	87,799	107,430	137,050
Existing Storage Tank						
Quantity	#	1	1	1	1	1
Solids Tank Diameter	ft	120.25	120.25	120.25	120.25	120.25
Solids Max SWD	ft	18.00	18.00	18.00	18.00	18.00
Bottom Cone Depth (1/12 Tank Radius)	ft	5.01	5.01	5.01	5.01	5.01
Volume	kcf	223	223	223	223	223
	gallons	1,670,972	1,670,972	1,670,972	1,670,972	1,670,972
New Storage Tank						
Quantity	#	0	0	0	0	1
Solids Tank Diameter	ft	60.00	60.00	60.00	60.00	30.00
Solids Max SWD	ft	18.00	18.00	18.00	18.00	18.00
Bottom Cone Depth (1/12 Tank Radius)	ft	2.50	2.50	2.50	2.50	1.25
Volume	kcf	0	0	0	0	13
	gallons	0	0	0	0	97,374
180 Days of Storage?						
Gallons needed		YES (892,766)	YES (554,218)	YES (542,133)	YES (289,727)	YES (6,278)

Appendix N

Environmental Impacts

Endangered Resources Review Request

Form 1700-047 (R 12/17)

Page 1 of 2

Notice: Pursuant to s. 23.27(3)(b), Wis. Stats., this form must be completed and submitted to the Department of Natural Resources (DNR) to request an Endangered Resources (ER) Review of proposed development, management, planning or similar type of project. An ER Review provides the requester with information from Wisconsin's Natural Heritage Inventory (NHI) database and other sources on rare plants and animals, high quality natural communities, and other endangered resources that may be impacted by the proposed project. The ER Review will also include specific recommendations and requirements to help projects comply with Wisconsin's Endangered Species Law (s. 29.604, Wis. Stats.) and other laws and regulations protecting endangered resources. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31-19.39, Wis. Stats.).

Instructions: The following materials are required to process this request. Submit all materials by mail to the address above or email (DNRERReview@wisconsin.gov). Do not include payment with this form.

- ☐ Completed, signed form
- ☐ Map(s) delineating the project area, preferably an aerial photo

Submission of the following materials are strongly encouraged and will facilitate review of your project:

- ☐ [NHI Public Portal Preliminary Assessment Printout](#)
- ☐ Photographs that clearly show the project area, including natural features and vegetation present on site
- ☐ Additional relevant information and reports (e.g., detailed project and habitat descriptions, wetland delineation, and site plans)

Section 1: Requester Information (ER Review, correspondence and invoice will be sent to this person)

Name		Organization	
Gregory J. Droessler		Town and Country Engineering, Inc.	
Mailing Address		City	State ZIP Code
10505 Corporate Drive, Suite 105A		Pleasant Prairie	WI 53158
Telephone Number		Email Address	
(262) 925-3210		gdroessler@tcengineers.net	

Section 2: Landowner Information (if different than Section 1)

Name		Organization	
Brian Kober		Village of Jackson	
Mailing Address		City	State ZIP Code
W194 N16660 Eagle Drive		Jackson	WI 53037
Telephone Number		Email Address	
(262) 677-0707		brian.kober@villageofjacksonwi.gov	

Section 3: Project Information

Project Name	Project Address (if applicable)
Wastewater Treatment Facility Upgrades	Eagle Drive

Project Types:

- ☐ Residential
 ☐ Commercial
 ☐ Industrial
 ☒ Utility/Energy
 ☐ Transportation (roads, railroads, trails, harbors, airports)
- ☐ NRCS
 ☐ Other: _____

PSC Approval (Utility/Energy only)

- ☐ Yes
 ☒ No
 ☐ Unknown

DOT or FHWA Administered

- ☐ Yes
 ☐ No
 ☐ Unknown

Start Date (on-site disturbance)

4/1/24

End Date (on-site disturbance)

6/30/25

Federal Land, Funding or Permit

- ☐ Yes
 ☒ No
 ☐ Unknown

County

Washington

☐ City

☐ Town

☒ Village of:

Jackson

Land Types (Select all that apply)

- ☐ Private
 ☒ Public (e.g. road ROWs, schools, city/county land, etc.)

Township	Range	Direction	Section	Additional Comments on TRS Location (attach additional information if necessary)
10 N	20	☒ E ☐ W	20	All improvements/upgrades will be within the WWTF site.
N		☐ E ☐ W		

Endangered Resources Review Request

Form 1700-047 (R 12/17)

Page 2 of 2

Section 3: Project Information, *continued*

Provide a detailed description of the proposed project and associated disturbance, including acres to be disturbed. Attach additional pages as needed.

The wastewater treatment facility's various processes require upgrades, replacement or modifications due to age-related issues and to provide treatment of the future flows and loads. A Facilities Planning document has been prepared for Village review and will be subsequently submitted to the DNR for review and comment later this year.

Provide a detailed description of the habitat types and current land use within the limits of the project area (e.g., 50% in active agriculture-currently corn, 20% floodplain forest, 15% industrial area, 10% hardwood swamp dominated by black ash, 5% fallow field - in active agriculture until one year ago). Attach additional pages as needed.

The project is within an existing industrial-like area and is comprised of 50% impervious areas and 50% grass within the proposed construction area. A floodplain map and wetland map are attached. The project area is approximately 20 acres.

List all wetlands and waterbodies (e.g., rivers, intermittent streams, lakes, marshes) within or adjacent to the project area. List any known or suspected impacts of the proposed project to these wetlands and waterbodies. Indicate the location(s) of any point source discharge(s) into wetlands or waterbodies.

Wetland maps are attached. The existing permitted outfall discharges on the east side of the WWTF site into Cedar Creek.

List any reports or correspondence concerning endangered resources or habitat that may be impacted by the proposed project (e.g., wetland delineation, endangered resources reviews, habitat assessments, and rare species surveys). Attach copies if available.

Endangered Resources Preliminary Assessment - Attached

USFWS IPaC List - Attached

Section 4: Related Permits, Licenses or Regulatory Approvals (DNR or other state/federal agency)

Permit, License or Approval	Permitting Agency Contact Person	Status
		☐ will be applying for ☐ have applied for ☐ have received
		☐ will be applying for ☐ have applied for ☐ have received

Section 5: Terms and Conditions

The requested ER Review may contain NHI data and information (including specific locations of endangered resources) which are considered sensitive and are not subject to Wisconsin's Open Records Law (per s. 23.27, Wis. Stats.). The information contained in the ER Review is solely for planning and implementation of the proposed project. As such, the information contained in the ER Review shall only be shared with individuals who need this information to carry out specific roles in the planning, permitting, and implementation of the proposed project. The requester must agree to not reproduce or disseminate the ER Review or the specific locations of endangered resources contained in the ER Review to any other parties or individuals without prior written permission from the DNR Bureau of Natural Heritage Conservation. (Contact the Endangered Resources Review Program at 608-267-0862 if you have any questions about sharing information contained in the ER Review.)

Section 6: Certification by Requester

I agree to pay, within 30 days of receipt of an invoice, the \$75/hour fee charged by the Department per s. NR 29.04(1), Wis. Adm. Code, for this ER review. I am the owner, authorized representative of the owner, or utility representative of the property for which I am requesting an Endangered Resources (ER) Review. I accept the terms and conditions outlined in Section 5 (above). To the best of my knowledge, the information I have provided is complete and accurate.


Gregory J. Droessler
Signature of Requester

11/21/2022
~~4/27/2020~~
Date Signed


Printed Name



Endangered Resources Preliminary Assessment

Created on **11/9/2022**. This report is good for one year after the created date.

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

Results

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

An ER Review is needed to ensure compliance with Wisconsin's Endangered Species Law (s. 29.604 Wis. Stats.) and the Federal Endangered Species Act (16 USC ss 1531-43). Therefore you should request an Endangered Resources Review <https://dnr.wi.gov/topic/ERReview/Review.html>. The ER Review will list the endangered resources that have been recorded within the vicinity of the project area and follow-up actions may be necessary.

One (or more) of the following situations apply:

- The species recorded are state or federal threatened or endangered animals.
- The species recorded are state threatened or endangered plants on public land.
- The species recorded are federal threatened or endangered plants on federal land or involve federal funds or a federal permit.
- The project site overlaps the Karner Blue Butterfly High Potential Range.
- The project overlaps the Rusty Patched Bumble Bee High Potential Zone.

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

Project Information

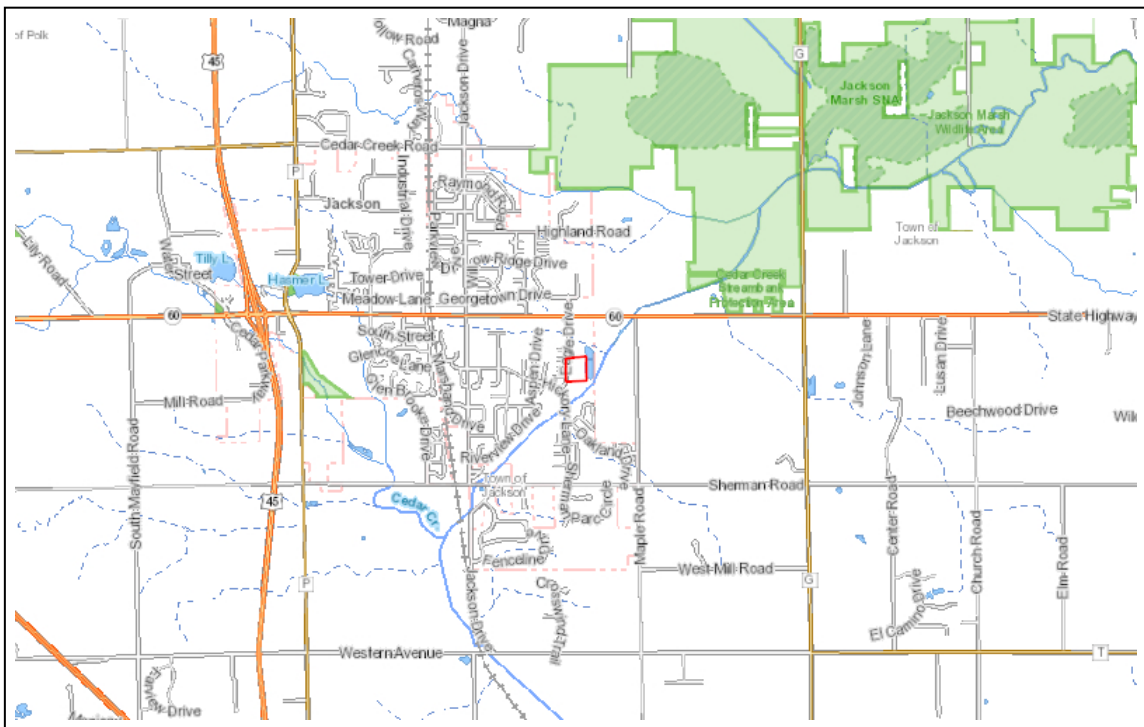
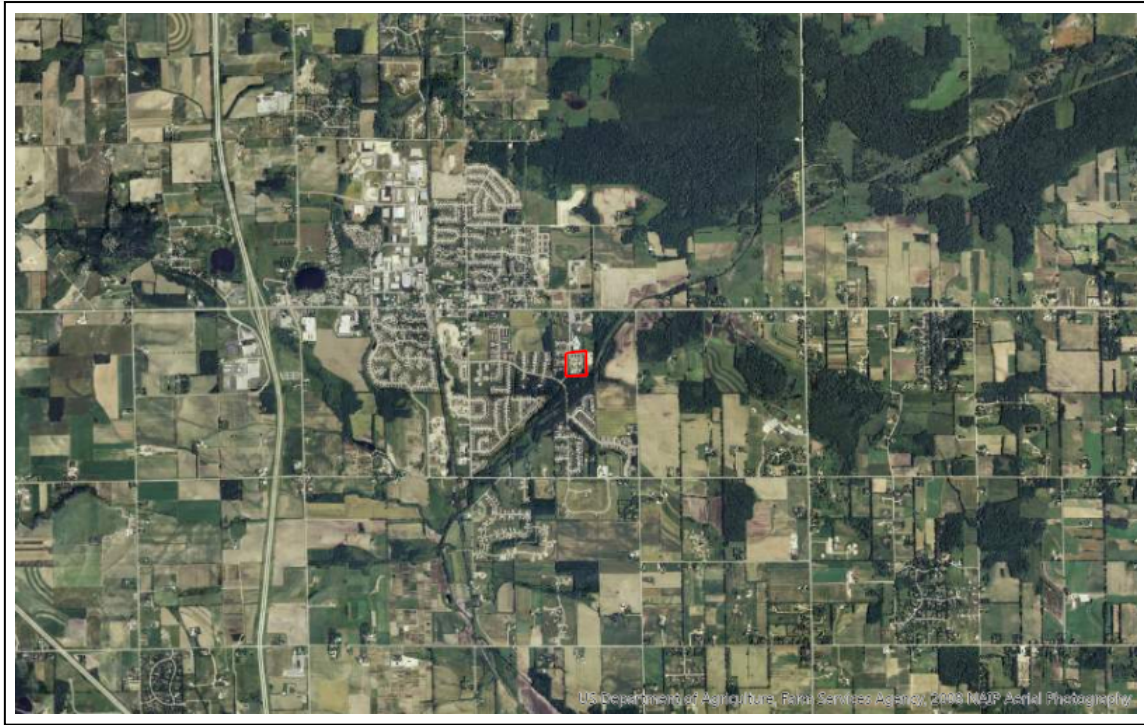
Landowner name	Village of Jackson
Project address	W194N16658 Eagle Drive, Jackson, WI
Project description	Wastewater Treatment Facility upgrade

Project Questions

Does the project involve a public property?	Yes
Is there any federal involvement with the project?	No
Is the project a utility, agricultural, forestry or bulk sampling (associated with mining) project?	Yes
Is the project property in Managed Forest Law or Managed Forest Tax Law?	No
Project involves tree or shrub removal?	Yes
Is project near (within 300 ft) a waterbody or a shoreline?	Yes
Is project within a waterbody or along the shoreline?	No

Public Portal ID: **Ma52@F4rT**

11/9/2022, 7:48:35 AM



The information shown on these maps has been obtained from various sources, and is of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. Users of these maps should confirm the ownership of land through other means in order to avoid trespassing. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>.

