MUSCATINE CITY COUNCIL
IN-DEPTH MEETING
Thursday, April 13, 2023

Brad Bark, Mayor

Dennis Froelich, 1st Ward	Angie Lewis, At Large
Jeff Osborne, 2nd Ward	DeWayne Hopkins, At Large
Peggy Gordon, 3rd Ward	Carol Webb, City Administrator
Nadine Brockert, 4th Ward	Cinda Hilger, Admin. Professional
John Jindrich, 5th Ward	Brent Hinders, City Attorney

City Council meetings are held at 6:00 pm on the 1st and 3rd Thursday of each month, In-depth sessions on the 2nd Thursday of each month. All meetings are available for review on the City of Muscatine YouTube page.
The public is welcome to attend virtually using the information below.

Please join my meeting from your computer, tablet or smartphone.
https://www.gotomeet.me/CityofMuscatine/city-council-meeting

You can also dial in using your phone.
United States: 1-669-224-3412

Access Code: 971-499-597

AGENDA

1. **CALL TO ORDER**

2. **ROLL CALL**

3. **PLEDGE OF ALLEGIANCE**

4. **COUNCIL DISCUSSION ITEMS**
   A. Special Events Process Presentation

B. WRRF Capital Improvement Plan Report - Report on the Capital Improvement Plan for the Water and Resource Recovery Facility, lift stations and levee gatewells.

C. Sewer Rate Study results presentation - A presentation by Bob Veenstra of Veenstra and Kim on the latest Sewer Rate Study.

D. Presentation on the Impact of a Change in State Law on the City's Home Occupation Regulations

E. Potential update to nuisance appeal process

5. MAYOR AND COUNCIL REPORTS

6. ADJOURNMENT

City of Muscatine

ITEM NUMBER 2023-977

DATE: 4/13/2023

IN-DEPTH ITEM - CITY COUNCIL

STAFF

Kelsie Stafford, Program Supervisor
Richard Klimes, Parks and Recreation Director

SUBJECT FOR DISCUSSION

Special Events Process Presentation

EXECUTIVE SUMMARY

The purpose of this item is to provide the City Council with an overview of the process for citizens to host special events on public property.

GENERAL DIRECTION SOUGHT AND SPECIFIC QUESTIONS TO BE ANSWERED

This item is informational, however, City staff welcome any questions City Council may have about the special events process.

BACKGROUND/DISCUSSION

City staff assist with the coordination of 150-200 special events on public property annually. The public property venues available for hosting events include but are not limited to park shelters and open green spaces, Riverview Center, Pearl City Station, Kent Stein Park, Riverfront, general parks, Muscatine Soccer Complex, Muscatine Municipal Golf Course, Muscatine Aquatic Center, public streets, and the Downtown area.

ATTACHMENTS

1. Special Events Process PowerPoint
2. Facility Special Request Form
3. Use of City Property Form
4. Parade Permit Form
5. CARNIVAL LICENSE FORM

Special Event Process

Date: April 13, 2023

Presenter: Kelsie Stafford, Program Supervisor

MUSCATINE

2023 Strategic Plan Focus Areas

- Excellent Customer Service
  - Provide excellent customer service to our residents, businesses, and visitors through effective citizen outreach and engagement, employee training and improved organizational processes
- Vibrant Community
  - Enhance and improve the vitality of our community core and gateways including Grandview Avenue Corridor, Park Avenue Corridor, Riverfront, and Downtown areas to support a thriving economy vibrant neighborhoods, and a high quality of life and place

MUSCATINE

Agenda

1. Discuss citizen process for requesting use of public property
2. Review event forms
3. Discuss City staff's role in approval process

MUSCATINE

Requesting Use of Public Property

- Step 1: Citizen makes contact with City staff
- Step 2: City staff and citizen determine type of event and select appropriate venue
  - 23 venues with 560 acres are available in the Parks and Recreation system
  - Other public property areas are available
- Step 3: Appropriate application is sent to citizen

MUSCATINE

Facility Special Request Form

MUSCATINE PARKS AND RECREATION DEPARTMENT

FACILITY SPECIAL REQUEST FORM

ORGANIZATION: _____

CONTACT PERSON: _____ TITLE: _____

ADDRESS: _____ PHONE: _____(DAY)

_____ _____(EVENING)

EMAIL ADDRESS: _____

LOCATION OF SPECIAL REQUEST: _____

DATE & TIME REQUESTING USE: _____

PLEASE DESCRIBE YOUR REQUEST

_____

_____

_____

_____

MUSCATINE

Use of City Property Form

License #_____
Wallet #_____
Sticker #_____
Receipt #_____
Issued_____
Expires_____

CITY OF MUSCATINE

APPLICATION FOR USE OF ANY STREET, SIDEWALK, ROADWAY, ALLEY, PARK, PUBLIC WAY, PROPERTY OR FACILITY

1. Name and address of applicant and sponsoring organization, if any:

   Address: _____

   Telephone Number: _____

   E-mail Address: _____

2. Type of event that is planned:

3. Proposed location:

MUSCATINE

Parade and Public Assemblies

License #_____
Wallet #_____
Sticker #_____
Receipt #_____
Issued_____
Expires_____

CITY OF MUSCATINE

TITLE 3, CHAPTER 3 AND CHAPTER 4

PARADE AND PUBLIC ASSEMBLIES* APPLICATION

APPLICATION FOR USE OF ANY STREET, SIDEWALK, ROADWAY, ALLEY, PARK, PUBLIC WAY, PROPERTY OR FACILITY

1. Name and address of applicant and sponsoring organization, if any:

   _____

   _____

2. Type of event that is planned:

   _____

   _____

   _____

   _____

3. Proposed location:

   _____

   _____

4. Date(s): _____ Starting Time: _____

   Time the event will begin to assemble: _____

   Expected length of use:_____

5. Expected size of group:_____

MUSCATINE

Carnival/Circus License

LICENSE #
WALLET#
STICKER#
RECEIPT#
ISSUED
EXPIRES

CITY OF MUSCATINE

LICENSE APPLICATION

TITLE 5, CHAPTER 8

CARNIVAL/CIRCUS LICENSE

APPLICANT'S NAME _____

NAME OF CARNIVAL/CIRCUS _____

BUSINESS ADDRESS _____

_____

TELEPHONE _____

PROPOSED LOCATION OF CARNIVAL OR CIRCUS _____

_____

WILL CARNIVAL OR CIRCUS INCLUDE ERECTION OF A TENT FOR USE BY THE PUBLIC? _____

PROPOSED DATES OF OPERATION _____ TO _____

ADDITIONAL REQUIREMENTS:

1. LICENSE FEE $250.00
   (FEE FOR CARNIVAL OR CIRCUS WITH A NON-PROFIT SPONSOR IS $125.00)
2. BOND $5,000
3. INSURANCE CERTIFICATES WITH THE FOLLOWING MINIMUM REQUIREMENTS:

MUSCATINE

Requesting Use of Public Property

- Step 4: Event is added to Special Event Listing after citizen request is made
  - www.muscatineiowa.gov/DocumentCenter/View/879
- Step 5: Citizen returns completed form for approval
- Step 6: Depending on type of event, a pre-event meeting may be scheduled
  - City staff include Police, Fire, Communications, Public Works, Sanitation, Parks and Recreation
- Step 7: Event takes place. If needed, a post-event meeting is scheduled

MUSCATINE

Next Steps

1. City staff will continue to provide excellent customer service to ensure success of special events on public property.

MUSCATINE

MUSCATINE PARKS AND RECREATION DEPARTMENT

FACILITY SPECIAL REQUEST FORM

ORGANIZATION: _____

CONTACT PERSON: _____ TITLE: _____

ADDRESS: _____ PHONE: _____(DAY)

_____ _____(EVENING)

EMAIL ADDRESS: _____

LOCATION OF SPECIAL REQUEST: _____

DATE & TIME REQUESTING USE: _____

PLEASE DESCRIBE YOUR REQUEST

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

SUBMITTED BY: _____ _____

Signature Date

RETURN TO: MUSCATINE PARKS AND RECREATION DEPARTMENT
215 SYCAMORE ST.
MUSCATINE, IA 52761
PHONE: 563-263-0241
FAX: 563-264-0750

License #_____
Wallet #_____
Sticker #_____
Receipt #_____
Issued_____
Expires_____

CITY OF MUSCATINE

APPLICATION FOR USE OF ANY STREET, SIDEWALK, ROADWAY, ALLEY, PARK, PUBLIC WAY, PROPERTY OR FACILITY

1. Name and address of applicant and sponsoring organization, if any:

   _____

   Address: _____

   Telephone Number: _____

   E-mail Address: _____

2. Type of event that is planned:

3. Proposed location:

4. Date(s)/Time(s):_____

5. Expected length of use:_____

6. Expected size of group:_____

7. Names of any person or persons in charge of the proposed use at the specified location:

   Address(es): _____

   Telephone Number(s): _____

   E-mail Address(es): _____

8. Names and addresses of any persons to be featured as entertainers or speakers:

9. List mechanical or electronic equipment to be used:

10. Number and type of any motor vehicles or other forms of transportation to be used, including bicycles, boats, carriages and golf carts:

11. Number and types of animals to be used:

12. A description of any sound amplification to be used:

13. Proposed monitoring of the group and/or activity including the number of people who will direct traffic, set up, clean up and maintain order, if necessary:

14. All plans for the provision of security:

15. Beer or wine consumption? Yes _____ No _____

16. Describe any items to be sold or distributed:

17. Is water connection requested: Yes _____ No _____

18. Is electricity requested: Yes _____ No _____

19. Have you provided a layout site plan for your proposed activity or event? Yes _____ No _____

    If yes, please attach.