<https://dnrx.wisconsin.gov/nhiportal/public>

101 S. Webster Street . PO Box 7921 . Madison, Wisconsin 53707-7921

Appendix O

Calculations for Parallel Cost Ratio, Septage Percentage, and Phosphorus Percentage

Wastewater Treatment Facility - Facilities Planning Document

Village of Jackson WWTF

Jackson, WI

Parallel Cost Evaluation

<https://dnr.wisconsin.gov/aid/documents/EIF/Guide/Pcperc.html>

Existing Base and Design Capacity

	Flow (MGD)	BOD (lbs/day)	TSS (lbs/day)	TKN (lbs/day)	Phos (lbs/day)
Village Base Loadings	0.788	3,056	3,988	237	80
20-Year Design Capacity (DC)	2.619	5,235	6,941	548	180

Market Rate Reserve Capacity

	Flow (MGD)	BOD (lbs/day)	TSS (lbs/day)	TKN (lbs/day)	Phos (lbs/day)
Future Village Increases	0.701	1,709	1,819	234	41
Additional Contributors (includes septage)	0.057	351	1,018	62	34
Existing + Future Sustained I/I	0.711	na	na	na	na
20-Year Reserve Capacity	1.469	2,060	2,837	296	75
Beyond 10-Year Reserve Capacity	0.735	1,030	1,419	148	38

Future Industrial Flow and Loading Capacity

	Flow (MGD)	BOD (lbs/day)	TSS (lbs/day)	TKN (lbs/day)	Phos (lbs/day)
Kerry Ingredients	0.060	119	233	15	5
Unallocated	0.000	0	0	0	0
Future Industrial Capacity	0.060	119	233	15	5

Market Rate Capacity Summary

	Flow (MGD)	BOD (lbs/day)	TSS (lbs/day)	TKN (lbs/day)	Phos (lbs/day)
Beyond 10-Year Reserve Capacity (linear growth)	0.735	1,030	1,419	148	38
Future Industrial Capacity	0.060	119	233	15	5
Market Rate Capacity	0.795	1,149	1,652	163	43

Reduced Capacity Summary

	Flow (MGD)	BOD (lbs/day)	TSS (lbs/day)	TKN (lbs/day)	Phos (lbs/day)
20-Year Design Capacity (DC)	2.619	5,235	6,941	548	180
Market Rate Capacity	0.795	1,149	1,652	163	43
Below Market Rate (RC Condition)	1.825	4,086	5,290	385	138

Septage Percentage Capacity

	Flow (MGD)	BOD (lbs/day)	TSS (lbs/day)	TKN (lbs/day)	Phos (lbs/day)
Below Market Rate (RC Condition)	1.825	4,086	5,290	385	138
Septage Capacity	0.057	351	1,018	62	34
Below Market Rate less Septage Capacity (RC2 Condition)	1.768	3,735	4,272	323	104

Parallel Cost and Septage Percentage Condition Capacity Summary

	Flow (MGD)	BOD (lbs/day)	TSS (lbs/day)	TKN (lbs/day)	Phos (lbs/day)
20-Year Design Capacity (DC)	2.619	5,235	6,941	548	180
RC Condition	1.825	4,086	5,290	385	138
RC2 Condition	1.768	3,735	4,272	323	104

Parallel & Septage Percentage Condition Cost Summary

Total Project Cost	DC Cost	RC Cost	RC2 Costs
Phase 1	\$9,802,000	\$8,878,000	\$8,878,000
Total	\$9,802,000	\$8,878,000	\$8,878,000

$$PC = RC/DC \quad 0.91$$

$$SP = (RC - RC2)/DC \quad 0.0\%$$

PC = the parallel cost percentage expressed as a decimal

RC = construction cost associated with the reduced capacity (below market rate eligible) condition

RC2 = construction costs associated with a capacity condition without market rate items and without septage receiving facilities or septage capacity.

SP = septage percentage (percent of project costs eligible for a 0% rate)

Village of Jackson
Jackson Facilities Plan
 Parallel Cost Estimate - Phase 1
 11/7/2022

	<u>Description</u>	<u>Quantity</u>		<u>Units</u>	<u>Unit Cost</u>			<u>Install</u>	<u>Site</u>	<u>Installed Cost</u>			
	<u>Base</u>	<u>RC</u>	<u>RC2</u>		<u>Base</u>	<u>RC</u>	<u>RC2</u>	<u>Factor</u>	<u>Const.</u>	<u>Base</u>	<u>RC</u>	<u>RC2</u>	
1	05-Site Work												
	Asphalt demolition	1	1	1	LS	\$25,000	\$25,000	\$25,000	1.00	1.00	\$25,000	\$25,000	\$25,000
	Fence demolition	400	400	400	LF	\$10	\$10	\$10	1.00	1.00	\$4,000	\$4,000	\$4,000
	Erosion Control	1	1	1	LS	\$10,000	\$10,000	\$10,000	1.00	1.00	\$10,000	\$10,000	\$10,000
	Dewatering and Sheeting	1	1	1	LS	\$50,000	\$50,000	\$50,000	1.00	1.00	\$50,000	\$50,000	\$50,000
	Site Piping	1	1	1	LS	\$1,751,000	\$1,751,000	\$1,751,000	1.00	1.00	\$1,751,000	\$1,751,000	\$1,751,000
	Natural Gas	1	1	1	LS	\$10,000	\$10,000	\$10,000	1.00	1.00	\$10,000	\$10,000	\$10,000
	Cable	1	1	1	LS	\$5,000	\$5,000	\$5,000	1.00	1.00	\$5,000	\$5,000	\$5,000
	Asphalt Paving	2500	2500	2500	SY	\$25	\$25	\$25	1.00	1.00	\$62,500	\$62,500	\$62,500
	Generator Pad	3	3	3	CY	\$550	\$550	\$550	1.00	3.00	\$4,950	\$4,950	\$4,950
	Sidewalks	5000	5000	5000	SF	\$10	\$10	\$10	1.00	1.00	\$48,000	\$48,000	\$48,000
	Site Grading	1	1	1	LS	\$50,000	\$50,000	\$50,000	1.00	1.00	\$50,000	\$50,000	\$50,000
	Seed, Fertilizer, Mulch	5000	5000	5000	SY	\$6	\$6	\$6	1.00	1.00	\$30,000	\$30,000	\$30,000
	Bollards	20	20	20	EA	\$1,000	\$1,000	\$1,000	1.00	1.00	\$20,000	\$20,000	\$20,000
	Generator / ATS	1	1	1	EA	\$250,000	\$250,000	\$250,000	1.00	1.00	\$250,000	\$250,000	\$250,000
	Automatic Gate	1	1	1	EA	\$20,000	\$20,000	\$20,000	1.00	1.00	\$20,000	\$20,000	\$20,000
	Fencing	400	400	400	LF	\$30	\$30	\$30	1.00	1.00	\$12,000	\$12,000	\$12,000
	Phase % of Total										30%	30%	30%
	Cost Subtotal										\$705,750	\$705,750	\$705,750
2	STR. 10 - Service Building												
	Demolition												
	Windows/Doors	15	15	15	EA	\$250	\$250	\$250	1.00	1.00	\$3,750	\$3,750	\$3,750
	Exterior Walls	700	700	700	SF	\$15	\$15	\$15	1.00	1.00	\$10,500	\$10,500	\$10,500
	Interior Walls	1500	1500	1500	SF	\$10	\$10	\$10	1.00	1.00	\$15,000	\$15,000	\$15,000
	Lab	0	0	0	LS	\$7,500	\$7,500	\$7,500	1.00	1.00	\$0	\$0	\$0
	Roofing	2800	2800	2800	SF	\$7	\$7	\$7	1.00	1.00	\$19,600	\$19,600	\$19,600
	Plumbing	2800	2800	2800	SF	\$3	\$3	\$3	1.00	1.00	\$8,400	\$8,400	\$8,400
	Generator	1	1	1	LS	\$5,000	\$5,000	\$5,000	1.00	1.00	\$5,000	\$5,000	\$5,000
	Asbestos Abatement	1	1	1	LS	\$20,000	\$20,000	\$20,000	1.00	1.00	\$20,000	\$20,000	\$20,000
	Renovation Construction												
	Architectural Ceiling	2800	2800	2800	SF	\$14	\$14	\$14	1.00	1.20	\$48,384	\$48,384	\$48,384
	Roofing	2800	2800	2800	SF	\$24	\$24	\$24	1.00	1.20	\$80,640	\$80,640	\$80,640
	Architectural	2800	2800	2800	SF	\$24	\$24	\$24	1.00	1.20	\$80,640	\$80,640	\$80,640
	Interior Walls - Wood Framed	1400	1400	1400	SF	\$10	\$10	\$10	1.00	1.20	\$16,800	\$16,800	\$16,800
	Flooring	2800	2800	2800	SF	\$8	\$8	\$8	1.00	1.20	\$26,880	\$26,880	\$26,880
	Louver / door masonry infill	400	400	400	SF	\$35	\$35	\$35	1.00	1.20	\$16,800	\$16,800	\$16,800
	Entry Doors	8	8	8	EA	\$4,000	\$4,000	\$4,000	1.00	1.20	\$38,400	\$38,400	\$38,400
	Overhead Doors	0	0	0	EA	\$15,000	\$15,000	\$15,000	1.00	1.20	\$0	\$0	\$0

Village of Jackson
Jackson Facilities Plan
 Parallel Cost Estimate - Phase 1
 11/7/2022

<u>Description</u>	<u>Quantity</u>			<u>Units</u>	<u>Unit Cost</u>			<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>		
	<u>Base</u>	<u>RC</u>	<u>RC2</u>		<u>Base</u>	<u>RC</u>	<u>RC2</u>			<u>Base</u>	<u>RC</u>	<u>RC2</u>
Windows	7	7	7	EA	\$1,500	\$1,500	\$1,500	1.00	1.20	\$12,600	\$12,600	\$12,600
Building Construction - Wetwell / Drywell												
Excavation	490	490	490	CY	\$30	\$30	\$30	1.00	2.00	\$29,400	\$29,400	\$29,400
Structural Fill	150	150	150	CY	\$35	\$35	\$35	1.00	2.00	\$10,500	\$10,500	\$10,500
Dewatering	1	1	1	LS	\$50,000	\$50,000	\$50,000	1.00	1.00	\$50,000	\$50,000	\$50,000
Wall Cuts / Cores	3	3	3	EA	\$8,000	\$8,000	\$8,000	1.00	1.50	\$36,000	\$36,000	\$36,000
Concrete												
Circular walls	0	0	0	CY	\$810	\$810	\$810	1.00	1.50	\$0	\$0	\$0
Straight walls	67	67	67	CY	\$720	\$720	\$720	1.00	1.50	\$72,360	\$72,360	\$72,360
Slab on soil	22	22	22	CY	\$660	\$660	\$660	1.00	1.50	\$21,780	\$21,780	\$21,780
Shored slab	10	10	10	CY	\$1,320	\$1,320	\$1,320	1.00	1.50	\$19,800	\$19,800	\$19,800
Shored beams	2	2	2	CY	\$2,040	\$2,040	\$2,040	1.00	1.50	\$6,120	\$6,120	\$6,120
Columns	0	0	0	CY	\$1,380	\$1,380	\$1,380	1.00	1.50	\$0	\$0	\$0
Concrete fill	5	5	5	CY	\$480	\$480	\$480	1.00	1.50	\$3,600	\$3,600	\$3,600
Misc concrete	5	5	5	CY	\$900	\$900	\$900	1.00	1.50	\$6,750	\$6,750	\$6,750
Concrete Ties to Existing	40	40	40	LF	\$250	\$250	\$250	1.00	1.50	\$15,000	\$15,000	\$15,000
Misc. Metals	0	0	0	LS	\$8,000	\$8,000	\$8,000	1.00	1.00	\$0	\$0	\$0
Block Walls - Interior	0	0	0	SF	\$24	\$24	\$24	1.00	1.00	\$0	\$0	\$0
Block Walls - Exterior	0	0	0	SF	\$42	\$42	\$42	1.00	1.00	\$0	\$0	\$0
Concrete Plank Ceiling	0	0	0	SF	\$24	\$24	\$24	1.00	1.00	\$0	\$0	\$0
Roofing	400	400	400	SF	\$24	\$24	\$24	1.00	1.00	\$9,600	\$9,600	\$9,600
Architectural	0	0	0	SF	\$24	\$24	\$24	1.00	1.00	\$0	\$0	\$0
Stairs and Railings	8	8	8	EA	\$1,000	\$1,000	\$1,000	1.00	1.00	\$8,000	\$8,000	\$8,000
Aluminum Railing	20	20	20	LF	\$60	\$60	\$60	1.00	1.00	\$1,200	\$1,200	\$1,200
Entry Doors	0	0	0	EA	\$3,000	\$3,000	\$3,000	1.00	1.00	\$0	\$0	\$0
Overhead Doors	0	0	0	EA	\$7,500	\$7,500	\$7,500	1.00	1.00	\$0	\$0	\$0
Windows	0	0	0	EA	\$1,500	\$1,500	\$1,500	1.00	1.00	\$0	\$0	\$0
Equipment												
RAW Pumps	4	3	3	EA	\$40,000	\$40,000	\$40,000	1.20	1.00	\$192,000	\$144,000	\$144,000
Check Valves	4	4	4	EA	\$10,000	\$10,000	\$10,000	1.20	1.00	\$48,000	\$48,000	\$48,000
Plug Valves	8	8	8	EA	\$8,000	\$8,000	\$8,000	1.20	1.00	\$76,800	\$76,800	\$76,800
Sluice Gates	1	1	1	EA	\$8,000	\$8,000	\$8,000	1.20	1.00	\$9,600	\$9,600	\$9,600
Pump VFDs	4	4	4	EA	\$20,000	\$20,000	\$20,000	1.20	1.00	\$96,000	\$96,000	\$96,000
Locker room Furniture	1	1	1	LS	\$15,000	\$15,000	\$15,000	1.20	1.00	\$18,000	\$18,000	\$18,000
Piping and Valves Modifications	1	1	1	LS	\$40,000	\$40,000	\$40,000	1.20	1.00	\$48,000	\$48,000	\$48,000
Painting												
Structure Surfaces	2800	2800	2800	SF	\$10	\$10	\$10	1.00	1.00	\$26,880	\$26,880	\$26,880
Piping	0	0	0	SF	\$18	\$18	\$18	1.00	1.00	\$0	\$0	\$0
HVAC (C1D1/damp)	1000	1000	1000	SF	\$75	\$75	\$75	1.00	1.50	\$112,500	\$112,500	\$112,500
HVAC (standard)	2800	2800	2800	SF	\$45	\$45	\$45	1.00	1.00	\$126,000	\$126,000	\$126,000

Village of Jackson
Jackson Facilities Plan
 Parallel Cost Estimate - Phase 1
 11/7/2022

<u>Description</u>	<u>Quantity</u>			<u>Units</u>	<u>Unit Cost</u>			<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>		
	<u>Base</u>	<u>RC</u>	<u>RC2</u>		<u>Base</u>	<u>RC</u>	<u>RC2</u>			<u>Base</u>	<u>RC</u>	<u>RC2</u>
Plumbing (C1D1/damp)	1000	1000	1000	SF	\$23	\$23	\$23	1.00	1.50	\$33,750	\$33,750	\$33,750
Plumbing (standard)	2800	2800	2800	SF	\$15	\$15	\$15	1.00	1.00	\$42,000	\$42,000	\$42,000
Cost Subtotal										\$1,523,100	\$1,475,100	\$1,475,100
14 STR. 60 - Tertiary Filter Building												
Demolition												
Chlorination Equipment	2	2	2	EA	\$5,000	\$5,000	\$5,000	1.00	1.00	\$10,000	\$10,000	\$10,000
Chlorine Storage	2	2	2	EA	\$5,000	\$5,000	\$5,000	1.00	1.00	\$10,000	\$10,000	\$10,000
Renovation Construction												
Architectural Ceiling	0	0	0	SF	\$14	\$14	\$14	1.00	1.00	\$0	\$0	\$0
Roofing	0	0	0	SF	\$24	\$24	\$24	1.00	1.00	\$0	\$0	\$0
Architectural	3500	3500	3500	SF	\$24	\$24	\$24	1.00	1.00	\$84,000	\$84,000	\$84,000
Flooring	0	0	0	SF	\$8	\$8	\$8	1.00	1.00	\$0	\$0	\$0
Louver / door masonry infill	0	0	0	SF	\$35	\$35	\$35	1.00	1.00	\$0	\$0	\$0
Entry Doors	4	4	4	EA	\$4,000	\$4,000	\$4,000	1.00	1.00	\$16,000	\$16,000	\$16,000
Building Construction										\$0	\$0	\$0
Excavation	700	700	700	CY	\$36	\$36	\$36	1.00	2.00	\$50,400	\$50,400	\$50,400
Structural Fill	200	200	200	CY	\$35	\$35	\$35	1.00	2.00	\$14,000	\$14,000	\$14,000
Dewatering - filter building	1	1	1	CY	\$15,000	\$15,000	\$15,000	1.00	1.00	\$15,000	\$15,000	\$15,000
Concrete												
Circular walls	0	0	0	CY	\$810	\$810	\$810	1.00	1.20	\$0	\$0	\$0
Straight walls	55	55	55	CY	\$720	\$720	\$720	1.00	1.20	\$47,520	\$47,520	\$47,520
Slab on soil	122	122	122	CY	\$660	\$660	\$660	1.00	1.20	\$96,624	\$96,624	\$96,624
Shored slab	10	10	10	CY	\$1,320	\$1,320	\$1,320	1.00	1.20	\$15,840	\$15,840	\$15,840
Shored beams	2	2	2	CY	\$2,040	\$2,040	\$2,040	1.00	1.20	\$4,896	\$4,896	\$4,896
Columns	0	0	0	CY	\$1,380	\$1,380	\$1,380	1.00	1.20	\$0	\$0	\$0
Concrete fill	0	0	0	CY	\$480	\$480	\$480	1.00	1.20	\$0	\$0	\$0
Misc concrete	5	5	5	CY	\$900	\$900	\$900	1.00	1.20	\$5,400	\$5,400	\$5,400
Misc. Metals	1	1	1	LS	\$8,000	\$8,000	\$8,000	1.00	1.20	\$9,600	\$9,600	\$9,600
Block Walls - Interior	0	0	0	SF	\$24	\$24	\$24	1.00	1.20	\$0	\$0	\$0
Block Walls - Exterior	1220	1220	1220	SF	\$42	\$42	\$42	1.00	1.20	\$61,488	\$61,488	\$61,488
Concrete Plank Ceiling	1584	1584	1584	SF	\$24	\$24	\$24	1.00	1.20	\$45,619	\$45,619	\$45,619
Roofing	1584	1584	1584	SF	\$24	\$24	\$24	1.00	1.20	\$45,619	\$45,619	\$45,619
Architectural	1584	1584	1584	SF	\$24	\$24	\$24	1.00	1.20	\$45,619	\$45,619	\$45,619
Stairs and Railings	20	20	20	EA	\$1,000	\$1,000	\$1,000	1.00	1.20	\$24,000	\$24,000	\$24,000
Aluminum Railing	150	150	150	LF	\$60	\$60	\$60	1.00	1.20	\$10,800	\$10,800	\$10,800
Aluminum Grating	800	800	800	SF	\$50	\$50	\$50	1.00	1.20	\$48,000	\$48,000	\$48,000
Entry Doors	2	2	2	EA	\$4,000	\$4,000	\$4,000	1.00	1.20	\$9,600	\$9,600	\$9,600
Overhead Doors	1	1	1	EA	\$7,500	\$7,500	\$7,500	1.00	1.20	\$9,000	\$9,000	\$9,000
Windows	2	2	2	EA	\$1,500	\$1,500	\$1,500	1.00	1.20	\$3,600	\$3,600	\$3,600