    If no, please explain:

20. Do you understand that you will be financially responsible for all site restoration needed to restore the side to pre-event status? Yes _____ No _____

The applicant agrees to indemnify, defend and save harmless the City of Muscatine, together with its agents, officers and employees, from any and all claims, lawsuits, damages, losses and expenses, of whatever nature, which may result from or arise from the activity or event covered by the permit, including but not limited to the use of public ways, irrespective of whether said claims are frivolous or meritorious.

Authorized Representative

Date

TO BE COMPLETED BY CITY DEPARTMENTS:

I have reviewed the attached application with the following recommendations:

Recommend Approval				Comments:
☐ YES	☐ NO	Parks & Recreation	Date	
☐ YES	☐ NO	Community Development	Date	
☐ YES	☐ NO	Public Works	Date	
☐ YES	☐ NO	Police Chief	Date	
☐ YES	☐ NO	Fire Chief	Date	

FINAL APPROVAL:

☐ YES	☐ NO	City Administrator	Date	

License #_____
Wallet #_____
Sticker #_____
Receipt #_____
Issued_____
Expires_____

CITY OF MUSCATINE

TITLE 3, CHAPTER 3 AND CHAPTER 4

PARADE AND PUBLIC ASSEMBLIES* APPLICATION

APPLICATION FOR USE OF ANY STREET, SIDEWALK, ROADWAY, ALLEY, PARK, PUBLIC WAY, PROPERTY OR FACILITY

1. Name and address of applicant and sponsoring organization, if any:

   _____

   _____

2. Type of event that is planned:

   _____

   _____

   _____

3. Proposed location:

   _____

   _____

4. Date(s): _____ Starting Time: _____

   Time the event will begin to assemble: _____

   Expected length of use:_____

5. Expected size of group:_____

6. Names, addresses and telephone numbers of any person or persons in charge of the proposed use at the specified location: _____

   _____

   _____

7. Names and addresses of any persons to be featured as entertainers or speakers:

   _____

   _____

   _____

   _____

8. List mechanical or electronic equipment to be used: _____

   _____

   _____

9. Number and type of any motor vehicles or other forms of transportation to be used, including bicycles, boats, carriages and golf carts: _____

   _____

   _____

10. Number and types of animals to be used: _____

_____

_____

_____

11. A description of any sound amplification to be used: _____

_____

_____

_____

12. Proposed monitoring of the group and/or activity including the number of people who will direct traffic, set up, clean up and maintain order, if necessary: _____

_____

_____

_____

_____

13. All plans for the provision of security: _____

_____

_____

_____

The applicant agrees to indemnify, defend and save harmless the City of Muscatine, together with its agents, officers and employees, from any and all claims, lawsuits, damages, losses and expenses, of whatever nature, which may result from or arise from the activity or event covered by the permit, including but not limited to the use of public ways, irrespective of whether said claims are frivolous or meritorious.

_____ _____

Authorized Representative Date

* Public Assemblies require completion of this application form. See City Code Section 3-3-2(B) for the definition of a Public Assembly

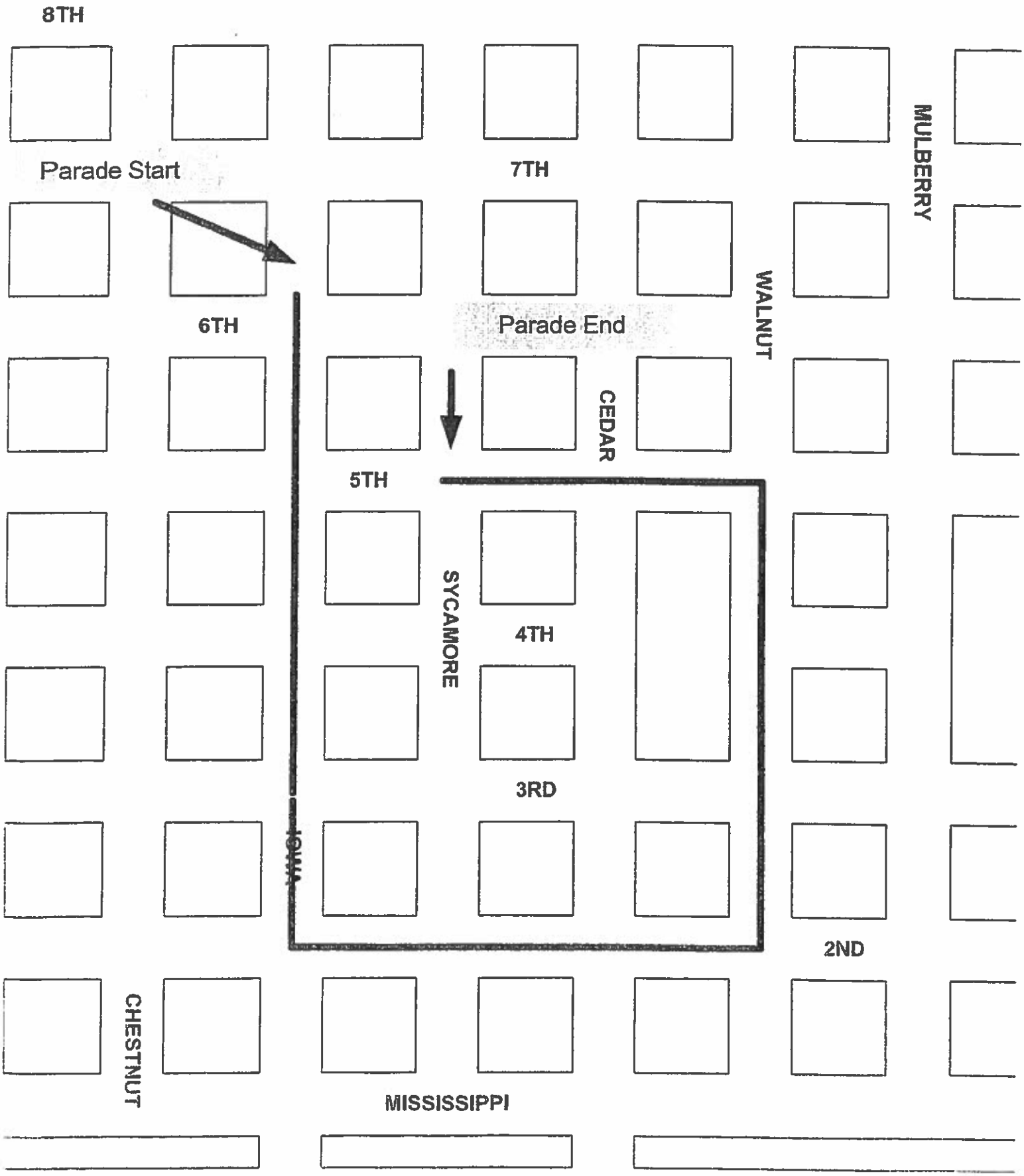
Additional Requirement for Parades:

1. Attach sketch of parade route. If parade is in the downtown area indicate whether parade route #1 or parade route #2 will be followed.
2. Submit $30.00 permit fee with application (non-profit organizations exempt from fee).
3. Insurance certificate with the following minimum requirements must accompany application:

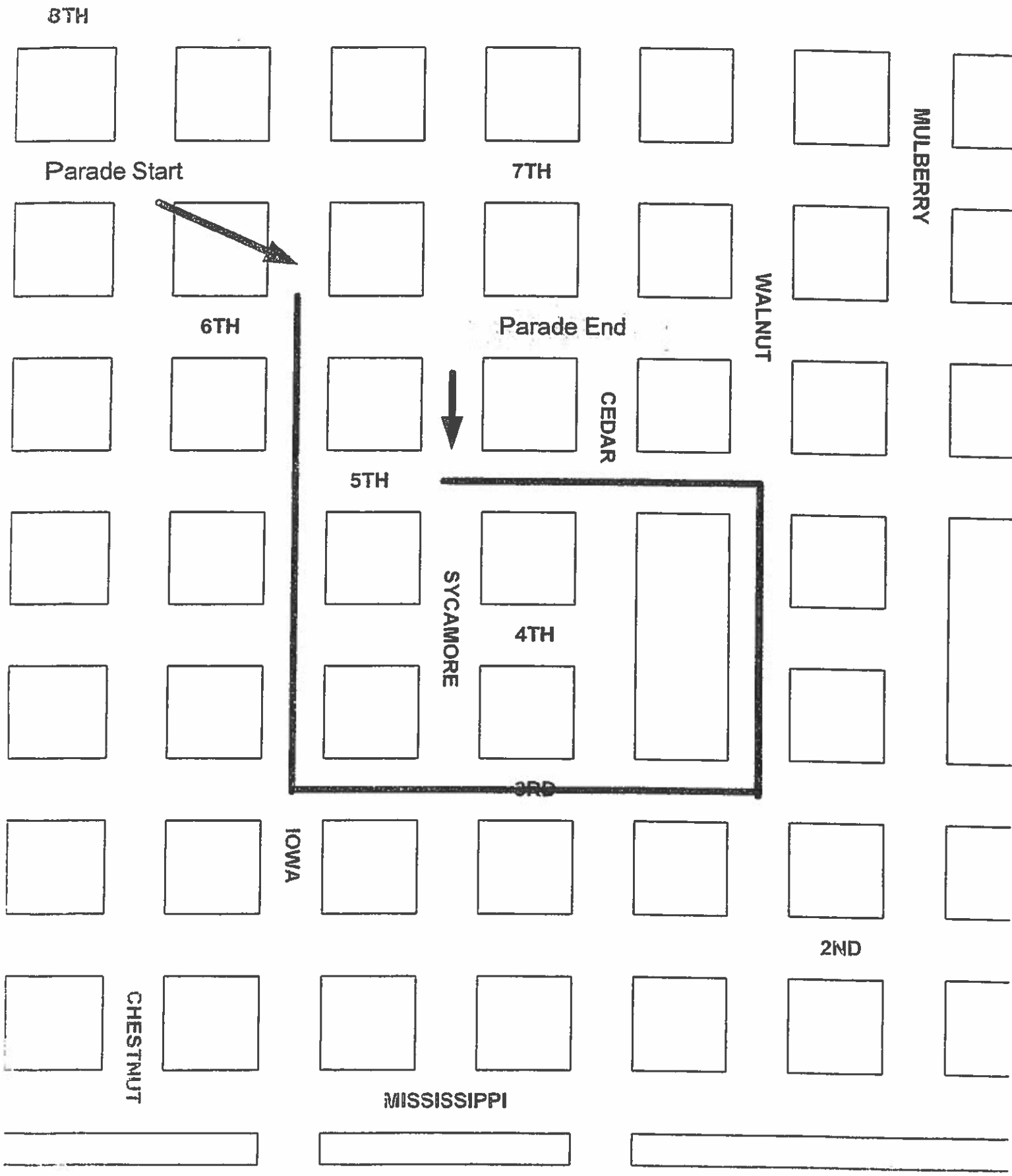
General Liability:

$1,000,000 Bodily Injury & Property Damage – Each Occurrence
$1,000,000 Personal Injury & Advertising Injury – Per Occurrence
$2,000,000 General Aggregate on above
$2,000,000 Products & Completed Operations General Aggregate

Parade Route #1



Parade Route #2



TO BE COMPLETED BY CITY DEPARTMENTS:

I have reviewed the attached application with the following recommendations:

Recommend Approval				Comments:
☐ YES	☐ NO	_____	_____	_____
		Parks & Recreation	Date	
☐ YES	☐ NO	_____	_____	_____
		Community Development	Date	
☐ YES	☐ NO	_____	_____	_____
		Public Works	Date	
☐ YES	☐ NO	_____	_____	_____
		Police Chief	Date	
☐ YES	☐ NO	_____	_____	_____
		Fire Chief	Date	

FINAL APPROVAL:

☐ YES	☐ NO	_____	_____	_____
		City Administrator	Date	

LICENSE #
WALLET#
STICKER#
RECEIPT#
ISSUED
EXPIRES

CITY OF MUSCATINE

LICENSE APPLICATION

TITLE 5, CHAPTER 8

CARNIVAL/CIRCUS LICENSE

APPLICANT'S NAME _____

NAME OF CARNIVAL/CIRCUS _____

BUSINESS ADDRESS _____

_____

TELEPHONE _____

PROPOSED LOCATION OF CARNIVAL OR CIRCUS _____

_____

WILL CARNIVAL OR CIRCUS INCLUDE ERECTION OF A TENT FOR USE BY THE PUBLIC? _____

PROPOSED DATES OF OPERATION _____ TO _____

ADDITIONAL REQUIREMENTS:

1. LICENSE FEE $250.00
   (FEE FOR CARNIVAL OR CIRCUS WITH A NON-PROFIT SPONSOR IS $125.00)

2. BOND $5,000

3. INSURANCE CERTIFICATES WITH THE FOLLOWING MINIMUM REQUIREMENTS:

   General Liability;
   - $1,000,000 Bodily Injury & Property Damage – Each Occurrence
   - $1,000,000 Personal Injury & Advertising Injury – Per Occurrence
   - $2,000,000 General Aggregate on above
   - $2,000,000 Products & Completed Operations General Aggregate

   Workers Compensation
   - Part 1 – Workers Compensation Benefits
   - Part 2 – Employers Liability
   - Limits $100,000 Bodily Injury Each Accident
   - $300,000 Bodily Injury by Disease Policy Limit
   - $100,000 Bodily Injury Disease Each Employee

   Business Automobile – owned, non-owned and hired automobiles
   - $1,000,000 Bodily Injury & Property Damage – Each Accident

4. IF CARNIVAL/CIRCUS IS TO BE HELD ON CITY PROPERTY, THIS APPLICATION MUST BE APPROVED BY CITY COUNCIL

5. APPROVAL OF PROPOSED OPERATIONS BY THE POLICE CHIEF, FIRE CHIEF, COMMUNITY DEVELOPMENT DIRECTOR AND HEALTH INSPECTOR IS REQUIRED. (SEE ATTACHED)

6. IF THE PROPOSED EVENT INVOLVES AMUSEMENT RIDES, THE OPERATOR OR SPONSOR SHALL ATTACH TO THE APPLICATION COPIES OF CURRENT INSPECTION REPORTS OR PERMITS AS REQUIRED BY CHAPTER 88A OF THE IOWA CODE.

SUPPLEMENTAL APPLICATION FOR CARNIVAL/CIRCUS LICENSE

I HEREBY CERTIFY THAT THE PROPOSED PLANS FOR THE CARNIVAL/CIRCUS ARE IN CONFORMANCE WITH ALL APPLICABLE PROVISIONS OF STATE AND CITY ORDINANCES, CODES AND REGULATIONS UNLESS OTHERWISE NOTED.

COMMENTS: _____

_____

_____
HEALTH INSPECTOR

COMMENTS: _____

_____

_____
COMMUNITY DEVELOPMENT DIRECTOR

COMMENTS: _____

_____

_____
POLICE CHIEF

COMMENTS: _____

_____

_____
FIRE CHIEF

IF ON PUBLIC PROPERTY:

CITY COUNCIL APPROVAL _____
DATE

City of Muscatine

ITEM NUMBER 2023-978

IN-DEPTH ITEM - CITY COUNCIL

DATE: 4/13/2023

STAFF

Jon Koch

SUBJECT FOR DISCUSSION

WRRF Capital Improvement Plan Report - Report on the Capital Improvement Plan for the Water and Resource Recovery Facility, lift stations and levee gatewells.

EXECUTIVE SUMMARY

Stanley consultants will give a report on the Capital Improvement Plan and Condition Assessment for the Water and Resource Recovery Facility, lift stations and levee gatewells. They will also outline costs for these projects and suggest long-term financing.

GENERAL DIRECTION SOUGHT AND SPECIFIC QUESTIONS TO BE ANSWERED

Direction sought on whether to proceed with planning projects as outlined in the report.

BACKGROUND/DISCUSSION

Stanley Consultants was selected by a selection committee from three qualified engineering service providers to perform a condition assessment of the Water and Resource Recovery Facility (WRRF), all the City owned lift stations and the gatewells operated along multiple levees in the City. The goal was to establish the general condition of the existing facilities and develop a prioritized capital improvement plan to guide investments in these assets. Each facility was assessed on form, function, redundancy and safety. They were also rated based on consequences of failure. Jay Brady from Stanley Consultants will provide an overview of the Condition Assessment and Capital Improvement Plan Reports including estimated costs associated with the prioritized items and present the working capital improvement plan showing how the City might make investments in these assets over the next 10 years.

ATTACHMENTS

1. CIP 23 Final Report.230407
2. 20230413_In Depth PPT-WRRF_CIP-SCI_Slides (1)

Stanley Consultants INC.

Connect. Create. Contributes.

Capital Improvements Plan

Muscatine WRRF Capital Planning

City of Muscatine

Draft

April 2023

MUSCATINE

Deliverable: Capital Improvements Plan
Project: Muscatine WRRF Capital Planning
Client: City of Muscatine
Location: Muscatine, IA

Submittal: Draft
Date: April 7, 2023

Prepared by: Candice Bark, P.E.
Reviewed by: Jay Brady, P.E.

I hereby certify that this report was prepared by me or under my direct personal supervision and that I am duly registered under the laws of the State of Iowa.		
Name	Signature	
Date	Registration Number	Expiration Date

Professional Seal:

Stanley Consultants

Table of Contents

Tables

Executive Summary

ES.1 Introduction

The City of Muscatine retained the services of Stanley Consultants to assess the condition of major equipment and structures for its aging wastewater system components including 22 pump (lift) stations, 12 gate wells, and the Water and Resource Recovery Facility (WRRF) in advance of developing a WRRF capital improvement plan (CIP) to guide City wastewater facility investments over the next 10 years.

ES.2 Methodology Overview

The following steps performed include obtaining the existing WRRF asset information, performing condition assessments, determining replacement and renovation needs utilizing the condition assessment results, identifying project groupings, estimating capital costs, and preparing a project prioritization matrix. Identified projects and their relative priorities in the matrix were refined collaboratively with City staff through a series of meetings and workshops.

The determined needs and prioritization matrix were utilized to develop multiple draft capital improvement plans (CIP) for City input before finalization with consideration of City wastewater utility revenues and user rates. A final CIP was arrived at through City input and presented to City Council.

ES.3 Condition Assessment

Each facility was assessed based on form, function, redundancy, and safety. The form, or physical condition and configuration, and function of each asset is captured in the risk of failure rating discussed in Section 2.2 Assessment Methodology. Asset redundancy is reviewed to determine not only if an asset has a backup in case of failure but if that backup is reliable. Safety covers personnel's health and the conditions that the assets are operating under.

Each asset is also rated based on the consequences of its failure.

The sum of each risk of failure rating is multiplied with the consequence of failure rating to calculate the asset risk rating. The risk rating of each asset is then used to judge overall impact that asset has on the system. Details of the field assessment and a listing of the critical risk assets and recommendations can be found in the Condition Assessment Report in Appendix A.

ES.4 Prioritization Methodology

Parameters taken from the condition assessment are weighted based on the level of importance to City staff. Table 3-1 lists the parameters used in the field assessments and their weight of importance. The weight of all the parameters totals 100 percent.

Table ES-1: Condition Assessment Parameters Weight of Importance

Parameter	Weight
Age of Asset	20%
Asset Visual Condition	20%
Asset Maintenance Records	30%
Hydraulic or Process Capacity	20%
External Risks to Asset	10%
Total	**100%**

Source: Stanley Consultants, Inc.

For each asset, the weight of the parameter is multiplied by the risk score given in the field. Scores ranged from 0 - 2 with 0 representing low risk and 2 representing high risk. The five weighted risk scores are added together resulting in a weighting total.

Each asset's field score for the consequence of failure identified in the condition assessment is multiplied by a factor of 4 to amplify the importance of failure consequence. The multiplied value is added to the weighting total resulting in a total weighted score. The total weighted score is used to rank the asset's level of needed attention relative to all the other assets with the highest score indicating the highest priority. Any asset scoring above the median total weighted score is considered a high priority.

ES.5 Cost Estimating

Project cost estimates have been developed for the proposed improvements to existing facilities. The cost estimates include both estimated construction cost and an allowance for professional engineering service. Cost estimates are based on labor and materials and include an allowance for undeveloped design details and a construction contingency factor for unforeseen conditions. Contractors' overhead and profit is then added to arrive at a total construction cost estimate.

ES.6 Project Grouping

The assets were reviewed and lumped into projects based the criticality of an asset or based on the amount of assets needing replaced or rehabbed in one location. Project groupings generally either are by location or by system (ie electrical). Descriptions of each project can be found in subsequent sections.

ES.7 CIP Development

Table 8-1 presents the overall list of projects considered for inclusion in the 10-year CIP. A total of $29.5 million in potential asset investments have been identified.

Table ES-2: Wastewater WRRF & Lift Station Projects

Project	Estimated 2022 Cost
UV Disinfection System	$1,250,000
WRRF Electrical Package	$440,000
WRRF HVAC Package	$740,000
HSW Rehab Tank	$480,000
Lift Station Electrical Package	$310,000
Lift Station HVAC Package	$400,000
Isett Lift Station (Near Term)	$350,000
System 03 Replace Roughing Filter Media	$2,010,000
Papoose Lift Station (Near Term)	$310,000
Digester Complex - Digester Capacity & Pumping	$1,280,000
Algae Phosphorus Removal	$5,500,000
Gate Well Project	$75,000
Engineering Study - Phosphorus Modeling	$50,000
Influent Gate Freeze Protection & Odor Control	$100,000
Lift Station In-House Process Projects	$81,250
Lift Station Process Projects	$195,000
Schley Lift Station	$160,000
Canon Lift Station	$280,000
System 01 Grit Replace & Line Drain Pipes	$30,000
WRRF In-House Process Projects	$185,000
WRRF Process Projects	$555,000
Engineering Study - Sewer Master Plan & Hydraulic Modeling	$250,000
Engineering Study - Papoose LS Reconfiguration	$75,000
Papoose Lift Station (Long Term-Dedicated Stormwater LS)	$3,100,000
Houser Lift Station	$100,000

Project	Estimated 2022 Cost
Papoose Lift Station (Public Bathroom/Generator Project)	$1,100,000
Isett Lift Station (Long Term)	$1,890,000
System 05 Add Launder Cover on Final Clarifier	$710,000
Biogas to Energy Conversion	$8,380,000
Engineering Study - WRRF Solids Handling Study	$40,000
Engineering Study - SMART Utility Management Master Plan	$30,000
SMART Utility Management Implementation	$400,000
Total Capital Expenditure Incl New Loan Debt Service	$38,475,000

Source: Stanley Consultants

ES.8 Methodology

The CIPs consider a 6 percent annual rate of inflation from the base 2022 cost estimate year and a 3 percent annual growth in revenues available to fund investments starting from a base 2022 amount of $450,000 annually. Project costs are spread over a single year or multiple years depending on overall project complexity and cost. These are accounted for in the Stanley Consultants CIP spreadsheet tool.

The final CIP was based on multiple iterations with City staff aligning the CIP with staff goals, condition-based prioritization and with recognition of project deferrals, debt financed projects, and potential for grant funding of select projects.

Table 8-2 presents the final overall calendar year 2023-2032 CIP for Wastewater WRRF & Lift Stations reflective of utilizing two 20-year state revolving fund loans to debt finance select projects. The first debt-financed project is anticipated to be completed no earlier than calendar year 2024-2025 with construction loan debt service starting in 2026. The first debt-financed project is anticipated to be completed no earlier than calendar year 2028-2029 with construction loan debt service starting in 2030. The remainder of the projects shown on the 2023-2032 CIP are pay as you go projects from wastewater revenues and/or reserve funds.

Table ES-3:2023-2032 Wastewater WRRF & Lift Stations CIP

		FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	
Assumed Average Annual Inflation Rate	6%	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	
Assumed Average Revenue Growth Rate	3%	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Cumulative

Projects	Estimated 2022 Cost	1	2	3	4	5	6	7	8	9	10	Inflated Totals
UV Disinfection System	$1,250,000	$1,258,750										$1,258,750
WRRF Electrical Package	$440,000	$69,960	$420,226									$490,186
Lift Station Electrical Package	$310,000	$32,860	$313,484									$346,344
Isett Lift Station (Near Term)	$350,000	$74,200	$314,608									$388,808
Lift Station In-House Process Package	$81,250		$22,823		$25,644		$28,814		$32,375			$109,656
System 01 Grit Replace & Line Drain Pipes	$30,000					$40,147						$40,147
WRRF In-House Projects	$185,000			$55,084	$58,390		$65,607	$69,543				$248,623

Projects	Estimated 2022 Cost	1	2	3	4	5	6	7	8	9	10	Inflated Totals
Engineering Study - SMART Utility Management Master Plan	$30,000	$31,800										$31,800
SMART Utility Management Implementation	$400,000			$71,461	$75,749	$80,294	$85,111	$60,145	$63,754	$67,579	$71,634	$575,726
Total Pay As You Go Expenditures	$3,076,250	$1,467,570	$1,071,142	$126,545	$159,782	$120,440	$179,531	$129,688	$96,129	$67,579	$71,634	$3,490,041
Loan 1 Estimated Cost & Payments	$4,140,000				$141,899.14	$283,798.28	$283,798.28	$283,798.28	$283,798.28	$283,798.28	$283,798.28	$4,674,962.52
Loan 2 Estimated Cost & Payments	$4,228,750							$193,963.83	$387,927.66	$387,927.66	$387,927.66	$6,390,268.84
Total Debt Estimated Cost & Payments	$8,368,750	$ -	$	$ -	$141,899	$283,798	$283,798	$477,762	$671,726	$671,726	$671,726	$11,065,231
CIP Totals	$11,445,000	$1,467,570	$1,071,142	$126,545	$301,681	$404,239	$463,330	$607,450	$767,855	$739,305	$743,360	$14,555,273

Section 1 Introduction

The City of Muscatine retained the services of Stanley Consultants to assess the condition of major equipment and structures for its aging wastewater system components including 22 pump (lift) stations, 12 gate wells, and the Water and Resource Recovery Facility (WRRF) in advance of developing a WRRF capital improvement plan (CIP) to guide City wastewater facility investments over the next 10 years.