Village of Jackson
Jackson Facilities Plan
 Parallel Cost Estimate - Phase 1
 11/7/2022

<u>Description</u>	<u>Quantity</u>			<u>Units</u>	<u>Unit Cost</u>			<u>Install</u>	<u>Site</u>	<u>Installed Cost</u>		
	<u>Base</u>	<u>RC</u>	<u>RC2</u>		<u>Base</u>	<u>RC</u>	<u>RC2</u>			<u>Base</u>	<u>RC</u>	<u>RC2</u>
Equipment												
Alum pumps	2	2	2	EA	\$7,500	\$7,500	\$7,500	1.20	1.00	\$18,000	\$18,000	\$18,000
Floc pumps	2	2	2	EA	\$7,500	\$7,500	\$7,500	1.20	1.00	\$18,000	\$18,000	\$18,000
Floc Tank - poly	1	1	1	EA	\$12,000	\$12,000	\$12,000	1.20	1.00	\$14,400	\$14,400	\$14,400
Contact tank	0	0	0	EA	\$5,000	\$5,000	\$5,000	1.20	1.00	\$0	\$0	\$0
Tertiary Filters	2	1	1	EA	\$400,000	\$400,000	\$400,000	1.20	1.00	\$960,000	\$480,000	\$480,000
Gates	3	3	3	EA	\$10,000	\$10,000	\$10,000	1.20	1.00	\$36,000	\$36,000	\$36,000
Flash Mixers	3	3	3	EA	\$15,000	\$15,000	\$15,000	1.20	1.00	\$54,000	\$54,000	\$54,000
Chemical / Floc Piping	2	2	2	LS	\$15,000	\$15,000	\$15,000	1.20	1.00	\$36,000	\$36,000	\$36,000
Piping and Valves	1	1	1	LS	\$150,000	\$150,000	\$150,000	1.20	1.00	\$180,000	\$180,000	\$180,000
HVAC (C1D1/damp)	0	0	0	SF	\$75	\$75	\$75	1.00	1.00	\$0	\$0	\$0
HVAC (standard)	1584	1584	1584	SF	\$45	\$45	\$45	1.00	1.00	\$71,280	\$71,280	\$71,280
Plumbing (C1D1/damp)	0	0	0	SF	\$23	\$23	\$23	1.00	1.00	\$0	\$0	\$0
Plumbing (standard)	1584	1584	1584	SF	\$15	\$15	\$15	1.00	1.00	\$23,760	\$23,760	\$23,760
Cost Subtotal										\$2,094,100	\$1,614,100	\$1,614,100

16 STR. 70 - Disinfection Tank

Demolition												
Chlorination and dechlorination equip	1	1	1	LS	\$5,000	\$5,000	\$5,000	1.00	1.00	\$5,000	\$5,000	\$5,000
Wall Cut / Wall Cores	3	3	3	EA	\$8,000	\$8,000	\$8,000	1.00	1.00	\$24,000	\$24,000	\$24,000
Wall Demolition	1	1	1	LS	\$15,000	\$15,000	\$15,000	1.00	1.00	\$15,000	\$15,000	\$15,000
Building Construction												
Channel Modifications	1	1	1	LS	\$40,000	\$40,000	\$40,000	1.20	1.00	\$48,000	\$48,000	\$48,000
New Aluminum Grating	200	200	200	SF	\$50	\$50	\$50	1.00	1.50	\$15,000	\$15,000	\$15,000
New Handrails	200	200	200	LF	\$35	\$35	\$35	1.00	1.50	\$10,500	\$10,500	\$10,500
Effluent Pump Structure	1	1	1	LS	\$60,000	\$60,000	\$60,000	1.00	1.50	\$90,000	\$90,000	\$90,000
Equipment												
Flume	1	1	1	LS	\$10,000	\$10,000	\$10,000	1.20	1.00	\$12,000	\$12,000	\$12,000
Effluent Pump	1	1	1	LS	\$50,000	\$50,000	\$50,000	1.20	1.00	\$60,000	\$60,000	\$60,000
UV System	1	1	1	LS	\$250,000	\$250,000	\$250,000	1.20	1.00	\$300,000	\$300,000	\$300,000
Cost Subtotal										\$579,500	\$579,500	\$579,500

22 STR. 95 - Storage Garage

Renovation Construction												
Architectural	4800	4800	4800	SF	\$24	\$24	\$24	1.00	1.20	\$138,240	\$138,240	\$138,240
Flooring	4800	4800	4800	SF	\$8	\$8	\$8	1.00	1.20	\$46,080	\$46,080	\$46,080
Louver / door masonry infill	0	0	0	SF	\$35	\$35	\$35	1.00	1.20	\$0	\$0	\$0
Entry Doors	2	2	2	EA	\$4,000	\$4,000	\$4,000	1.00	1.20	\$9,600	\$9,600	\$9,600
Building Construction												
Excavation	175	175	175	CY	\$36	\$36	\$36	1.00	1.50	\$9,450	\$9,450	\$9,450

Village of Jackson
Jackson Facilities Plan
 Parallel Cost Estimate - Phase 1
 11/7/2022

<u>Description</u>	<u>Quantity</u>			<u>Units</u>	<u>Unit Cost</u>			<u>Install Factor</u>	<u>Site Const.</u>	<u>Installed Cost</u>		
	<u>Base</u>	<u>RC</u>	<u>RC2</u>		<u>Base</u>	<u>RC</u>	<u>RC2</u>			<u>Base</u>	<u>RC</u>	<u>RC2</u>
Structural Fill Concrete	75	75	75	CY	\$30	\$30	\$30	1.00	1.50	\$3,375	\$3,375	\$3,375
Straight Walls	30	30	30	CY	\$600	\$600	\$600	1.00	1.00	\$18,000	\$18,000	\$18,000
Slab on soil	45	45	45	CY	\$660	\$660	\$660	1.00	1.00	\$29,700	\$29,700	\$29,700
Architectural												
Doors and Windows	4	4	4	EA	\$5,000	\$5,000	\$5,000	1.20	1.00	\$24,000	\$24,000	\$24,000
Overhead Doors	2	2	2	EA	\$15,000	\$15,000	\$15,000	1.20	1.00	\$36,000	\$36,000	\$36,000
Wood Framed Structure	2400	2400	2400	SF	\$120	\$120	\$120	1.00	1.00	\$288,000	\$288,000	\$288,000
HVAC (standard)	2400	2400	2400	SF	\$25	\$25	\$25	1.00	1.00	\$60,000	\$60,000	\$60,000
Plumbing (standard)	2400	2400	2400	SF	\$15	\$15	\$15	1.00	1.00	\$36,000	\$36,000	\$36,000
Cost Subtotal										\$698,500	\$698,500	\$698,500
Construction Subtotal										\$5,600,950	\$5,072,950	\$5,072,950
Additional Contractor Costs					15%					\$840,200	\$761,000	\$761,000
Electrical Costs					25%					\$1,400,300	\$1,268,300	\$1,268,300
Total Construction Cost										\$7,841,500	\$7,102,300	\$7,102,300
Additional Design and Management Costs												
Contingencies					10%					\$784,200	\$710,300	\$710,300
Engineering, Admin, Legal					11%					\$862,600	\$781,300	\$781,300
Resident Observation					4%					\$313,700	\$284,100	\$284,100
Cost Subtotal										\$1,960,500	\$1,775,700	\$1,775,700
Total Project Cost										\$9,802,000	\$8,878,000	\$8,878,000

Appendix P

Funding and Financial Information

Village of Jackson
 WWTP
Wastewater Meters - 2017

Meter Size	Meter Equivalent	Residential	Multi-family	Commercial	Industrial	Public Authority	Total Meter Count	Equivalent Meters	Current Fixed Charge	Current Multiplier	Current Equivalent Meters
5/8"	1.0	2677	3	50	17	7	2,754	2,754	\$47.72	1.00	2,754
3/4"	1.0						0	0	\$47.72	1.00	0
1"	1.0	5	17	24	18	1	65	65	\$66.06	1.38	90
1-1/4"	1.0						0	0	\$91.61	1.92	0
1-1/2"	1.0	1	40	21	6	6	74	74	\$113.80	2.38	176
2"	1.0			6	1		7	7	\$146.83	3.08	22
3"	1.0		1	3		1	5	5	\$238.61	5.00	25
4"	1.0			1	1	1	3	3	\$275.32	5.77	17
		2683	61	105	43	16	2,908	2,908			3,084
2017 Total Billed Sewer Flow								213,637,000	2017 Total Billed Sewer Flow		213,637,000
Flow Per Equivalent Meter								6,122	Flow Per Equivalent Meter		5,773
Total Residential Flow								129,803,000			
Total Residential Users								2,683			
Flow per Residential User/Month								4,032			

Wastewater Meters - 2018

Meter Size	Meter Equivalent	Residential	Multi-family	Commercial	Industrial	Public Authority	Total Meter Count	Equivalent Meters	Current Fixed Charge	Current Multiplier	Current Equivalent Meters
5/8"	1.0	3001	3	50	18	7	3,079	3,079	\$47.72	1.00	3,079
3/4"	1.0						0	0	\$47.72	1.00	0
1"	1.0	5	17	24	18	1	65	65	\$66.06	1.38	90
1-1/4"	1.0						0	0	\$91.61	1.92	0
1-1/2"	1.0	1	40	21	7	7	76	76	\$113.80	2.38	181
2"	1.0			6	2		8	8	\$146.83	3.08	25
3"	1.0		1	3		1	5	5	\$238.61	5.00	25
4"	1.0			1	1	1	3	3	\$275.32	5.77	17
		3007	61	105	46	17	3,236	3,236			3,417
2018 Total Billed Sewer Flow								209,952,000	2018 Total Billed Sewer Flow		209,952,000
Flow Per Equivalent Meter								5,407	Flow Per Equivalent Meter		5,121
Total Residential Flow								129,922,000			
Total Residential Users								3,007			
Flow per Residential User/Month								3,601			

Wastewater Meters - 2019

Meter Size	Meter Equivalent	Residential	Multi-family	Commercial	Industrial	Public Authority	Total Meter Count	Equivalent Meters	Current Fixed Charge	Current Multiplier	Current Equivalent Meters
5/8"	1.0	3403	3	50	17	5	3,478	3,478	\$47.72	1.00	3,478
3/4"	1.0						0	0	\$47.72	1.00	0
1"	1.0	5	19	22	18	1	65	65	\$66.06	1.38	90
1-1/4"	1.0						0	0	\$91.61	1.92	0
1-1/2"	1.0	1	42	18	6	6	73	73	\$113.80	2.38	174
2"	1.0		2	4	2		8	8	\$146.83	3.08	25
3"	1.0		1	3		1	5	5	\$238.61	5.00	25
4"	1.0			1	1	1	3	3	\$275.32	5.77	17
		3409	67	98	44	14	3,632	3,632			3,808
2019 Total Billed Sewer Flow								205,006,000	2019 Total Billed Sewer Flow		205,006,000
Flow Per Equivalent Meter								4,704	Flow Per Equivalent Meter		4,486
Total Residential Flow								128,136,000			
Total Residential Users								3,409			
Flow per Residential User/Month								3,132			

Wastewater Meters - 2020
Sewer Users

Meter Size	Meter Equivalent	Residential	Multi-family	Commercial	Industrial	Public Authority	Total Meter Count	Equivalent Meters	Current Fixed Charge	Current Multiplier	Current Equivalent Meters
5/8"	1.0	3462		51	18	6	3,537	3,537	\$47.72	1.00	3,537
3/4"	1.0						0	0	\$47.72	1.00	0
1"	1.0	5	18	14	14	1	52	52	\$66.06	1.38	72
1-1/4"	1.0						0	0	\$91.61	1.92	0
1-1/2"	1.0	1	31	19	6	6	63	63	\$113.80	2.38	150
2"	1.0		2	3	2		7	7	\$146.83	3.08	22
3"	1.0		1	3		1	5	5	\$238.61	5.00	25
4"	1.0			1	1	1	3	3	\$275.32	5.77	17
		3468	52	91	41	15	3,667	3,667			3,823
2020 Total Billed Water Flow								212,196,000	2020 Total Billed Water Flow		212,196,000
% Deduct 0.9 for sewer flow								190,976,400			
Flow Per Equivalent Meter								4,822	Flow Per Equivalent Meter		4,626
Total Residential Flow								135,563,000			
Total Residential Users								3,468			
Flow per Residential User/Month								3,257			

Appendix Q

User Charge Calculations

Assumptions Notes:
1. Assumes \$0 grant for the phosphorus work
2. Census MHI = \$70,974 2% of MHI = \$1,419.48/yr, \$118.29/month
3. Assumes 0% CWF Grant Funding for the Phase 2 projects

Option #1 - Stepped Rate Increase

ASSUMPTIONS		
WWTP Annual O&M Costs		Existing plant
WWTP Annual Replacement Fund Costs		Existing plant
Annual % Rate Increase		
Connection Fee	\$ 4,000	
Interest Income Rate Assumed	0.5%	
Other Income Annual Increase	0.0%	

Annual % Increase
1.75%
0.0%
0.0%

FACILITIES UPGRADES	Capital Costs	Cash Contrib	Grant \$	Net Cost	Interest Rate	Payback Yrs	Rate Factor	Yearly Paymt
Phase 1 Construction (Assumed 2024)	\$9,802,000	\$2,000,000	\$0	\$7,802,000	3.000%	20	0.0672	\$524,417
Phase 2a Construction (Assumed 2026)	\$14,399,800	\$0	\$0	\$14,399,800	3.000%	20	0.0672	\$967,893
Phase 2b Construction (Assumed 2028)	\$7,660,300	\$0	\$0	\$7,660,300	3.000%	20	0.0672	\$514,892