The lift stations age varies widely with many of the lift stations constructed in the 1950s and 1960s but some are from 1990s and 2000s.

Many of the gatewells are older with construction in the 1950s, 1960s and 1970s.

The Muscatine Water & Resource Recovery Facility (WRRF) was originally configured for primary treatment consisting of screening and primary clarification in the 1960s. A secondary treatment system including a high purity oxygen system designed to receive high strength wastewater from a corn wetmill and tannery was constructed in the 1970s. After these two industries discontinued discharges to the treatment plant, the plant was reconfigured to a traditional aerated activated sludge plant in the 1980s. Additional upgrades occurred throughout the 1990s; and the plant underwent a major $18 million renovation in 2009-2011.

1.1 Methodology Overview

The following steps performed include obtaining the existing WRRF asset information, performing condition assessments, determining replacement and renovation needs utilizing the condition assessment results, identifying project groupings, estimating capital costs, and preparing a project prioritization matrix. Identified projects and their relative priorities in the matrix were refined collaboratively with City staff through a series of meetings and workshops.

The determined needs and prioritization matrix were utilized to develop multiple draft capital improvement plans (CIP) for City input before finalization with consideration of City wastewater utility revenues and user rates. A final CIP was arrived at through City input and presented to City Council.

A multi-step approach was implemented to aid in managing City's wastewater assets.

1. Prepare Asset Register & Develop GAP Analysis

   The City initially provided a list of assets to be included in the asset management process. These assets were reviewed to determine which assets were critical in the assessment and if all the pertinent information was provided to correctly identify the assets in the field. A preliminary list of parameters was created to carry out the condition assessments. A collaboration meeting was then held with the City to get their input on the condition assessment parameters. The final parameters were input into a field assessment form using ArcGIS Survey 123 which was used to conduct the physical condition assessment.

2. Asset Condition Assessment and Rating System

   The condition of each asset was recorded using photos, interviewing staff about the operation and maintenance conditions, and documenting the visual conditions. Each asset was named to match

the City's existing asset inventory so the assets can be easily referenced in the future. A rating system was generated for each asset based on a risk-based analysis evaluating the criticality of failure versus the consequence of failure.

3. Project Groupings

   The WRRF systems have hundreds of discrete assets. Individual assets were grouped into projects to simplify capital investment planning and aggregate costs. Groupings are generally by site such as Isett Lift Station but can also be by system such as Lift Station HVAC improvements.

4. Estimate Project Capital Costs

   Estimated capital cost for each project was generated. Capital cost estimates are in year 2022 dollars and include factors for supply chain interruptions as well as typical project administration, contingency, contractor, and engineering fees.

5. Prioritize Projects

   Each project is prioritized based on criticality and rating of assets within the project. The higher ratings mean that the project is more critical due to need to replace or upgrade that asset. The ratings are used to calculate an asset risk score. Assets are ranked in order of criticality to determine which assets should receive priority. A prioritization workshop was conducted to review the asset criticality ratings and how the ratings were calculated. The ratings provide insight into relative project priorities but are guidance for human decision making on final prioritized project list. The prioritized project list was finalized based on prioritization rank scoring and City input.

6. Prepare Prioritized Capital Improvement Plan

   The prioritized project list was utilized to develop multiple draft capital improvement plans (CIP) for City review and feedback. City staff considered relative project priorities, year to year capital cost, and wastewater system user revenues and impact on user rates as the CIP was finalized. The final CIP covers a 10-year planning horizon and provides the City a guide for re-investing in the wastewater system.

1.2 Acknowledgements

We would like to thank City staff for their significant involvement in this process. The time and insights provided by WRRF plant and lift station operation and maintenance personnel and WRRF Director Jon Koch were critical to this resulting data driven CIP. We also express our appreciation for City Administrator Carol Webb and Finance Director Nancy Lueck in providing valuable perspectives on CIP constraints pertaining to sewer user revenues and reserve funds.

Section 2 Condition Assessment

2.1 Facility Design Criteria

Each facility is assessed based on form, function, redundancy, and safety. The form, or physical condition and configuration, and function of each asset is captured in the risk of failure rating discussed in Table 2-1 under assessment methodology. Asset redundancy is reviewed to determine not only if an asset has a backup in case of failure but if that backup is reliable. Safety covers personnel health and asset operating conditions.

2.2 Assessment Methodology

Prior to the site visits, the team reviewed the City's existing asset inventory and collected information on each lift station and process at the Water Resource Recovery Facility (WRRF). The assessment team spent two days visiting the lift stations and two days visiting the processes and buildings at the WRRF. During the site visits the assessment team visually inspected and rated the assets based on age, visual condition, maintenance history, capacity/functionality, and external risks as presented in Table 2-1. Examples of external risks would be high hydrogen sulfide concentrations in room causing surface deterioration or water dripping on a motor ultimately causing the unit to fail.

Table 2-1: Risk of Failure Rating and Description

Risk of Failure	0	1	2
Age of asset	Less than 5 years old	Between 5 and 20 years old	Greater than 20 years old
Visual Condition	Like new	Some corrosion or signs of age	Significant corrosion or visually identified degradation
Maintenance History	Regularly maintained No known issues	Some operational disruptions	Multiple historic operational disruptions
Unit capacity	Meets current and future needs	Will not meet future needs	Does not meet current needs
External risks to asset	No external risks to asset	Limited risks to asset	Moderate or higher external risks to asset

Source: Stanley Consultants, Inc.

The ratings were based on a numerical scale of 0 - 2 where 0 would be a minimal risk of failure and a 2 would be a great risk of failure. The total Risk of Failure is the summation of all five components resulting in a score of 0 to 10.

Each asset is also rated based on the consequences of its failure. Table 2-2 presents the rating scale and a description of impact based on each rating.

Table 2-2: Consequence of Failure Rating and Impact

Rating	Impact
0	No impacts
2	Minor impacts to operations Redundancy available
4	Moderate impacts to operations including temporary outages and moderate financial impacts
6	Significant impacts to operations including extended outage and major financial impacts
8	Permit violation or loss of service, unsuitable environmental conditions
10	Harm of utility staff or WWTP operations

Source: Stanley Consultants, Inc.

The consequence of failure scale ranges from 0 - 10. A rating of 0 - 2 would indicate that the asset has no impact to operations or that there is a redundant asset available as a backup in case of failure. A rating of 4 - 6 would indicate a moderate to significant disruption to operations and would acquire financial burden. A rating of 8 - 10 is a serious impact to operations that could result in discharge permit violations, a risk to staff health and safety, and/or conditions that may cause deterioration of process equipment.

The sum of each risk of failure rating is multiplied with the consequence of failure rating to calculate the asset risk rating. Table 2-3 presents the asset risk rating scale and the action required.

Table 2-3: Asset Risk Rating and Impact

Rating	Impacts
0 - 30	Low risk asset - No risk-based action is required
31 - 60	Moderate risk asset - Consider replacement/upgrades or A risk mitigation plan within a 10-year planning period
61 - 100	High risk asset - Replace or mitigate risk as soon as possible

Source: Stanley Consultants, Inc.

Details of the field assessment and a listing of the critical risk assets and recommendations can be found in the Condition Assessment Report in Appendix A.

Section 3 Asset Ranking

Parameters taken from the condition assessment are weighted based on the level of importance to City staff. Table 3-1 lists the parameters used in the field assessments and their weight of importance. The weight of all the parameters totals 100 percent.

Table 3-1: Condition Assessment Parameters Weight of Importance

Parameter	Weight
Age of Asset	20%
Asset Visual Condition	20%
Asset Maintenance Records	30%
Hydraulic or Process Capacity	20%
External Risks to Asset	10%
Total	100%

Source: Stanley Consultants, Inc.

For each asset, the weight of the parameter is multiplied by the risk score given in the field. Scores ranged from 0 - 2 with 0 representing low risk and 2 representing high risk. The five weighted risk scores are added together resulting in a weighting total.

Each asset's field score for the consequence of failure identified in the condition assessment is multiplied by a factor of 4 to amplify the importance of failure consequence. The multiplied value is added to the weighting total resulting in a total weighted score. The total weighted score is used to rank the asset's level of needed attention relative to all the other assets with the highest score indicating the highest priority. Any asset scoring above the median total weighted score is considered a high priority. The median total weighted score for the lift station assets is 40 and for the WRRF assets is 41. Table 3-2 and 3-3 presents the list of lift station and WRRF assets ranked in order from highest priority to lowest priority. The final column calculates the ranking of each asset. A ranking of 1 indicates the first asset that should be addressed.