Cash and Equivalents Available as of December 31 2020, 2021	\$ 838,822	\$ 1,681,479
Equipment and Replacement Fund as of December 31 2020, 2021	\$ 1,067,078	\$ 1,254,231
Capital Projects Restricted Fund as of December 31, 2020, 2021	\$ 1,971,035	\$ 2,021,949

BUDGET ITEM	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
EXPENSES																	
Ex. Debt Payment	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New Loans / Debt																	
Phase 1 - Loan Debt	\$ -	\$ -	\$ -	\$ -	\$ 262,208	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417
Phase 2a - Loan Debt	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 483,946	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893
Phase 2b - Loan Debt	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 257,446	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892
Estimated Outside Services Costs - Facilities Upgrade	\$ -	\$ -	\$ -	\$ 500,000	\$ 400,000	\$ 700,000	\$ 700,000	\$ 400,000	\$ 400,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
O&M																	
Annual Operation and Maintenance Costs	\$ 1,175,464	\$ 1,103,644	\$ 1,122,958	\$ 1,142,610	\$ 1,162,605	\$ 1,182,951	\$ 1,203,652	\$ 1,224,716	\$ 1,246,149	\$ 1,267,956	\$ 1,290,146	\$ 1,312,723	\$ 1,335,696	\$ 1,359,071	\$ 1,382,854	\$ 1,407,054	\$ 1,431,678
Collection System Repairs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Replacement																	
WWTP Replacement Fund Deposit	\$ 96,959	\$ 10,122	\$ -	\$ -	\$ 71,211	\$ 71,211	\$ 163,766	\$ 163,766	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823
TOTAL ANNUAL EXPENSES	\$ 1,272,423	\$ 1,113,766	\$ 1,122,958	\$ 1,642,610	\$ 1,896,025	\$ 2,478,579	\$ 3,075,782	\$ 3,280,792	\$ 3,588,728	\$ 3,467,982	\$ 3,490,171	\$ 3,512,748	\$ 3,535,721	\$ 3,559,096	\$ 3,582,880	\$ 3,607,079	\$ 3,631,703
REVENUES																	
User Charge Revenues	\$ 1,603,106	\$ 1,701,872	\$ 1,706,645	\$ 1,711,418	\$ 1,716,191	\$ 1,720,964	\$ 2,584,530	\$ 2,592,930	\$ 3,083,732	\$ 3,093,932	\$ 3,104,132	\$ 3,114,332	\$ 3,124,532	\$ 3,134,732	\$ 3,144,932	\$ 3,155,132	\$ 3,165,332
Industrial Surcharge	\$ 66,218	\$ 53,815	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000
CWF Reimbursement - outside services	\$ -	\$ -	\$ -	\$ -	\$ 900,000	\$ -	\$ 1,400,000	\$ -	\$ 800,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Cash from Replacement Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Use of Cash on Hand	\$ -	\$ -	\$ -	\$ -	\$ 2,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Hauled Waste Revenue	\$ 205,556	\$ 209,458	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
Outside Services Reimbursement	\$ 15,377	\$ 3,197	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
Connection / Impact Fees	\$ 198,479	\$ 272,000	\$ 200,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
S. Interceptor Impact Fee	\$ 389,164	\$ 4,902	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Interest Income	\$ 15,024	\$ 1,951	\$ 8,407	\$ 13,693	\$ 15,930	\$ 31,436	\$ 29,630	\$ 36,147	\$ 34,713	\$ 38,187	\$ 38,333	\$ 38,419	\$ 38,444	\$ 38,405	\$ 38,301	\$ 38,127	\$ 37,883
TOTAL ACTUAL ANNUAL REVENUE	\$ 2,492,924	\$ 2,247,195	\$ 2,180,053	\$ 2,090,111	\$ 4,997,121	\$ 2,117,400	\$ 4,379,160	\$ 2,994,077	\$ 4,283,445	\$ 3,497,118	\$ 3,507,464	\$ 3,517,751	\$ 3,527,976	\$ 3,538,137	\$ 3,548,232	\$ 3,558,259	\$ 3,568,215
EXCESS REVENUE FOR THIS FISCAL YEAR	\$ 1,220,501	\$ 1,133,429	\$ 1,057,095	\$ 447,501	\$ 3,101,097	\$ (361,179)	\$ 1,303,378	\$ (286,715)	\$ 694,717	\$ 29,137	\$ 17,293	\$ 5,002	\$ (7,746)	\$ (20,959)	\$ (34,647)	\$ (48,821)	\$ (63,488)
CARRYOVER FROM PREVIOUS YEAR	\$ -	\$ -	\$ 1,681,479	\$ 2,738,574	\$ 3,186,075	\$ 6,287,172	\$ 5,925,993	\$ 7,229,372	\$ 6,942,657	\$ 7,637,374	\$ 7,666,510	\$ 7,683,804	\$ 7,688,806	\$ 7,681,060	\$ 7,660,101	\$ 7,625,454	\$ 7,576,633
TOTAL AVAILABLE CARRYOVER	\$ 1,681,479	\$ 1,133,429	\$ 2,738,574	\$ 3,186,075	\$ 6,287,172	\$ 5,925,993	\$ 7,229,372	\$ 6,942,657	\$ 7,637,374	\$ 7,666,510	\$ 7,683,804	\$ 7,688,806	\$ 7,681,060	\$ 7,660,101	\$ 7,625,454	\$ 7,576,633	\$ 7,513,145
REVENUE DETAILS																	
Equivalent Meters Added Per Year	25																
Monthly Usage per Meter (gallons)	3,257																
Estimated Number of Equivalent Meters	3,823	3,873	3,898	3,923	3,948	3,973	3,998	4,023	4,048	4,073	4,098	4,123	4,148	4,173	4,198	4,223	4,248
Estimated Annual Water Usage (1000 gallons)	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400
ESTIMATED QUARTERLY USER CHARGES																	
Fixed Charges on Debt																	
Actual Monthly Fixed Charge per Equivalent Meter Implemented	\$ 15.91	\$ 15.91	\$ 15.91	\$ 15.91	\$ 15.91	\$ 15.91	\$ 28.00	\$ 28.00	\$ 34.00	\$ 34.00	\$ 34.00	\$ 34.00	\$ 34.00	\$ 34.00	\$ 34.00	\$ 34.00	\$ 34.00
Actual Annual Fixed Charge Revenue Generated	\$ 729,805	\$ 739,351	\$ 744,124	\$ 748,897	\$ 753,670	\$ 758,443	\$ 1,343,184	\$ 1,351,584	\$ 1,651,409	\$ 1,661,609	\$ 1,671,809	\$ 1,682,009	\$ 1,692,209	\$ 1,702,409	\$ 1,712,609	\$ 1,722,809	\$ 1,733,009
Variable Charges - O, M & R Costs (Cost per 1000 gallons)																	
Actual Variable Charge per 1000 Gallons Implemented	\$ 5.04	\$ 5.04	\$ 5.04	\$ 5.04	\$ 5.04	\$ 5.04	\$ 6.50	\$ 6.50	\$ 7.50	\$ 7.50	\$ 7.50	\$ 7.50	\$ 7.50	\$ 7.50	\$ 7.50	\$ 7.50	\$ 7.50
Actual Annual Variable Charge Revenue Generated	\$ 962,521	\$ 962,521	\$ 962,521	\$ 962,521	\$ 962,521	\$ 962,521	\$ 1,241,347	\$ 1,241,347	\$ 1,432,323	\$ 1,432,323	\$ 1,432,323	\$ 1,432,323	\$ 1,432,323	\$ 1,432,323	\$ 1,432,323	\$ 1,432,323	\$ 1,432,323
TOTAL ACTUAL MONTHLY USER CHARGE PER RESIDENTIAL USER	\$ 32.33	\$ 32.33	\$ 32.33	\$ 32.33	\$ 32.33	\$ 32.33	\$ 49.17	\$ 49.17	\$ 58.43	\$ 58.43	\$ 58.43	\$ 58.43	\$ 58.43	\$ 58.43	\$ 58.43	\$ 58.43	\$ 58.43
REVENUE GENERATED BY RATES	\$ 1,692,326	\$ 1,701,872	\$ 1,706,645	\$ 1,711,418	\$ 1,716,191	\$ 1,720,964	\$ 2,584,530	\$ 2,592,930	\$ 3,083,732	\$ 3,093,932	\$ 3,104,132	\$ 3,114,332	\$ 3,124,532	\$ 3,134,732	\$ 3,144,932	\$ 3,155,132	\$ 3,165,332
Replacement Fund - Can be used to offset costs	\$ 1,067,078	\$ 1,254,231	\$ 1,254,231	\$ 1,254,231	\$ 1,325,442	\$ 1,396,653	\$ 1,560,419	\$ 1,724,185	\$ 1,917,008	\$ 2,109,831	\$ 2,302,654	\$ 2,495,477	\$ 2,688,300	\$ 2,881,123	\$ 3,073,946	\$ 3,266,769	\$ 3,459,592
Revised Debt Coverage Ratio Calculation					354%	177%	176%	118%	128%	111%	110%	110%	109%	108%	108%	107%	106%

Assumptions Notes:
1. Assumes \$0 grant for the phosphorus work
2. Census MHI = \$70,974 2% of MHI = \$1,419.48/yr, \$118.29/month
3. Assumes 0% CWF Grant Funding for the Phase 2 projects

Option #2 - Annual % Increase

ASSUMPTIONS		
WWTP Annual O&M Costs		Existing plant
WWTP Annual Replacement Fund Costs		Existing plant
Annual % Rate Increase		
Connection Fee	\$ 4,000	
Interest Income Rate Assumed	0.5%	
Other Income Annual Increase	0.0%	

Annual % Increase
1.75%
0.0%
8.0%

FACILITIES UPGRADES	Capital Costs	Cash Contrib	Grant \$	Net Cost	Interest Rate	Payback Yrs	Rate Factor	Yearly Paymt
Phase 1 Construction (Assumed 2024)	\$9,802,000	\$2,000,000	\$0	\$7,802,000	3.000%	20	0.0672	\$524,417
Phase 2a Construction (Assumed 2026)	\$14,399,800	\$0	\$0	\$14,399,800	3.000%	20	0.0672	\$967,893
Phase 2b Construction (Assumed 2028)	\$7,660,300	\$0	\$0	\$7,660,300	3.000%	20	0.0672	\$514,892

Cash and Equivalents Available as of December 31 2020, 2021	\$ 838,822	\$ 1,681,479
Equipment and Replacement Fund as of December 31 2020, 2021	\$ 1,067,078	\$ 1,254,231
Capital Projects Restricted Fund as of December 31, 2020, 2021	\$ 1,971,035	\$ 2,021,949

BUDGET ITEM	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
EXPENSES																	
Ex. Debt Payment	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New Loans / Debt																	
Phase 1 - Loan Debt	\$ -	\$ -	\$ -	\$ -	\$ 262,208	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417
Phase 2a - Loan Debt	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 483,946	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893
Phase 2b - Loan Debt	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 257,446	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892
Estimated Outside Services Costs - Facilities Upgrade	\$ -	\$ -	\$ -	\$ 500,000	\$ 400,000	\$ 700,000	\$ 700,000	\$ 400,000	\$ 400,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
O&M																	
Annual Operation and Maintenance Costs	\$ 1,175,464	\$ 1,103,644	\$ 1,122,958	\$ 1,142,610	\$ 1,162,605	\$ 1,182,951	\$ 1,203,652	\$ 1,224,716	\$ 1,246,149	\$ 1,267,956	\$ 1,290,146	\$ 1,312,723	\$ 1,335,696	\$ 1,359,071	\$ 1,382,854	\$ 1,407,054	\$ 1,431,678
Collection System Repairs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Replacement																	
WWTP Replacement Fund Deposit	\$ 96,959	\$ 10,122	\$ -	\$ -	\$ 71,211	\$ 71,211	\$ 163,766	\$ 163,766	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823
TOTAL ANNUAL EXPENSES	\$ 1,272,423	\$ 1,113,766	\$ 1,122,958	\$ 1,642,610	\$ 1,896,025	\$ 2,478,579	\$ 3,075,782	\$ 3,280,792	\$ 3,588,728	\$ 3,467,982	\$ 3,490,171	\$ 3,512,748	\$ 3,535,721	\$ 3,559,096	\$ 3,582,880	\$ 3,607,079	\$ 3,631,703
REVENUES																	
User Charge Revenues	\$ 1,603,106	\$ 1,701,872	\$ 1,706,645	\$ 1,848,332	\$ 2,001,765	\$ 2,167,919	\$ 2,347,846	\$ 2,542,687	\$ 2,753,676	\$ 2,982,150	\$ 3,229,557	\$ 3,238,391	\$ 3,247,226	\$ 3,256,060	\$ 3,264,895	\$ 3,273,729	\$ 3,282,564
Industrial Surcharge	\$ 66,218	\$ 53,815	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000
CWF Reimbursement - outside services	\$ -	\$ -	\$ -	\$ -	\$ 900,000	\$ -	\$ 1,400,000	\$ -	\$ 800,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Cash from Replacement Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Use of Cash on Hand	\$ -	\$ -	\$ -	\$ -	\$ 2,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Hauled Waste Revenue	\$ 205,556	\$ 209,458	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
Outside Services Reimbursement	\$ 15,377	\$ 3,197	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
Connection / Impact Fees	\$ 198,479	\$ 272,000	\$ 200,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
S. Interceptor Impact Fee	\$ 389,164	\$ 4,902	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Interest Income	\$ 15,024	\$ 1,951	\$ 8,407	\$ 13,693	\$ 16,615	\$ 33,552	\$ 33,991	\$ 39,346	\$ 37,678	\$ 39,516	\$ 39,109	\$ 39,827	\$ 40,479	\$ 41,064	\$ 41,579	\$ 42,022	\$ 42,390
TOTAL ACTUAL ANNUAL REVENUE	\$ 2,492,924	\$ 2,247,195	\$ 2,180,053	\$ 2,227,024	\$ 5,283,380	\$ 2,566,471	\$ 4,146,837	\$ 2,947,034	\$ 3,956,354	\$ 3,386,666	\$ 3,633,666	\$ 3,643,218	\$ 3,652,705	\$ 3,662,124	\$ 3,671,474	\$ 3,680,751	\$ 3,689,954
EXCESS REVENUE FOR THIS FISCAL YEAR	\$ 1,220,501	\$ 1,133,429	\$ 1,057,095	\$ 584,415	\$ 3,387,356	\$ 87,892	\$ 1,071,056	\$ (333,758)	\$ 367,626	\$ (81,315)	\$ 143,495	\$ 130,470	\$ 116,984	\$ 103,029	\$ 88,594	\$ 73,672	\$ 58,251
CARRYOVER FROM PREVIOUS YEAR	\$ -	\$ -	\$ 1,681,479	\$ 2,738,574	\$ 3,322,989	\$ 6,710,344	\$ 6,798,236	\$ 7,869,292	\$ 7,535,534	\$ 7,903,160	\$ 7,821,844	\$ 7,965,339	\$ 8,095,809	\$ 8,212,793	\$ 8,315,822	\$ 8,404,416	\$ 8,478,088
TOTAL AVAILABLE CARRYOVER	\$ 1,681,479	\$ 1,133,429	\$ 2,738,574	\$ 3,322,989	\$ 6,710,344	\$ 6,798,236	\$ 7,869,292	\$ 7,535,534	\$ 7,903,160	\$ 7,821,844	\$ 7,965,339	\$ 8,095,809	\$ 8,212,793	\$ 8,315,822	\$ 8,404,416	\$ 8,478,088	\$ 8,536,339
REVENUE DETAILS																	
Equivalent Meters Added Per Year	25																
Monthly Usage per Meter (gallons)	3,257																
Estimated Number of Equivalent Meters	3,823	3,873	3,898	3,923	3,948	3,973	3,998	4,023	4,048	4,073	4,098	4,123	4,148	4,173	4,198	4,223	4,248
Estimated Annual Water Usage (1000 gallons)	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400
ESTIMATED QUARTERLY USER CHARGES																	
Fixed Charges on Debt																	
Actual Monthly Fixed Charge per Equivalent Meter Implemented	\$ 15.91	\$ 15.91	\$ 15.91	\$ 17.18	\$ 18.56	\$ 20.04	\$ 21.65	\$ 23.38	\$ 25.25	\$ 27.27	\$ 29.45	\$ 29.45	\$ 29.45	\$ 29.45	\$ 29.45	\$ 29.45	\$ 29.45
Actual Annual Fixed Charge Revenue Generated	\$ 729,805	\$ 739,351	\$ 744,124	\$ 808,809	\$ 879,081	\$ 955,420	\$ 1,038,347	\$ 1,128,428	\$ 1,226,276	\$ 1,332,558	\$ 1,447,998	\$ 1,456,832	\$ 1,465,667	\$ 1,474,501	\$ 1,483,336	\$ 1,492,170	\$ 1,501,005
Variable Charges - O, M & R Costs (Cost per 1000 gallons)																	
Actual Variable Charge per 1000 Gallons Implemented	\$ 5.04	\$ 5.04	\$ 5.04	\$ 5.44	\$ 5.88	\$ 6.35	\$ 6.86	\$ 7.41	\$ 8.00	\$ 8.64	\$ 9.33	\$ 9.33	\$ 9.33	\$ 9.33	\$ 9.33	\$ 9.33	\$ 9.33
Actual Annual Variable Charge Revenue Generated	\$ 962,521	\$ 962,521	\$ 962,521	\$ 1,039,523	\$ 1,122,685	\$ 1,212,499	\$ 1,309,499	\$ 1,414,259	\$ 1,527,400	\$ 1,649,592	\$ 1,781,559	\$ 1,781,559	\$ 1,781,559	\$ 1,781,559	\$ 1,781,559	\$ 1,781,559	\$ 1,781,559
TOTAL ACTUAL MONTHLY USER CHARGE PER RESIDENTIAL USER	\$ 32.33	\$ 32.33	\$ 32.33	\$ 34.91	\$ 37.71	\$ 40.72	\$ 43.98	\$ 47.50	\$ 51.30	\$ 55.40	\$ 59.84	\$ 59.84	\$ 59.84	\$ 59.84	\$ 59.84	\$ 59.84	\$ 59.84
REVENUE GENERATED BY RATES	\$ 1,692,326	\$ 1,701,872	\$ 1,706,645	\$ 1,848,332	\$ 2,001,765	\$ 2,167,919	\$ 2,347,846	\$ 2,542,687	\$ 2,753,676	\$ 2,982,150	\$ 3,229,557	\$ 3,238,391	\$ 3,247,226	\$ 3,256,060	\$ 3,264,895	\$ 3,273,729	\$ 3,282,564
Replacement Fund - Can be used to offset costs	\$ 1,067,078	\$ 1,254,231	\$ 1,254,231	\$ 1,254,231	\$ 1,325,442	\$ 1,396,653	\$ 1,560,419	\$ 1,724,185	\$ 1,917,008	\$ 2,109,831	\$ 2,302,654	\$ 2,495,477	\$ 2,688,300	\$ 2,881,123	\$ 3,073,946	\$ 3,266,769	\$ 3,459,592
Revised Debt Coverage Ratio Calculation					464%	263%	153%	115%	109%	105%	117%	116%	115%	114%	114%	113%	112%

Assumptions Notes:
1. Assumes \$0 grant for the phosphorus work
2. Census MHI = \$70,974 2% of MHI = \$1,419.48/yr, \$118.29/month
3. Assumes 0% CWF Grant Funding for the Phase 2 projects

Option #3 - Annual % Increase + Stepped Increase

ASSUMPTIONS		
WWTP Annual O&M Costs		Existing plant
WWTP Annual Replacement Fund Costs		Existing plant
Annual % Rate Increase		
Connection Fee	\$ 4,000	
Interest Income Rate Assumed	0.5%	
Other Income Annual Increase	0.0%	

Annual % Increase
1.75%
0.0%
3.5%

FACILITIES UPGRADES	Capital Costs	Cash Contrib	Grant \$	Net Cost	Interest Rate	Payback Yrs	Rate Factor	Yearly Paymt
Phase 1 Construction (Assumed 2024)	\$9,802,000	\$2,000,000	\$0	\$7,802,000	3.000%	20	0.0672	\$524,417
Phase 2a Construction (Assumed 2026)	\$14,399,800	\$0	\$0	\$14,399,800	3.000%	20	0.0672	\$967,893
Phase 2b Construction (Assumed 2028)	\$7,660,300	\$0	\$0	\$7,660,300	3.000%	20	0.0672	\$514,892

Cash and Equivalents Available as of December 31 2020, 2021	\$ 838,822	\$ 1,681,479
Equipment and Replacement Fund as of December 31 2020, 2021	\$ 1,067,078	\$ 1,254,231
Capital Projects Restricted Fund as of December 31, 2020, 2021	\$ 1,971,035	\$ 2,021,949

BUDGET ITEM	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
EXPENSES																	
Ex. Debt Payment	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
New Loans / Debt																	
Phase 1 - Loan Debt	\$ -	\$ -	\$ -	\$ -	\$ 262,208	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417	\$ 524,417
Phase 2a - Loan Debt	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 483,946	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893	\$ 967,893
Phase 2b - Loan Debt	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 257,446	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892	\$ 514,892
Estimated Outside Services Costs - Facilities Upgrade	\$ -	\$ -	\$ -	\$ 500,000	\$ 400,000	\$ 700,000	\$ 700,000	\$ 400,000	\$ 400,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
O&M																	
Annual Operation and Maintenance Costs	\$ 1,175,464	\$ 1,103,644	\$ 1,122,958	\$ 1,142,610	\$ 1,162,605	\$ 1,182,951	\$ 1,203,652	\$ 1,224,716	\$ 1,246,149	\$ 1,267,956	\$ 1,290,146	\$ 1,312,723	\$ 1,335,696	\$ 1,359,071	\$ 1,382,854	\$ 1,407,054	\$ 1,431,678
Collection System Repairs	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Replacement																	
WWTP Replacement Fund Deposit	\$ 96,959	\$ 10,122	\$ -	\$ -	\$ 71,211	\$ 71,211	\$ 163,766	\$ 163,766	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823	\$ 192,823
TOTAL ANNUAL EXPENSES	\$ 1,272,423	\$ 1,113,766	\$ 1,122,958	\$ 1,642,610	\$ 1,896,025	\$ 2,478,579	\$ 3,075,782	\$ 3,280,792	\$ 3,588,728	\$ 3,467,982	\$ 3,490,171	\$ 3,512,748	\$ 3,535,721	\$ 3,559,096	\$ 3,582,880	\$ 3,607,079	\$ 3,631,703
REVENUES																	
User Charge Revenues	\$ 1,603,106	\$ 1,701,872	\$ 1,706,645	\$ 1,771,318	\$ 1,838,427	\$ 1,908,064	\$ 1,980,323	\$ 2,784,960	\$ 2,891,749	\$ 3,002,601	\$ 3,117,670	\$ 3,127,649	\$ 3,137,627	\$ 3,147,606	\$ 3,157,584	\$ 3,167,563	\$ 3,177,541
Industrial Surcharge	\$ 66,218	\$ 53,815	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000	\$ 60,000
CWF Reimbursement - outside services	\$ -	\$ -	\$ -	\$ -	\$ 900,000	\$ -	\$ 1,400,000	\$ -	\$ 800,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Cash from Replacement Fund	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Use of Cash on Hand	\$ -	\$ -	\$ -	\$ -	\$ 2,000,000	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Hauled Waste Revenue	\$ 205,556	\$ 209,458	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
Outside Services Reimbursement	\$ 15,377	\$ 3,197	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000	\$ 5,000
Connection / Impact Fees	\$ 198,479	\$ 272,000	\$ 200,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
S. Interceptor Impact Fee	\$ 389,164	\$ 4,902	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Interest Income	\$ 15,024	\$ 1,951	\$ 8,407	\$ 13,693	\$ 16,230	\$ 32,348	\$ 31,482	\$ 34,987	\$ 34,508	\$ 37,021	\$ 36,704	\$ 36,850	\$ 36,934	\$ 36,953	\$ 36,905	\$ 36,788	\$ 36,600
TOTAL ACTUAL ANNUAL REVENUE	\$ 2,492,924	\$ 2,247,195	\$ 2,180,053	\$ 2,150,011	\$ 5,119,657	\$ 2,305,412	\$ 3,776,805	\$ 3,184,947	\$ 4,091,257	\$ 3,404,622	\$ 3,519,374	\$ 3,529,499	\$ 3,539,561	\$ 3,549,559	\$ 3,559,489	\$ 3,569,351	\$ 3,579,141
EXCESS REVENUE FOR THIS FISCAL YEAR	\$ 1,220,501	\$ 1,133,429	\$ 1,057,095	\$ 507,401	\$ 3,223,632	\$ (173,167)	\$ 701,023	\$ (95,845)	\$ 502,529	\$ (63,360)	\$ 29,203	\$ 16,750	\$ 3,840	\$ (9,537)	\$ (23,390)	\$ (37,729)	\$ (52,562)
CARRYOVER FROM PREVIOUS YEAR	\$ -	\$ -	\$ 1,681,479	\$ 2,738,574	\$ 3,245,975	\$ 6,469,607	\$ 6,296,440	\$ 6,997,463	\$ 6,901,619	\$ 7,404,147	\$ 7,340,787	\$ 7,369,991	\$ 7,386,741	\$ 7,390,581	\$ 7,381,044	\$ 7,357,653	\$ 7,319,925
TOTAL AVAILABLE CARRYOVER	\$ 1,681,479	\$ 1,133,429	\$ 2,738,574	\$ 3,245,975	\$ 6,469,607	\$ 6,296,440	\$ 6,997,463	\$ 6,901,619	\$ 7,404,147	\$ 7,340,787	\$ 7,369,991	\$ 7,386,741	\$ 7,390,581	\$ 7,381,044	\$ 7,357,653	\$ 7,319,925	\$ 7,267,363
REVENUE DETAILS																	
Equivalent Meters Added Per Year	25																
Monthly Usage per Meter (gallons)	3,257																
Estimated Number of Equivalent Meters	3,823	3,873	3,898	3,923	3,948	3,973	3,998	4,023	4,048	4,073	4,098	4,123	4,148	4,173	4,198	4,223	4,248
Estimated Annual Water Usage (1000 gallons)	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400	190,976,400
ESTIMATED QUARTERLY USER CHARGES																	
Fixed Charges on Debt																	
Actual Monthly Fixed Charge per Equivalent Meter Implemented	\$ 15.91	\$ 15.91	\$ 15.91	\$ 16.47	\$ 17.04	\$ 17.64	\$ 18.26	\$ 30.00	\$ 31.05	\$ 32.14	\$ 33.26	\$ 33.26	\$ 33.26	\$ 33.26	\$ 33.26	\$ 33.26	\$ 33.26
Actual Annual Fixed Charge Revenue Generated	\$ 729,805	\$ 739,351	\$ 744,124	\$ 775,108	\$ 807,350	\$ 840,899	\$ 875,808	\$ 1,448,125	\$ 1,508,125	\$ 1,570,550	\$ 1,635,498	\$ 1,645,476	\$ 1,655,455	\$ 1,665,433	\$ 1,675,412	\$ 1,685,390	\$ 1,695,368
Variable Charges - O, M & R Costs (Cost per 1000 gallons)																	
Actual Variable Charge per 1000 Gallons Implemented	\$ 5.04	\$ 5.04	\$ 5.04	\$ 5.22	\$ 5.40	\$ 5.59	\$ 5.78	\$ 7.00	\$ 7.25	\$ 7.50	\$ 7.76	\$ 7.76	\$ 7.76	\$ 7.76	\$ 7.76	\$ 7.76	\$ 7.76
Actual Annual Variable Charge Revenue Generated	\$ 962,521	\$ 962,521	\$ 962,521	\$ 996,209	\$ 1,031,077	\$ 1,067,164	\$ 1,104,515	\$ 1,336,835	\$ 1,383,624	\$ 1,432,051	\$ 1,482,173	\$ 1,482,173	\$ 1,482,173	\$ 1,482,173	\$ 1,482,173	\$ 1,482,173	\$ 1,482,173
TOTAL ACTUAL MONTHLY USER CHARGE PER RESIDENTIAL USER	\$ 32.33	\$ 32.33	\$ 32.33	\$ 33.46	\$ 34.63	\$ 35.84	\$ 37.10	\$ 52.80	\$ 54.65	\$ 56.56	\$ 58.54	\$ 58.54	\$ 58.54	\$ 58.54	\$ 58.54	\$ 58.54	\$ 58.54
REVENUE GENERATED BY RATES	\$ 1,692,326	\$ 1,701,872	\$ 1,706,645	\$ 1,771,318	\$ 1,838,427	\$ 1,908,064	\$ 1,980,323	\$ 2,784,960	\$ 2,891,749	\$ 3,002,601	\$ 3,117,670	\$ 3,127,649	\$ 3,137,627	\$ 3,147,606	\$ 3,157,584	\$ 3,167,563	\$ 3,177,541
Replacement Fund - Can be used to offset costs	\$ 1,067,078	\$ 1,254,231	\$ 1,254,231	\$ 1,254,231	\$ 1,325,442	\$ 1,396,653	\$ 1,560,419	\$ 1,724,185	\$ 1,917,008	\$ 2,109,831	\$ 2,302,654	\$ 2,495,477	\$ 2,688,300	\$ 2,881,123	\$ 3,073,946	\$ 3,266,769	\$ 3,459,592
Revised Debt Coverage Ratio Calculation					401%	213%	116%	131%	117%	106%	111%	110%	110%	109%	108%	107%	107%

Appendix R

Public Input

Brian Kober

From: Arendt, Michele M <Michele.Arendt@we-energies.com>
Sent: Friday, November 18, 2022 1:39 PM
To: Brian Kober
Cc: Mike Schwab; Jen Keller
Subject: Gas and Electric Easement - WRs 4791347, 4791461 and 4791102
Attachments: 4791347-4791461-4791102VJacksonEAgas-electric.pdf; JacksonTempExA.pdf

Importance: High

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Mr. Kober:

In order to relocate existing gas and electric facilities for the Sysco Road Project located on Cedar Parkway in the Village of Jackson, Washington County, Wisconsin, we will need easement rights prior to installation. I have attached a copy of the easement and the exhibit indicating its location. The exhibit is only temporary until the equipment has actually been installed and our surveyors complete a final one. Please have the easement signed and notarized in black ink, return the original signed and notarized copy to me at the address below, and retain a copy for your records. The document will be recorded with the office of the Register of Deeds.

For your safety, we will have Diggers Hotline locate underground utilities including natural gas, electric, telephone, cable television, sewer and water. We also need your help to make sure we don't damage any of your privately maintained facilities. To avoid damage to your facilities – such as an underground sprinkler system, electric, propane, sewer and sump pump lines, well, septic system, yard lighting, etc. – please notify us of their location. It is very important that we are aware of these facilities. We Energies and/or its agents are not responsible for damage to your facilities that we are not aware of before our work begins.

If you have any questions, please call me at 262-338-7673. Thank you.

Sincerely,

Michele Arendt
Right of Way Agent
We-Energies
245 Sand Drive
West Bend, WI 53095

Michele.arendt@we-energies.com
262.338.7673

**DISTRIBUTION EASEMENT
ELECTRIC AND GAS**

Document Number

WR NO. **4791347, 4791461 & 4791102** IO NO. **75675**

For good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, **VILLAGE OF JACKSON**, hereinafter referred to as "Grantor", owner of land, hereby grants and warrants to **WISCONSIN ELECTRIC POWER COMPANY, a Wisconsin corporation and WISCONSIN GAS LLC, a Wisconsin limited liability company, both doing business as We Energies**, hereinafter referred to as "Grantee", a permanent easement upon, within, beneath, over and across a part of Grantor's land hereinafter referred to as "easement area".