Table 3-2: Priority List of Lift Station Assets

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
Item	Lift Station	Project Title	15	20	15	25	25	100	4		
1	Isett	Replace Wet Well Cover with Fiberglass Cover	2	2	2	0	2	30	10	70	1
2	Papoose	Motor Control Center MCC500101	2	1	1	1	2	28	10	68	2
3	Canon	Motor Control Center	2	1	1	1	2	28	10	68	2
4	Bond	Motor Control Center MCC540101	2	2	1	1	1	27	10	67	4
5	Sampson	Motor Control Center MCC63	2	2	1	1	1	27	10	67	4
6	Schley	Motor Control CenterMCC550101	2	2	1	1	1	27	10	67	4
7	Isett	Install 6400 gpm dry-pit submersible pump with VFD	2	2	2	2	2	40	6	64	7
8	Isett	Piping Modifications	2	2	2	2	2	40	6	64	7
9	Stewart	Add safety cages on pump shafts	2	1	1	0	2	23	10	63	9

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
10	Progress Park	Add safety cages on pump shafts	1	1	2	0	2	23	10	63	9
11	Mad Creek	Replace Control Room Exhaust Fan, 4000 CFM	2	2	2	0	0	20	10	60	11
12	Canon	Replace Dry Well/Control Room Exhaust Fan, 4,000 CFM	2	2	2	0	0	20	10	60	11
13	Bond	Replace Dry Well Exhaust Fan, 1,600 CFM	2	2	2	0	0	20	10	60	11
14	Bond	Replace Wet Well Exhaust Fan, 1,200 CFM, Explosion Proof	2	2	2	0	0	20	10	60	11
15	Stewart	Replace Screen Room and Wet Well Exhaust Fan	2	2	2	0	0	20	10	60	11
16	Stewart	Replace Makeup Air Unit	2	2	2	0	0	20	10	60	11
17	Progress Park	Replace Makeup Air Units	2	2	2	0	0	20	10	60	11
18	Isett	Replace Floor Drains, 4" Stainless Steel	2	2	2	0	0	20	10	60	11

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
19	Tipton	Replace Screen Room Exhaust Fan, 1,200 CFM, Explosion Proof	2	2	2	2	1	35	6	59	19
20	Mad Creek	Replace Wet Well Platforms	2	2	0	2	2	34	6	58	20
21	Papoose	Public Bathroom/Generator Project	1	1	1	1	2	25	8	57	21
22	Houser	Install cages around pump shafts	2	2	1	0	0	17	10	57	21
23	Stewart	Repair bathroom sanitary piping, 4" PVC Piping	2	2	1	0	0	17	10	57	21
24	Papoose	Close off entry between control room and bar screen room/ Add window	2	2	0	0	2	24	8	56	24
25	Canon	Replace Wet Well Exhaust Fan, 1,200 CFM, Explosion Proof	2	1	2	0	0	16	10	56	24
26	Canon	Replace Basement Unit Heater, 15 kW	2	1	2	0	0	16	10	56	24
27	Sampson	Replace Dry Well Exhaust Fan, 1,200 CFM	2	1	2	0	0	16	10	56	24

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
28	Isett	Structural Modifications (floor and roof hatches)	1	2	2	1	2	32	6	56	24
29	Schley	Replace Dry Well Exhaust Fan, 1,000 CFM	2	2	0	0	0	14	10	54	29
30	Schley	Replace Wet Well/Screen Room Exhaust Fan, 1,000 CFM, Expl. Proof	2	2	0	0	0	14	10	54	29
31	Papoose	New ventilation system in wet well	2	2	0	1	2	29	6	53	31
32	Hershey	Replace wet well hatches	2	1	1	0	0	13	10	53	31
33	Stewart	Replace worn parts on bar screen	2	2	1	0	2	27	6	51	33
34	Isett	Install two 3900 gpm dry-pit submersible pump with VFD	1	2	2	0	2	27	6	51	33
35	Papoose	Replace Precast Wall Panels	2	1	0	0	0	10	10	50	35
36	Mad Creek	Replace Dry Well Exhaust Fan, 1600 CFM	2	1	0	0	0	10	10	50	35

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
37	Mad Creek	Replace Wet Well Supply Fan, 1200 CFM, Explosion Proof	2	1	0	0	0	10	10	50	35
38	58th Avenue	Replace Screen Room Unit Heater	2	1	0	0	0	10	10	50	35
39	60th Avenue	Replace Screen Room/Wet Well Exhaust Fan	2	1	0	0	0	10	10	50	35
40	Hershey	Replace exhaust fan	2	1	0	0	0	10	10	50	35
41	Hershey	Replace fixed ladder with OSHA approved ladder (square cage)	2	1	0	0	0	10	10	50	35
42	Isett	Replace exhaust fans	2	1	0	0	0	10	10	50	35
43	Mad Creek	Replace 10" Suction Shutoff Valve for Pump #3	2	2	2	0	1	25	6	49	43
44	Papoose	Replace exhaust fans	2	2	0	1	1	24	6	48	44
45	Schley	Replace 1020 gpm shafted pump	2	2	0	0	0	14	8	46	45

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
46	Tanglefoot	New electrical service pedestal & manual portable electric transfer switch	2	2	0	0	0	14	8	46	45
47	Sunset	New electrical panel	2	2	0	0	0	14	8	46	45
48	Papoose	New LED Lighting	1	1	2	0	0	13	8	45	48
49	Canon	200KW Generator Gen520101	2	2	2	0	0	20	6	44	49
50	Isett	Add 225 kW Generator	2	2	2	0	0	20	6	44	49
51	Papoose	Replace windows	2	2	0	0	1	19	6	43	51
52	Storm Water	Replace Roof Vents, 500 CFM gravity ventilators	2	2	2	2	1	35	2	43	51
53	Tipton	Replace 15 HP Pump Buckets	2	2	2	2	1	35	2	43	51
54	Papoose	New grounding and electrical service entrance	2	2	1	0	0	17	6	41	54
55	Canon	Replace Platform Hardware	2	2	1	0	0	17	6	41	54

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
56	Slough	Replace decking, ~4'x4' with a few steps	2	2	1	0	0	17	6	41	54
57	Magnolia	Labor to relocate new electrical control panel (this year)	2	2	2	0	1	25	4	41	54
58	Hershey	Replace automatic transfer switch and locate indoors	2	2	2	0	1	25	4	41	54
59	Houser	15HP Motor MTR570101	2	1	2	0	0	16	6	40	59
60	Houser	15HP Motor MTR570102	2	1	2	0	0	16	6	40	59
61	Houser	120V Panel	2	1	2	0	0	16	6	40	59
62	Houser	480V Panel	2	1	2	0	0	16	6	40	59
63	Bond	15HP Motor MTR540101	2	1	2	0	0	16	6	40	59
64	Schley	15HP Motor MTR550101	2	1	2	0	0	16	6	40	59
65	Schley	15HP Motor MTR550102	2	1	2	0	0	16	6	40	59
66	Schley	15HP Motor MTR550103	2	1	2	0	0	16	6	40	59

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
67	Miles	Replace backflow preventer, 3/4"	2	2	0	0	2	24	4	40	59
68	Miles	Replace 4" DI discharge piping in wet well, ~20' deep	2	1	0	0	1	15	6	39	68
69	Miles	Replace 4" 90 degree elbows in wet well	2	1	0	0	1	15	6	39	68
70	Papoose	Replace Roof	2	2	0	0	0	14	6	38	70
71	Papoose	Reseal air gaps in precast concrete walls	2	2	0	0	0	14	6	38	70
72	Mad Creek	Replace Hoist	2	2	2	2	0	30	2	38	70
73	Canon	Replace Supply Air Unit, 4,000 CFM, Heating and Ventilation	2	2	0	0	0	14	6	38	70
74	Canon	Wet Well Makeup Air Unit, 1,200 CFM, Nat. Gas, Expl. Proof	2	2	0	0	0	14	6	38	70
75	Canon	Panelboard	2	2	0	0	0	14	6	38	70
76	Canon	New LED Lighting, ~60'x12' ground floor & basement	2	2	0	0	0	14	6	38	70

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
77	Hershey	Facade Work	2	2	0	0	0	14	6	38	70
78	Isett	Replace precast concrete walls, ~8'x12'	2	2	0	0	0	14	6	38	70
79	Bond	75KW Generator ENG540301	2	1	1	0	0	13	6	37	79
80	Magnolia	Labor to install two new pumps (this year)	2	2	2	0	0	20	4	36	80
81	Tipton	Patch leaking Roof around exhaust fan	2	2	0	0	1	19	4	35	81
82	Tipton	Replace two smaller pumps	1	2	2	2	0	27	2	35	81
83	Sampson	Replace Generator Exhaust Fan, 4,260 CFM	2	1	0	0	0	10	6	34	83
84	Sampson	Replace Wet Well/Screen Room Exhaust Fan, 700 CFM, Explosion Proof	2	1	0	0	0	10	6	34	83
85	Sampson	Replace Screen Room Unit Heater, 33 kW Electric, Explosion Proof	2	1	0	0	0	10	6	34	83
86	Sampson	Replace Generator Room Unit Heater, 7.5 kW Electric	2	1	0	0	0	10	6	34	83