The easement area is described as strips of land 12 feet in width being a part of **Outlot 2 of Certified Survey Map No. 4407** as recorded in the office of the Register of Deeds for Washington County in Volume 29 on Page 165 as Document No. 681135 and being a part of the Southeast 1/4 of the Northeast 1/4 of Section 24, Township 10 North, Range 19 East in the Village of Jackson, Washington County, Wisconsin.

The location of the easement area with respect to Grantor's land is as shown on the attached drawing, marked Exhibit "A", and made a part of this document.

RETURN TO:
We Energies
PROPERTY RIGHTS & INFORMATION GROUP
231 W. MICHIGAN STREET, ROOM P277
PO BOX 2046
MILWAUKEE, WI 53201-2046

V3-030300B
(Parcel Identification Number)

- 1. Purpose:** The purpose of this easement is to construct, install, operate, maintain repair, replace and extend underground utility facilities, conduit and cables, electric pad-mounted transformers, concrete slabs, power pedestals, riser equipment, terminals and markers, together with all necessary and appurtenant equipment under and above ground, as well as pipeline or pipelines with valves, tieovers, main laterals and service laterals, together with all necessary and appurtenant equipment under and above ground, including cathodic protection apparatus used for corrosion control, as deemed necessary by Grantee, for the transmission and distribution of electric energy, signals, television and telecommunications services; natural gas and all by-products thereof, or any liquids, gases, or substances which can or may be transported or distributed through a pipeline, including the customary growth and replacement thereof. Trees, bushes, branches and roots may be trimmed or removed so as not to interfere with Grantee's use of the easement area.
- 2. Access:** Grantee or its agents shall have the right to enter and use Grantor's land with full right of ingress and egress over and across the easement area and adjacent lands of Grantor for the purpose of exercising its rights in the easement area.
- 3. Buildings or Other Structures:** Grantor agrees that no structures will be erected in the easement area or in such close proximity to Grantee's facilities as to create a violation of all applicable State of Wisconsin electric and gas codes or any amendments thereto.
- 4. Elevation:** Grantor agrees that the elevation of the ground surface existing as of the date of the initial installation of Grantee's facilities within the easement area will not be altered by more than 4 inches without the written consent of Grantee.
- 5. Restoration:** Grantee agrees to restore or cause to have restored Grantor's land, as nearly as is reasonably possible, to the condition existing prior to such entry by Grantee or its agents. This restoration, however, does not apply to any trees, bushes, branches or roots which may interfere with Grantee's use of the easement area.
- 6. Exercise of Rights:** It is agreed that the complete exercise of the rights herein conveyed may be gradual and not fully exercised until some time in the future, and that none of the rights herein granted shall be lost by non-use.
- 7. Binding on Future Parties:** This grant of easement shall be binding upon and inure to the benefit of the heirs, successors and assigns of all parties hereto.

8. **Easement Review:** Grantor acknowledges receipt of materials which describe Grantor's rights and options in the easement negotiation process and furthermore acknowledges that Grantor has had at least 5 days to review this easement document *or* voluntarily waives the five day review period.

Grantor:

VILLAGE OF JACKSON

By _____

(Print name and title): _____

By _____

(Print name and title): _____

Personally came before me in _____ County, Wisconsin on _____, 2022,
the above named _____, the _____
and _____, the _____
of the VILLAGE OF JACKSON, for the municipal corporation, by its authority, and pursuant to Resolution File
No. _____ adopted by its _____ on _____, 2022.

Notary Public Signature, State of Wisconsin

Notary Public Name (Typed or Printed)

(NOTARY STAMP/SEAL)

My commission expires _____

This instrument was drafted by Michele Arendt on behalf of Wisconsin Electric Power Company, PO Box 2046, Milwaukee, Wisconsin 53201-2046.

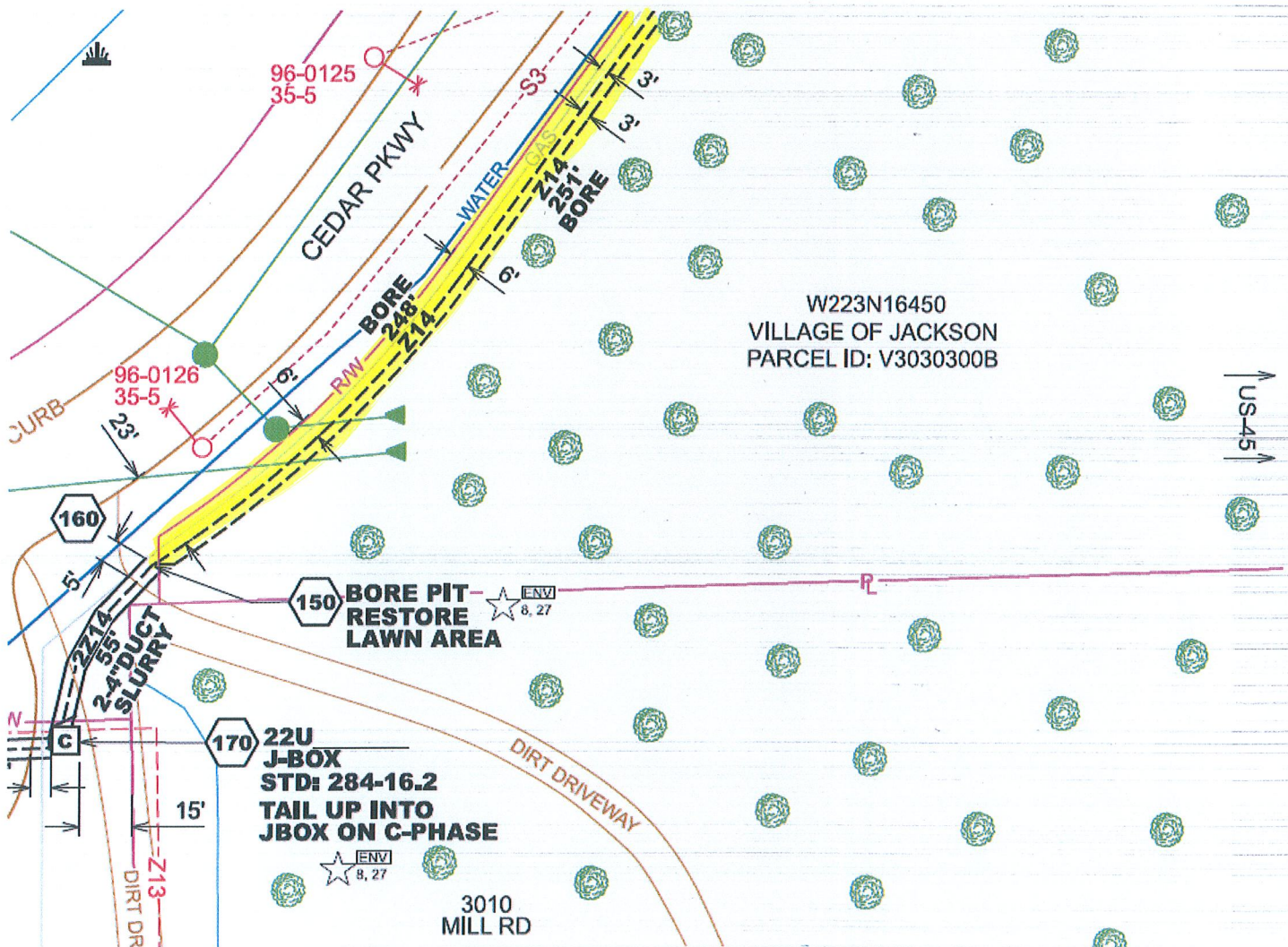
TEMPORARY EXHIBIT A

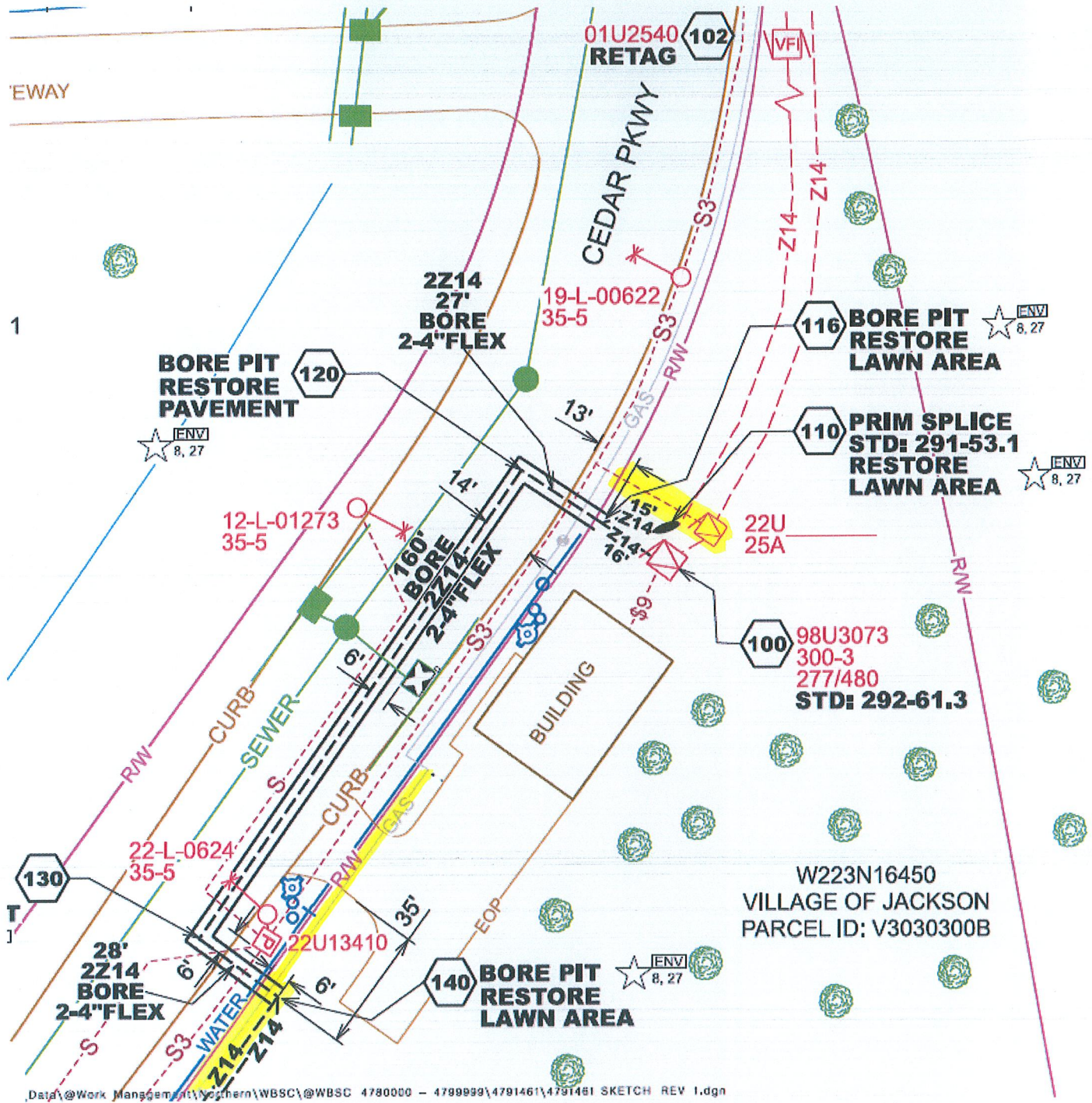
 = Proposed Easement Area



WRs 4791347, 4791102, 4791461

Page 1 of 2





Memo

To: Board of Public Works

From: Brian W. Kober, P. E., Director of Public Works 

Subject: Painting Public Works/Water Department Building in 2023

Date: November 22, 2022

CC:

The 2023 Budgets for the Streets and Water Utility have funding for painting the exterior of the Public Works/Water Department Building. We have been looking for a painter and found a professional Village resident to paint the building.

The proposal is very reasonable in price and includes the following: power washing and painting. We own a boom lift so the cost to paint the building would be \$12,000.00.

We are seeking approval now, so the project is placed on Independence Painting, LLC schedule in 2023. Independence Painting, LLC had no openings this year (2022) to schedule the project.

If you have any questions, please let me know.

Brian W. Kober, P.E.

Independence Painting LLC

Freeing you from your painting problems

Village of Jackson - DPW building exterior proposal

From

Tom Scherwinski
Independence Painting LLC
W197 N16477 Hawthorn Cir.
Jackson, WI 53037

To

Russell Krueger
Village of Jackson DPW

Russ,

I propose to furnish labor and materials for the following work at the Department of Public Works building:

- Power wash all light colored corrugated metal siding that is to be painted. TSP will be used to clean all aluminum oxide off of the siding to assure good adhesion of the topcoat.

- Paint all light colored corrugated metal siding on the building with Sherwin Williams *Waterbourne alkyd urethane* exterior semi-gloss metal coating.

Total time estimate for this project: **150 hours @ \$70.00 per hour = \$10,500.00 + \$1,500.00 in materials = \$12,000.00 + \$1,000.00 for boom rental = \$13,000.00.**

Thank you for this opportunity and I look forward to working with you in the future.

Sincerely,

Tom Scherwinski
Owner/Independence Painting LLC
(262) 347-8736

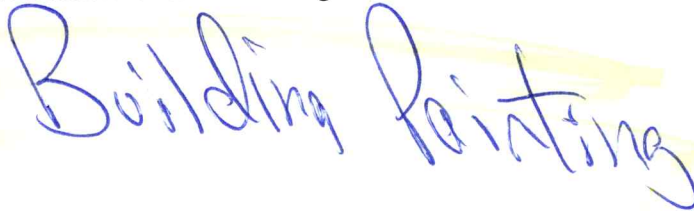
Russell Krueger

From: Tom Scherwinski <tomscherwinski1@gmail.com>
Sent: Friday, September 16, 2022 2:47 PM
To: Russell Krueger
Subject: Re: Independence Painting LLC

Sounds great Russ. If you contact me by text or phone call you'll get me every time (262) 347-8736. I can swing through there sometime next week to have a conversation for sure. Have a great weekend!

Tom

Sent from my iPhone



On Sep 16, 2022, at 8:14 AM, Russell Krueger <russell.krueger@villageofjacksonwi.gov> wrote:

Tom we would like to have you come and take a look at painting the west side of building and possibly the north and south sides as well. When you have chance would you give me a call so we can set up a time and look at some options and get your thoughts on painting. 262-677-0707 Russell Krueger

From: Tom Scherwinski <tomscherwinski1@gmail.com>
Sent: Wednesday, June 15, 2022 11:47 AM
To: Russell Krueger <russell.krueger@villageofjacksonwi.gov>
Subject: Independence Painting LLC

Good afternoon Russ,

My name is Tom Scherwinski. I contacted you a couple of weeks back to inquire about the Village's painting needs. I own Independence Painting LLC and have worked in the commercial painting sector for decades.

I would be very interested in painting for the Village for various reasons. Firstly, I live in the Village of Jackson. As such, I see the buildings that I would be working on on a daily basis. I would love to be able to lend my expertise in the maintenance and beautification of my community. Secondly, I see a need for my services. Certain buildings in the Village have exterior paint issues that need attention from a maintenance standpoint. Painting left undone causes permanent damage.

I work at an hourly rate of \$70.00 per hour. I feel that this is a great bargain for municipalities like the Village in that I provide all necessary insurance, worker's comp, salaries and benefits to my employees from this rate. Then, when the project is completed, I cease to cost the Village a penny. In essence, I'm there when you need me and gone when you don't.

I currently serve the School District of Menomonee Falls, Arrowhead Union School District, Waukesha County Technical College, Waukesha County, Sussex Hamilton School District, and Slinger School District along with other smaller clients. I'm confident that my company could handle all the Village's painting needs.

Here are some contacts from these accounts for reference:

- Waukesha County Technical College: Christine Mauer. (262) 691-5366, cmauer@wctc.edu
- Waukesha County: Jeff Lisiecki. (262) 548-7061, jlisiecki@waukeshacounty.gov
- School District of Menomonee Falls: Rick Fechter. (262) 483-3566, fechric@sdmfschools.org

Thank you for your time today. As I've said, I'd love to have the opportunity to do some small project with you to establish a relationship and show you what my company is capable of. Have a great day, I hope to hear from you soon!

Regards,

Tom Scherwinski

Owner/Independence Paitning LLC

(262)347-8736

Memo

To: Board of Public Works

From: Brian W. Kober, P. E., Director of Public Works 

Subject: New Overhead Door – Street Department

Date: November 22, 2022

CC:

The 2023 Budget for the Streets/Parks Department has funding for installation of another overhead garage door. The framing for the door was original done in 2017, and when the door was needed a budget amount would be created for the installation. The budgeted amount is \$25,000.00.

Reliable Door and Dock, Inc. is a Village of Jackson company and has installed all our doors at the Public Works building. Also, Reliable Door installed the doors at the Municipal Complex Building.

The uncertainty of the market, material delivery, and the rate of inflation are concerns to approve the proposal now with the proposed cost. The cost of the door installation is \$23,635.50.

If you have any questions, please let me know.

Brian W. Kober, P.E.



N173 W21130 Northwest Passage Way
Jackson, WI 53037

4745 W. 136th Street
Crestwood, IL 60418

Estimate Number: Q331757
Reference: New OH Door
Date: 10/11/2022
Account No: 815867
Terms: Net 15 Days
Customer PO:
Sales Rep: John Lanser
262-525-8577
JLanser@RDoor.com

Billing Address

Village Of Jackson - DPW
W194N16660 Eagle Dr
Jackson, WI 53037-9797

Service Address

Village Of Jackson - DPW
W194N16660 Eagle Dr
Jackson, WI 53037-9797
Russell Krueger
414-640-7951
russell.krueger@villageofjacksonwi.gov

REQUEST

QJL840 - New Overhead Door

Qty	Description	Price	Extended
	Thank you for the opportunity to quote the following:		
1.00	Clopay Garage Door - Model 3724 - Complete door and track - 20'2"x14' - Polyurethane Insulated - R18 - 2 windows in section 3 - 24"x12" - White - 3" high lift track - 12" high lift - weather seal - radio controlled 4-button remote - Liftmaster J501 Jackshaft operator - 3 button O/C/S control station		
1.00	Price Includes Installation, Materials and Tax		\$13,848.00
1.00	Freight - actual freight cost TBD at time of order		\$500.00
1.00	*Man-Lift Equipment Rental - If Customer Supplies Lift Equipment.....Subtract: \$375		\$375.00
1.00	Subcontractor - Brand Construction Scope of work - New Door Opening - Cut out and trim 20' x 14' door opening in existing door frame. Utilize 14' steel sections to patch dented areas of building. Labor and materials and man lift rental.		\$8,912.50
All permits, bonds, licenses needed for a job and or location will be responsibilities of Owner or Owners of said property. B.C.. cannot be held responsible for any fines or penalties due to lack of permits, license or bonds. Bids are good for 30 days. Work must be booked within 60 days of bid. Terms of payment are 30 days from Invoice date. Finance charges. will be applied at 18% annual. Additional \$200			

10/11/2022

1:26:58PM

Remit to: PO Box 278, Jackson, WI 53037

REQUEST

QJL840 - New Overhead Door

Reliable Door And Dock, Inc.**Quote: Q331757**

Qty	Description	Price	Extended
-----	-------------	-------	----------

charge under 450 s.f. To indemnify and hold harmless B.C. LLC and employees, officers from ,against any and all rights, demands,suits, liabilities, damages, costs arising from acts of customer,sales co.,any vendors working on site.. B.C.is not responsible for the locating or repairing of any unknown underground utilities or obstacles, such as electrical, phone, water, gas or sewer damaged in the coarse of our demolition or construction. If down time does occur for reasons beyond B.C control., B.C. will be reimbursed for all time at \$150.00 per hour per man, plus materials. Certificate of Ins. additional names \$75.00 pr name charge if applicable. NOVEMBER 1st-APRIL 30th, ADDITIONAL COST MAY OCCUR FOR WINTER PROTECTION. No Safety meeting in this pricing. Estimates will be null/void if prints/verbiage change from original. Work must be completed within 90 days of PO date
** NOTE: DUE TO VOLATILITY IN STEEL PRICES, EQUIPMENT MAY BE SUBJECT TO SURCHARGES **

RDD INSTALLATION INCLUDES:

- o Complete Mechanical Installation
- o Install During Normal Business Hours (M-F 7:00 am to 4:00pm)
- o Equipment Start-Up, Testing and Training
- o Offloading & Staging Onsite
- o Lift Equipment (Fork Truck/Scissor Lift) with Required Height of 19'

NOT INCLUDED (CUSTOMER RESPONSIBLE FOR):

- o Onsite Dumpster for Disposal
- o Additional costs related to safety training and/or additional customer required safety procedures outside of RDD's standard safety policies
- o Removal of Existing Equipment
- o Any and All Electrical Including:
 - o High Voltage Connections
 - o Low Voltage & Safety Device Connections
 - o Electrical conduit
 - o Customer to supply electrical disconnect within 3 feet of operator

RDD ELECTRICAL ACKNOWLEDGEMENT (Only if Electrical is Included by RDD):

- o All main power and disconnects are to be provided by others. The main power is to be pulled and terminated into the new equipment control box or fused disconnect located within 3 feet of door opening by others.
- o RDD will complete remaining field wiring and terminate all connections in the new equipment control box or J-box to the new equipment and all activators, limit switches etc.
- o Conduit provided will be EMT type and/or flex. No rigid type conduit, explosion proof or special NEMA rated connections will be provided by RDD unless specifically called out in this proposal. Low voltage wiring will not be run in conduit.

10/11/2022

1:26:58PM

Remit to: PO Box 278, Jackson, WI 53037

REQUEST

QJL840 - New Overhead Door

Reliable Door And Dock, Inc.

Quote: Q331757

Qty	Description	Price	Extended
-----	-------------	-------	----------

Customer Scope of Work Acceptance: _____
Date: _____

Total: \$23,635.50

Authorized By:

Print Name

10/11/2022

1:26:58PM

Remit to: PO Box 278, Jackson, WI 53037

Addendum

**Reliable Door and Dock Reserves the Right to Revise this Estimate for Any Unforeseen Labor and/or Material Costs Prior to Installation*

Addendum:

- o Equipment, freight, tax and mechanical installation included (no installation included if quoted as "parts only").
- o Any and all building permits, if necessary, by others.
- o Need space requirements on specification sheet for installation. Any obstructions to be removed by owner, unless purchased as an option.
Any & all wall/structural work by owner unless called out in scope of work.
- o Ready access must be made available.
- o Door and area to be clear of traffic during installation.
- o All contracts subject to Reliable Door & Dock, Inc.'s contract specific addendum.
- o This price quote is subject to change at any time before: (a) all open questions and issues are fully answered and agreed to by both parties; (b) sign-off of complete OEM approval drawings is received by RDD; and (c) RDD returns a fully signed and executed contract (if applicable). RDD providing approval drawings and submittals is a continuation of the proposal process and does not constitute RDD's acceptance of customer terms and conditions. RDD specifically rejects and shall not be bound by any customer terms and conditions unless an until RDD returns a fully signed and executed contract.



Note: If installation is listed in this proposal, the equipment is considered real property improvement; therefore, is not taxable to you, as the customer. RDD is responsible for remitting any taxes to the state. If installation is not included in this proposal, RDD will be adding sales tax to the invoice unless a valid exemption certificate is provided.

***Terms & Conditions: 50% Down at The Time of Sales and 50% Due Net 30 Days at The Time of Invoice**

Terms of quoting and sale are according to RDD Terms and Conditions found on our website, <https://www.rdoor.com>. RDD's acceptance of Buyer's order is expressly conditioned on Buyer's acceptance of the terms and conditions contained therein. RDD hereby rejects any additional or contrary terms and conditions provided by Buyer in its purchase order, acknowledgement, contract, or other documents provided, unless specifically agreed to in writing by an officer of RDD.

THANK YOU FOR YOUR BUSINESS!

10/11/2022

1:26:58PM

Remit to: PO Box 278, Jackson, WI 53037

Reliable Door and Dock Warranty

Reliable Door and Dock, Inc. ("RDD") warrants that RDD labor shall be free from defects in workmanship for the warranty period of: (a) sixty (60) days for trouble-shooting, repair, part or component replacement, or other general service work ("Service Work"); or (b) twelve (12) months for installation of new equipment ("Installation Work"). The warranty period begins on the date the labor was performed for Service Work or the date that installation was completed by RDD for Installation Work.

RDD does not independently warrant the materials or equipment we install for either Service Work or Installation Work. Instead, RDD passes the original equipment manufacturer ("OEM") warranty for all materials and equipment installed, to the extent permitted. RDD will facilitate warranty claims to the OEM, but ultimately it is up to the OEM to honor their warranty.

RDD's sole obligation under this warranty is to repair or replace, at RDD's sole discretion, any work which is defective. No such repair or replacement will extend the applicable warranty period. No claims under this warranty shall be valid unless RDD is notified in writing of the defect within a reasonable time following its discovery, but in no event later than the expiration of the applicable warranty period. When a warranty claim arises, customer must contact RDD to arrange for repair.

This warranty does not cover ordinary wear and tear, vandalism, abuse, misuse, overloading, altered equipment, equipment or parts which have not been properly operated or maintained or which have been improperly serviced or adjusted by others, or damages caused by failure to follow the maintenance or operation procedures outlined in the applicable owner's manual or in technical information issued by the original equipment manufacturer.

The remedy of repair or replacement provided for herein is the sole and exclusive remedy for breach of the above limited warranty. If such remedy fails its essential purpose, RDD's liability shall be limited to a refund of the purchase price paid by the customer for the subject labor.

THE ABOVE LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, AND THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE FACE HEREOF, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

RDD WILL NOT BE LIABLE UNDER ANY CIRCUMSTANCES FOR ANY INDIRECT, PUNITIVE, INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES, INCLUDING WITHOUT LIMITATION ANY LOST PROFITS, LABOR COSTS, MATERIAL COSTS, OR PENALTIES ARISING FROM THE SALE, USE OR INSTALLATION OF THE GOODS, FROM ANY BREACH OF CONTRACT OR WARRANTY (EXPRESSED OR IMPLIED) OR OTHERWISE BASED ON CONTRACT TERMS OF ANY NATURE, AND REGARDLESS OF ANY ADVICE OR REPRESENTATIONS THAT MAY HAVE BEEN RENDERED BY RDD CONCERNING THE SALE, USE OR INSTALLATION OF THE GOODS. IN ADDITION, IN NO EVENT SHALL RDD BE LIABLE IN CONNECTION WITH AN AMOUNT THAT EXCEEDS THE PAYMENTS RDD HAS RECEIVED FOR THE GOODS SOLD AND SERVICES PERFORMED FOR THE SUBJECT EQUIPMENT. RDD SHALL NOT BE SUBJECT TO BACK-CHARGES, OFF-SETS, OR CREDITS WITHOUT THE EXPRESS WRITTEN PERMISSION OF AN OFFICER OF RDD.

Revision 12/31/15B





Memo

To: Board of Public Works

From: Brian W. Kober, P. E., Director of Public Works 

Subject: Purchase of UW56 Toolcat Utility Work Machine

Date: November 22, 2022

CC: Village Board

The 2023 Budgets for the Streets Department has funding for the purchase of the Bobcat UW56 Toolcat Utility Work Machine. The unit would compliment the current Bobcat Skid loader. The Toolcat has more versatility specifically with plow operation. We would be able to blow/plow snow and salt sidewalks/paths in the same operation. The Toolcat can use all the existing attachments used by the Bobcat skid loader.

Another operation is summer spraying would be done more efficiently with the Toolcat unit instead of using the ball groomer machine. The ball groomer machine has been modified for spraying, but not the best piece of equipment for spraying. We use the equipment we have at the time.

The total purchase price is \$85,724.00.

If you have any questions, please let me know.

Brian W. Kober, P.E.

UW56 Toolcat Utility Work Machine



Our work requires power and precision. The UW56 gives you the perfect balance of both.

- Efficient Bobcat® Tier 4 engine
- Variable-flow hydraulics
- All-wheel steer
- Operator-friendly controls

[Build & Quote](#)

[Contact Dealer](#)

[View Offers](#)

[Find Dealer](#)

[Download Brochure](#)



UW56 Overview

- The UW56 Toolcat™ puts power in your hands to operate more than 45 attachments for unmatched versatility.
- The efficient Tier 4 engine delivers the performance you need while reducing and simplifying routine maintenance. It also improves cold-weather operation and includes a variety of features that make maintenance and service more convenient.
- The updated drive response system, with two drive modes, makes it easy to adjust between traveling and working.
- An integrated 5-inch display shows the updated SAE standard fault code format for improved diagnostics.

UW56 Specifications

[Show more](#)



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material handling equipment, power

trademarks of Bobcat Company in



Product Quotation

Quotation Number: 35762D036479

Date: 2022-08-23 11:55:40

Ship to	Bobcat Dealer	Bill To
Village of Jackson Attn: Jeff N168 W20733 Main Street Jackson, WI	Bobcat Plus, Inc, Butler, WI 12411 WEST SILVER SPRING DRIVE BUTLER WI 53007-1002 Phone: (262) 781-1199 Fax: (262) 781-0735 ----- Contact: Mark Dow Fax: 262-781-0735 Cellular: 262-307-6993 E Mail: mdow@bobcatplus.com	Village of Jackson Attn: Jeff N168 W20733 Main Street Jackson, WI

Description	Part No	Qty	Price Ea.	Total
Bobcat UW56	M1225	1	\$66,582.00	\$66,582.00
Adjustable Vinyl Seats	Hydraulic Dump Box			
All-Wheel Steer	Instrumentation: Standard 5" Display with Keyless Start,			
Automatically Activated Glow Plugs	Engine Temperature and Fuel Gauges, Hour meter, RPM			
Auxiliary Hydraulics	and Warning Indicators. Includes maintenance interval			
Variable Flow with dual direction detent	notification, fault display, job codes, quick start, and			
Beverage Holders	security lockouts.			
Bob-Tach	Joystick, Manually Controlled with Lift Arm Float			
Boom Float	Lift Arm Support			
Cargo Box Support	Parking Brake, automatic			
Cruise Control	Power Steering with Tilt Steering Wheel			
Speed Management	Radiator Screen			
Enclosed Cab with HVAC	Rear Receiver Hitch			
Dual Port USB charger	Seat Belts, Shoulder Harness			
Lower Engine Guard	Spark Arrestor Muffler			
Limited Slip Transaxle	Suspension, 4-wheel independent			
Engine and Hydraulic Monitor with Shutdown	Tires: 27 x 10.5-15 (8 ply), Lug Tread			
Front LED Work Lights	Toolcat Interlock Control System (TICS)			
Full-time Four-Wheel Drive	Two-Speed Transmission			
Horsepower Management	Machine Warranty: 12 Months, unlimited hours			
Roll Over Protective Structure (ROPS) . Meets Requirements	Bobcat Engine Warranty: Additional 12 Months or total			
of SAE-J1040 & ISO 3471	of 2000 hours after initial 12 month warranty			
Falling Object Protective Structure (FOPS) . Meets				
Requirements of SAE-J1043 & ISO3449, Level I				
Dome Light				
29 X 10.5 Trac Tire	M1225-R05-C04	1	\$546.00	\$546.00
Deluxe Road Package	M1225-P01-C01	1	\$2,895.00	\$2,895.00
Deluxe Road Package includes: Backup Alarm, Turn Signals,				
Flashers, Tail Lights, Brake Lights, Rear view mirror, Side				
Mirrors, Horn, Rear work lights, and headlights				
High Flow Package	M1225-R03-C02	1	\$1,736.00	\$1,736.00
Heavy Duty Battery	M1225-R07-C02	1	\$97.00	\$97.00
Attachment Control	M1225-R08-C02	1	\$236.00	\$236.00
Power Bob-Tach	M1225-R14-C03	1	\$1,099.00	\$1,099.00
Radio Option	M1225-R15-C02	1	\$533.00	\$533.00
Traction Control	M1225-R16-C02	1	\$545.00	\$545.00
Engine Block Heater	M1225-A01-C02	1	\$130.00	\$130.00
Interior Trim	M1225-A01-C04	1	\$205.00	\$205.00
Rear Camera Kit, Frame Mounted	7432524	1	\$662.00	\$662.00
Strobe Light	7424783	1	\$221.00	\$221.00
68" Standard Duty Bucket	7272771	1	\$1,108.00	\$1,108.00

Description

29" Turf Tires and Rims

Part No

Total for this Machine

\$76,595.00**Qty Price Ea.****Total**

1 \$2,340.00

\$2,340.00

Total for these items

\$2,340.00

Total of Items Quoted

\$78,935.00

Dealer P.D.I.