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
87	Papoose	Dumpster Area Paving	2	2	1	0	0	17	4	33	87
88	Papoose	New dumpster (on order)	2	2	0	0	2	24	2	32	88
89	Slough	Replace wall louver, 12" x 12"	2	2	0	0	2	24	2	32	88
90	Stewart	Replace Dry Well, Generator Room Exhaust Fans	2	1	2	0	0	16	4	32	88
91	Papoose	250 HP Motor MTR500102	1	1	0	0	0	7	6	31	91
92	Papoose	250 HP Motor MTR500103	1	1	0	0	0	7	6	31	91
93	Stewart	Rebuild 1,680 gpm shafted pumps	2	1	1	0	2	23	2	31	91
94	Progress Park	Rebuild 2510 gpm shafted pump	1	1	2	0	2	23	2	31	91
95	Papoose	Replace Exterior Concrete Stairs	2	2	0	0	0	14	4	30	95
96	Storm Water	Replace Hoist	2	2	2	2	0	30	0	30	95

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
97	Mad Creek	Install New LED Lighting	2	2	0	0	0	14	4	30	95
98	Sunset	Unplug suction line #2	2	2	1	1	0	22	2	30	95
99	Stewart	Replace backflow preventer, 3/4"	2	2	0	0	0	14	4	30	95
100	Canon	Control Panel	1	1	2	0	0	13	4	29	100
101	Tipton	Replace Generator Room Exhaust Fan, 1,600 CFM	2	1	1	0	0	13	4	29	100
102	Slough	Add Exterior Lighting	2	2	2	0	0	20	2	28	102
103	Schley	75KW Generator ENG550301	2	2	2	0	0	20	2	28	102
104	Papoose	New exterior lighting at entranceway	2	2	0	0	1	19	2	27	104
105	Storm Water	Automatic Control Valve ACV 620201	2	2	1	1	1	27	0	27	104
106	Houser	Replace exhaust fan, 1,600 CFM	2	1	0	0	0	10	4	26	106

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
107	Houser	Replace unit heater, 15 kW, Electric	2	1	0	0	0	10	4	26	106
108	Miles	Replace Generator Room Exhaust Fan	2	1	0	0	0	10	4	26	106
109	Miles	Replace Wet Well/Screen Room Exhaust Fan	2	1	0	0	0	10	4	26	106
110	59th Avenue	Replace Control Room Exhaust Fan	2	1	0	0	0	10	4	26	106
111	61st Avenue	Replace backflow preventer, 3/4"	2	1	0	0	0	10	4	26	106
112	Progress Park	Replace Generator Room and Control Room Exhaust Fans	2	1	0	0	0	10	4	26	106
113	Progress Park	Replace Wet Well Exhaust Fan	2	1	0	0	0	10	4	26	106
114	Progress Park	Replace Dry Well Exhaust Fan	2	1	0	0	0	10	4	26	106

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
115	Progress Park	Replace Unit Heaters	2	1	0	0	0	10	4	26	106
116	Houser	Replace 300 gpm shafted pumps with dry pit submersibles	2	2	1	0	0	17	2	25	116
117	Canon	60HP Motor MTR520101	2	1	2	0	0	16	2	24	117
118	Canon	60HP Motor MTR5220102	2	1	2	0	0	16	2	24	117
119	Bond	25HP Motor MTR540102	2	1	2	0	0	16	2	24	117
120	Bond	25HP Motor MTR540103	2	1	2	0	0	16	2	24	117
121	Maple Grove	Replace air ejector system with duplex submersible pump system	2	1	2	0	0	16	2	24	117
122	Papoose	Replace double doors for dumpster	2	2	0	0	0	14	2	22	122
123	Mad Creek	Replace Unit Heater, 15 kW	2	0	0	0	0	6	4	22	122

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
124	Slough	Replace Interior Lighting, ~4'x4' bldg	2	2	0	0	0	14	2	22	122
125	Mad Creek	Replace VFDs (100 HP Motor)	1	1	2	0	0	13	2	21	125
126	Mad Creek	Replace VFDSs (75 HP Motor)	1	1	2	0	0	13	2	21	125
127	Hershey	Add exterior lighting	2	1	1	0	0	13	2	21	125
128	Hershey	Replace unit heater	2	1	0	0	0	3	4	19	128
129	Miles	Replace Screen Room Unit Heater	2	1	0	0	0	10	2	18	129
130	Miles	Replace Generator Room Unit Heater	2	1	0	0	0	10	2	18	129
131	Stewart	Replace unit heater, 7.5 kW	2	1	0	0	0	10	2	18	129
132	57th Avenue	Replace Control Room Unit Heater	2	0	0	0	0	6	2	14	132

Table 3-3: Priority List of WRRF Assets

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
Item	Lift Station	Project Title	15	20	15	25	25	100	4		
1	01	Replace Motor Control Center	2	2	1	1	1	28	10	68	1
2	03	Replace Motor Control Center	2	2	1	1	1	28	10	68	1
3	06	Replace Makeup Air Unit	2	2	2	0	0	28	10	68	1
4	06	Replace MCC	2	2	1	1	1	28	10	68	1
5	11	Replace MCC	2	2	1	1	1	28	10	68	1
6	14	Replace UV System and Downstream Flow Control	1	2	2	0	2	28	10	68	1
7	01	New odor control system						0		66	5
8	01	Influent gate freeze protection – Headbox cover/building	1	2	2	0	1	26	10	66	5
9	05	Replace sidewalk with 6' wide (around the clarifiers)	2	2	1	0	2	26	10	66	5

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
10	11	Retrofit old digester for added digester capacity	1	1	2	2	2	32	8	64	8
11	01	Replace PLC	2	0	2	0	0	20	10	60	9
12	Collection	Gatewell 5073	2	1	2	2	1	34	6	58	10
13	Collection	Gatewell 6284	2	1	2	2	1	34	6	58	10
14	Collection	Gatewell 6305	2	1	2	2	1	34	6	58	10
15	03	Replace exterior lighting on pump building and roughing filter tank	2	1	1	0	0	18	10	58	10
16	11	Replace Boiler	2	1	1	1	2	26	8	58	10
17	01	Replace interior drains < 6" with PVC and install trench with grating	2	2	2	0	2	32	6	56	15
18	01	Televise & line belowgrade drains 6" and greater	2	2	2	0	2	32	6	56	15
19	01	Replace exposed drain piping (materials on hand - staff project)	2	2	2	0	2	32	6	56	15

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
20	11	Struvite Mitigation in Piping - Modify piping to empty digesters efficiently	1	1	2	2	2	32	6	56	15
21	13	Lagoon Capacity - Solids Handling Analysis	2	1	2	2	0	32	6	56	15
22	13	Replace Lagoon Dredger	2	2	2	1	0	32	6	56	15
23	03	Replace all media (5 years down the road)	2	2	2	0	1	30	6	54	21
24	05	New 14” shut off valve	2	2	2	0	0	28	6	52	22
25	11	Replace two 10 HP Penn Valley Transfer Pumps to rotary lobe pumps	1	0	2	2	2	28	6	52	22
26	90	Relocate electrical panels	2	2	2	0	0	28	6	52	22
27	01	Replace Hydraulic Press Motor	2	1	2	0	0	24	6	48	25
28	06	Replace Switchgear (eliminate? - no secondary power to PLCs)	2	1	2	0	0	24	6	48	25
29	06	Replace Unit Heater	2	2	2	0	0	28	4	44	27

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
30	Administration	Replace Lighting in Garage Bays	2	1	1	0	0	18	6	42	28
31	01	Replace Makeup Air Unit	2	1	2	0	0	24	4	40	29
32	01	OH garage door openers (No door)	2	1	2	0	0	24	4	40	29
33	06	Replace Panels	2	1	2	0	0	24	4	40	29
34	11	Replace Panels	2	1	2	0	0	24	4	40	29
35	Administration	Replace Garage Doors	2	1	2	0	0	24	4	40	29
36	Administration	Replace HVAC Equipment	2	1	2	0	0	24	4	40	29
37	11	Replace Heat Exchanger	2	1	0	0	1	14	6	38	35
38	90	Replace or modify Air Handling Units (size of unit for accurate cost)	1	0	0	0	1	6	8	38	35
39	05	New 8” plug valves for three RAS pumps	2	2	2	0	0	28	2	36	37

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
40	Administration	Replace Roof (Above Maintenance Area) - 5 Years out	1	1	0	0	2	12	6	36	37
41	90	Replace drive belts and bearings on exhaust fans	1	0	0	0	0	1	8	33	39
42	01	Replace Equipment Room Exhaust Fans	2	1	2	0	0	24	2	32	40
43	01	Replace exhaust fans	2	1	2	0	0	24	2	32	40
44	03	Replace Makeup Air Unit	2	1	2	0	0	24	2	32	40
45	05	Replace RAS Pump VFDs	2	2	0	2	0	24	2	32	40
46	05	Skimmer Arm replacement with SST on the 3 clarifiers	2	2	1	0	1	24	2	32	40
47	06	Replace Basement Supply Fan	2	1	2	0	0	24	2	32	40
48	13	Overhaul 30HP Pumps	2	1	2	0	0	24	2	32	40
49	03	Overhaul 75 HP Pumps	2	0	2	0	0	20	2	28	47