\$150.00

Freight Charges

\$1,480.00

Dealer Assembly Charges

\$143.00

Other Charges: Material and Logistics

\$5,016.00

Quote Total - US dollars

\$85,724.00**Notes:**

All prices subject to change without prior notice or obligation. This price quote supersedes all preceding price quotes.

Customer Acceptance:

Purchase Order: _____

Authorized Signature:**Print:** _____ **Sign:** _____ **Date:** _____**Finance Worksheet**

QuoteFinance

Public Works Report

November 29, 2022

Treatment Plant - Designed Capacity – 1.67 million gallons per day
Peak Flow Capacity – 6.0 million gallons per day

Year 2020

January	Avg. Flow 1.280 MGD	Min. Flow 1.055 MGD	Max. 1.720 MGD
February	Avg. Flow 1.221 MGD	Min. Flow 1.000 MGD	Max. 1.630 MGD
March	Avg. Flow 1.581 MGD	Min. Flow 1.010 MGD	Max. 2.290 MGD
April	Avg. Flow 1.283 MGD	Min. Flow 940,000 g.p.d.	Max. 2.210 MGD
May	Avg. Flow 1.607 MGD	Min. Flow 1.010 MGD	Max. 4.090 MGD
June	Avg. Flow 1.178 MGD	Min. Flow 980,000 g.p.d.	Max. 1.510 MGD
July	Avg. Flow 1.269 MGD	Min. Flow 800,000 g.p.d.	Max. 2.370 MGD
August	Avg. Flow 1.042 MGD	Min. Flow 760,000 g.p.d.	Max. 1.510 MGD
September	Avg. Flow 1.148 MGD	Min. Flow 810,000 g.p.d.	Max. 1.850 MGD
October	Avg. Flow 1.172 MGD	Min. Flow 870,000 g.p.d.	Max. 2.210 MGD
November	Avg. Flow 1.122 MGD	Min. Flow 860,000 g.p.d.	Max. 1.770 MGD
December	Avg. Flow 1.164 MGD	Min. Flow 940,000 g.p.d.	Max. 1.480 MGD

Year 2021

January	Avg. Flow 1.075 MGD	Min. Flow 880,000 g.p.d.	Max. 1.460 MGD
February	Avg. Flow 1.015 MGD	Min. Flow 830,000 g.p.d.	Max. 1.590 MGD
March	Avg. Flow 1.525 MGD	Min. Flow 1.160 MGD	Max. 1.970 MGD
April	Avg. Flow 1.264 MGD	Min. Flow 1.020 MGD	Max. 1.950 MGD
May	Avg. Flow 1.108 MGD	Min. Flow 880,000 g.p.d.	Max. 1.450 MGD
June	Avg. Flow 1.091 MGD	Min. Flow 810,000 g.p.d.	Max. 1.670 MGD
July	Avg. Flow 983,226 g.p.d.	Min. Flow 780,000 g.p.d.	Max. 1.410 MGD
August	Avg. Flow 1.281 MGD	Min. Flow 800,000 g.p.d.	Max. 2.530 MGD
September	Avg. Flow 932,333 g.p.d.	Min. Flow 710,000 g.p.d.	Max. 1.170 MGD
October	Avg. Flow 930,000 g.p.d.	Min. Flow 770,000 g.p.d.	Max. 1.140 MGD
November	Avg. Flow 853,667 g.p.d.	Min. Flow 720,000 g.p.d.	Max. 970,000 g.p.d.
December	Avg. Flow 952,581 g.p.d.	Min. Flow 720,000 g.p.d.	Max. 1.330 MGD

Year 2022

January	Avg. Flow 839,968 g.p.d.	Min. Flow 720,000 g.p.d.	Max. 960,000 g.p.d.
February	Avg. Flow 848,571 g.p.d.	Min. Flow 710,000 g.p.d.	Max. 1.080 MGD
March	Avg. Flow 1.499 MGD	Min. Flow 890,000 g.p.d.	Max. 3.910 MGD
April	Avg. Flow 2.245 MGD	Min. Flow 1.200 MGD	Max. 4.100 MGD
May	Avg. Flow 1.237 MGD	Min. Flow 850,000 g.p.d.	Max. 2.070 MGD
June	Avg. Flow 1.438 MGD	Min. Flow 780,000 g.p.d.	Max. 3.680 MGD
July	Avg. Flow 1.141 MGD	Min. Flow 760,000 g.p.d.	Max. 2.370 MGD
August	Avg. Flow 1.139 MGD	Min. Flow 810,000 g.p.d.	Max. 1.920 MGD
September	Avg. Flow 1.395 MGD	Min. Flow 780,000 g.p.d.	Max. 4.160 MGD
October	Avg. Flow 920,322 g.p.d.	Min. Flow 760,000 g.p.d.	Max. 1.130 MGD

Years Summary of Water Consumption

2006 Total Pumpage 207,719,000 gallons	2007 Total Pumpage 217,224,000 gallons
2008 Total Pumpage 229,613,000 gallons	2009 Total Pumpage 231,160,000 gallons
2010 Total Pumpage 239,326,000 gallons	2011 Total Pumpage 240,268,000 gallons
2012 Total Pumpage 253,492,000 gallons	2013 Total Pumpage 228,371,000 gallons
2014 Total Pumpage 230,973,000 gallons	2015 Total Pumpage 222,621,000 gallons
2016 Total Pumpage 254,531,000 gallons	2017 Total Pumpage 251,387,000 gallons
2018 Total Pumpage 241,322,000 gallons	2019 Total Pumpage 253,427,000 gallons
2020 Total Pumpage 259,413,000 gallons	2021 Total Pumpage 242,216,000 gallons

Year 2020

Jan.	Avg.	662,650 g.p.d.	Highest Day 769,000 gals.	Total	20,542,000 gallons
Feb	Avg.	682,280 g.p.d.	Highest Day 886,000 gals.	Total	19,786,000 gallons
March	Avg.	702,030 g.p.d.	Highest Day 837,000 gals.	Total	21,763,000 gallons
April	Avg.	731,070 g.p.d.	Highest Day 1.153 MGD	Total	21,932,000 gallons
May	Avg.	691,030 g.p.d.	Highest Day 915,000 gals.	Total	21,422,000 gallons
June	Avg.	806,030 g.p.d.	Highest Day 1.057 MGD	Total	24,181,000 gallons
July	Avg.	841,970 g.p.d.	Highest Day 1.431 MGD	Total	26,101,000 gallons
August	Avg.	878,710 g.p.d.	Highest Day 1.437 MGD	Total	27,240,000 gallons
Sept	Avg.	696,370 g.p.d.	Highest Day 1.058 MGD	Total	20,891,000 gallons
October	Avg.	677,160 g.p.d.	Highest Day 963,000 gals.	Total	20,992,000 gallons
Nov	Avg.	567,100 g.p.d.	Highest Day 850,000 gals.	Total	17,013,000 gallons
Dec	Avg.	566,130 g.p.d.	Highest Day 815,000 gals.	Total	17,550,000 gallons

Year 2021

Jan.	Avg.	565,650 g.p.d.	Highest Day 789,000 gals.	Total	17,535,000 gallons
Feb	Avg.	517,650 g.p.d.	Highest Day 913,000 gals.	Total	16,047,000 gallons
March	Avg.	583,770 g.p.d.	Highest Day 1.303 MGD	Total	18,097,000 gallons
April	Avg.	642,770 g.p.d.	Highest Day 1.190 MGD	Total	19,283,000 gallons
May	Avg.	659,610 g.p.d.	Highest Day 1.103 MGD	Total	20,448,000 gallons
June	Avg.	825,730 g.p.d.	Highest Day 1.311 MGD	Total	24,772,000 gallons
July	Avg.	750,190 g.p.d.	Highest Day 1.529 MGD	Total	23,256,000 gallons
August	Avg.	768,940 g.p.d.	Highest Day 1.920 MGD	Total	23,837,000 gallons
Sept	Avg.	633,060 g.p.d.	Highest Day 1.775 MGD	Total	19,625,000 gallons
Oct	Avg.	753,030 g.p.d.	Highest Day 1.992 MGD	Total	23,344,000 gallons
Nov	Avg.	619,870 g.p.d.	Highest Day 1.059 MGD	Total	18,596,000 gallons
Dec	Avg.	560,520 g.p.d.	Highest Day 1.167 MGD	Total	17,376,000 gallons

Year 2022

Jan.	Avg.	553,580 g.p.d.	Highest Day 707,000 gals.	Total	17,161,000 gallons
Feb.	Avg.	575,360 g.p.d.	Highest Day 683,000 gals.	Total	16,110,000 gallons
March	Avg.	578,290 g.p.d.	Highest Day 861,000 gals.	Total	17,927,000 gallons
April	Avg.	606,400 g.p.d.	Highest Day 1.084 MGD	Total	18,192,000 gallons
May	Avg.	605,190 g.p.d.	Highest Day 808,000 gals.	Total	18,761,000 gallons
June	Avg.	660,500 g.p.d.	Highest Day 1.034 MGD	Total	19,815,000 gallons
July	Avg.	685,520 g.p.d.	Highest Day 853,000 gals.	Total	21,251,000 gallons
August	Avg.	654,160 g.p.d.	Highest Day 800,000 gals.	Total	20,279,000 gallons
Sept	Avg.	602,170 g.p.d.	Highest Day 727,000 gals.	Total	18,065,000 gallons
October	Avg.	661,390 g.p.d.	Highest Day 1.185 MGD	Total	20,503,000 gallons

Pump Capacity Well #1- 400 g.p.m. Well #3 -900 g.p.m. Well #4 - 1200 g.p.m. Well #5 – 1,100 g.p.m. Well #6 – 800 g.p.m.

WWTP – Holding & Septage Receiving

2005	\$ 87,562.01	2006	\$101,115.11	2007	\$152,201.07	2008	\$210,441.47
2009	\$183,815.34	2010	\$197,653.66	2011	\$220,576.28	2012	\$236,224.70
2013	\$235,336.46	2014	\$203,938.32	2015	\$210,644.47	2016	\$220,473.17
2017	\$232,358.23	2018	\$245,767.74	2019	\$219,822.80	2020	\$204,656.11
2021	\$209,083.10						

2020	Holdings (gals)	Grease (gals)	G Decant (gals)	Septage (gals)	S Decant (gals)	Total Billings
January	1,426,900				71,000	\$11,872.50
February	1,310,500			2,250	88,500	\$12,786.50
March	1,471,600	900		5,000	173,650	\$16,429.05
April	1,263,950			29,000	326,170	\$19,570.85
May	1,168,670			4,450	308,250	\$17,255.86
June	1,253,900			9,900	196,550	\$15,390.45
July	1,459,700			16,450	212,650	\$17,734.10
August	1,148,750			4,250	168,530	\$13,594.50
September	1,276,950			22,700	299,450	\$18,723.35
October	1,372,200	2,200		39,750	456,000	\$24,386.35
November	1,231,850			33,650	301,700	\$18,911.55
December	1,489,450			16,950	160,200	\$16,683.35

2021	Holdings (gals)	Grease (gals)	G Decant (gals)	Septage (gals)	S Decant (gals)	Total Billings
January	1,284,600			6,650	77,250	\$12,507.30
February	1,386,475			3,000	44,450	\$12,338.05
March	1,633,050			27,600	206,050	\$19,457.65
April	1,425,850			38,000	268,500	\$19,829.30
May	1,297,900			34,550	232,100	\$17,740.45
June	1,392,350			52,800	258,500	\$19,977.30
July	1,338,500			31,600	245,050	\$18,256.25
August	1,499,450			31,200	196,250	\$18,305.85
September	1,389,200			23,900	213,400	\$17,524.10
October	1,275,550			16,250	297,260	\$18,367.15
November	1,249,400			22,400	224,200	\$16,608.20
December	1,448,000			32,000	205,900	\$18,171.50

2022	Holdings (gals)	Grease (gals)	G Decant (gals)	Septage (gals)	S Decant (gals)	Total Billings
January	1,311,750	2,700			40,650	\$11,780.25
February	1,321,050	8,000			48,350	\$12,577.15
March	2,076,350	2,000		40,750	303,750	\$26,238.30
April	1,791,650	5,400	1,500	101,700	326,050	\$27,660.95
May	1,703,450		5,200	164,850	288,100	\$28,456.35
June	1,759,050	3,000		100,400	373,050	\$28,348.65
July	1,437,400	2,700		92,100	186,800	\$20,583.70
August	1,670,350	1,200	3,500	63,700	242,850	\$22,560.55
September	1,479,850			73,350	168,950	\$19,363.30
October	1,204,370	3,000	5,500	47,650	253,200	\$18,629.21

CTH P and STH 60 Intersection Project and old Park-n-Lot Property

This is a place holder for the item. We will look to contact WisDOT for a meeting this Fall of 2022.

Morning Meadows Subdivision

Streetlights are being planned by the Village for installation in Phase 1 and 2. Phase 1 and 2 has received the final lift of asphalt. Phase 3 has been put on hold by the Developer. No Change

Little Lambs Subdivision (Glen Brooke Drive)

The Developer/Owner of property has placed the development on hold.

Willow Ridge Drive Reconstruction Project

Streetlights and growing grass are the remaining items. The Village is still holding the retainage of the project.

Spruce Street/Ridgeway Drive Extension Project

We are working on a streetlight layout for the two streets. We have poles, and fixtures, but now the meter pedestals are back ordered for 12 to 40 weeks. No Change.

Eagle Drive & STH 60 Intersection Improvement

Funding has not approved by the State. No working on environmental concerns of the project. One concern is the sizing of the existing two 48-inch culvert pipes crossing Eagle Drive (north). Stormwater modeling is showing the culverts are too small and flooding will occur on Eagle Drive (north). Recommending replacing with two 72-inch pipes. Right now, the discussion has the Village responsible for the large pipe cost. More to come on this matter.

Midwest Fiber Installation

Still waiting for them to start the Fiber to the Home Project. Reviewing Street Opening Permits for the next Phase. Also, working with Midwest on landscaping issues.

Impact Fee Study

Contact has been made with Trilogy Consulting LLC, and they agreed to recognize the agreement signed in 2019. We are starting to collect data and will complete the study by the end of the year. Continuing process.

Stormwater Ponds Management Inspection Program

A pause in the inspections have occurred until the vegetation becomes less in the Fall. Difficult to walk around some ponds. We are using the time to look for pond plans. No change.

Main Street (STH 60) Sewer and Water Replacement

Advanced Construction has been awarded the contract. Design the water main to be replaced in Jackson Drive and scheduling a pre-Preconstruction meeting with the contractor.

CTH P (Sherman Road to STH 60) Utility Project

Starting to work on the design for bidding.

Maple Fields Subdivision

The subdivision has been paved. Next, is We-Energies Utility installation.

Next Generation Housing

The PMT (Project Management Team) is working on concept plans to be submitted for review by all Village Committees.

Respectfully submitted, Brian W. Kober, P.E.