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
50	04	Replace 150 HP Blower with a smaller VFD Blower and reprogram blower operation sequencing	1	1	2	0	0	20	2	28	47
51	06	Optimize DAF Efficiency	1	1	0	1	0	12	4	28	47
52	11	Replace Makeup Air Unit	2	1	1	0	0	18	2	26	50
53	11	Replace Makeup Air Unit - Boiler Room	2	1	1	0	0	18	2	26	50
54	05	Install launder covers on 3 clarifier effluent troughs	1	1	1	0	1	16	2	24	52
55	11	Replace Exhaust Fan	2	2	0	0	0	16	2	24	52
56	01	Replace Grit Separator & Auger	2	1	0	0	0	12	2	20	54
57	01	Replace Grit Auger	0	0	2	0	0	12	2	20	54
58	03	Replace four 75 HP motors	2	0	0	0	0	8	2	16	56
59	Aspirational	Methane to Natural Gas Conversion						0		0	57

			Prioritization								
			Non-Monetary Criteria Weighting								
			Rank 0-2; with 2 as high risk and 0 as low risk								
			Age of Asset	Asset Visual Condition	Asset Maintenance Records	Hydraulic or Process Capacity	External Risks to Asset	Weighting Total	Consequence of Failure	Total Weighted Score	Ranking
60	Aspirational	Algae Phosphorous Removal						0		0	57

Section 4 Cost Estimating

Project cost estimates have been developed for the proposed improvements to existing facilities. The cost estimates include both estimated construction cost and an allowance for professional engineering service. Cost estimates are based on labor and materials and include an allowance for undeveloped design details and a construction contingency factor for unforeseen conditions. Contractors' overhead and profit is then added to arrive at a total construction cost estimate.

- Undeveloped design details are 20 percent. This line item accounts for the project items that do not have line-item costs.
- An additional 15 percent is added for the supply chain interruption that the market has been experiencing for the past year.
- Contractor overhead is 15 percent.
- Contractor profit is 10 percent.
- The cost markup for engineering is 10 percent.

The cost estimates are based on high level concepts with minimal development. The probable cost envelope for this level of estimating is -20 percent to +30 percent.

All cost estimates presented in this report are Stanley Consultants' opinions of probable project, construction, and/or operation and maintenance costs. Cost estimates are made on the basis of our experience and represent our best judgment. We have no control over cost of labor, materials, equipment, contractor's methods, or over competitive bidding or market conditions. Therefore, we do not guarantee that proposals, bids, or actual construction costs will not vary from estimates of project costs, construction, and/or operation and maintenance costs presented.

The construction cost estimates are presented in terms of 2022 dollars. As the timing of these projects are not firm, actual cost may vary with time due to inflation and bid climate factors.

Section 5 Project ID and Grouping

The assets were reviewed and lumped into projects based the criticality of an asset or based on the amount of assets needing replaced or rehabbed in one location. Project groupings generally either are by location or by system (ie electrical). Descriptions of each project can be found in subsequent sections. Summary results of the project groupings are presented in this section.

5.1 Lift Station Projects

Some of the lift station assets rated lower except for HVAC or electrical equipment. A HVAC project was created to address all lift station make-up air units, exhaust fans, and unit heaters that need replacement allowing specialty contractors to bid on like work. An electrical project was created to address all lift station MCCs, backup feeds, and electrical panels that need replacement allowing specialty contractors to bid on like work.

Other lift stations require process and/or structural modifications in addition to HVAC and electrical work. A separate project encompassing all assets in one location is created for these lift stations. Table 5-1 presents the lift stations that are their own project due to the amount of assets that need to be replaced or modified. These projects encompass process, structural, HVAC, and electrical assets replacements.

Table 5-1: Major Lift Station Projects

Score	Lift Station Name	Cost
57	Papoose Lift Station (Façade/Bathroom/Generator)	$1,100,000
60	Isett Lift Station (Near Term)	$460,000
43	Schley Lift Station	$160,000
40	Papoose Lift Station (Near Term)	$310,000
40	Houser Lift Station	$150,000
38	Canon Lift Station	$280,000
56	Isett Lift Station (Long Term)	$1,890,000
-	Papoose Lift Station (Long Term)	$3,100,000

Source: Stanley Consultants, Inc.

Each lift station lists a project cost estimate and the median score for all assets within the lift station. Papoose Lift Station façade, bathroom, and generator project has the highest score indicating it is the most critical project to address. Papoose Lift Station long term project does not have a score because this project addresses concerns not related to the condition of the existing assets. Papoose Lift Station short term project considers the condition of the existing assets.

Table 5-2 includes the lift stations that are a part of the electrical project. Each lift station lists a cost estimate for each station and a total cost for the project at the bottom. A median score for all electrical assets at each lift station is shown in the table.

Table 5-2: Lift Station Electrical Package

Score	Lift Station Name	Cost
67	Sampson	$37,000
46	Tanglefoot	$10,000
46	Sunset	$50,000
43	Tipton	$10,000
37	Bond	$106,000
31	Hershey	$11,000
25	Slough	$4,000
21	Mad Creek	$120,000
Total		$348,000

Source: Stanley Consultants, Inc.

The electrical package addresses the most critical assets within Sampson Lift Station to the less critical assets within Mad Creek Lift Station. With all electrical components being replaced at the same time, the manufacturer and setup will be consistent at each location and will be easier to operate and to keep spare parts on hand.

Similar to Table 5-2, Table 5-3 includes the lift stations that are a part of the HVAC project.

Table 5-3:Lift Station HVAC Package

Score	Lift Station Name	Cost
60	Bond	$20,000
50	Mad Creek	$43,000
45	Stewart Road	$107,000
43	Storm Water	$3,000
35	Progress Park	$80,000
35	Tipton	$20,000
35	Hershey	$24,000

Score	Lift Station Name	Cost
34	Sampson	$42,000
32	Slough	$2,000
26	Miles	$34,000
26	57th Avenue	$25,000
Total		$400,000

Source: Stanley Consultants, Inc.

The score for each lift station is a median of all the HVAC asset scores. For example, Progress Park Lift Station has a median score of 35 and it does not reflect the criticality to replace of some of the assets. The makeup air unit needs replacement and scored a 60. The score for the exhaust fans and unit heaters lowered the median score at Progress Park Lift Station. The HVAC package encompasses all critical assets as well as those not rated as high.

The remaining assets not included in one of the above projects are divided into process assets taken care of by City staff or contracted out to others. Table 5-4 and 5-5 lists the lift stations that have assets taken care of by City staff and contracted out to others.

Table 5-4: Lift Station Process Package Completed In-House

Score	Lift Station Name	Cost
51	Stewart Road	$70,000
49	Mad Creek	$26,000
47	Progress Park	$17,000
41	Slough	$7,000
39	Magnolia Lift Station Package	$37,000
39	Miles	$8,000
35	Tipton	$17,000
29	Stormwater	$7,000
24	Maple Grove Lift Station Package	$66,000
Total		$255,000

Source: Stanley Consultants, Inc.

The process package completed in-house includes activities that City staff complete on a regular basis. This package will not be completed all at once as those projects that are contracted out, but as City staff have time to complete in their day-to-day schedule.

Table 5-5: Lift Station Process Packages Contracted Out

Score	Lift Station Name	Cost
50	Hershey	$28,000
30	Tanglefoot	$20,000
30	Sunset	$22,000
Total		$70,000

Source: Stanley Consultants, Inc.

The process package contracted out, shown in Table 5-5, are individual projects but the fee is small in comparison to the other packages and are grouped together to be completed in the same fiscal year.

5.2 WRRF Asset Prioritization

Similarly, to the lift station assets, The WRRF assets were reviewed and lumped into projects based the criticality of an asset or based on the amount of assets needing replaced or modified in one system. Project descriptions can be found in subsequent sections.

Table 5-6 presents the systems that are their own project due to the size and/or criticality of the project.

Table 5-6: Major WRRF Projects

Score	Project Name	Cost
68	UV Disinfection System	$1,250,000
66	Influent Gate Freeze Protection & Odor Control	$100,000
56	Digester Complex - Digester Capacity & Pumping	$1,280,000
54	System 03 - Replace Roughing Filter Media	$2,010,000
-	HSW Rehab Tank	$480,000
-	Algae Phosphorus Removal	$5,500,000
-	Methane to Natural Gas Conversion	$7,700,000

Source: Stanley Consultants, Inc.

Table 5-7 includes the WRRF assets that are a part of the electrical project. A cost estimate is listed for each system or building and a total cost for the electrical project at the bottom. A median score for all electrical assets at each location is shown in the table.

Table 5-7: WRRF Electrical Package

Score	Project Name	Cost
64	System 01 - Replace MCC & PLC	$64,000
63	System 03 - Replace MCC & Add Exterior Lighting	$100,000
54	System 06 - Replace MCC & Panels	$73,000
54	System 11 - Replace MCC & Panels	$100,000
52	System 90 - Relocate Electrical Panels	$20,000
42	Replace Lighting in Garage Bays	$42,000
32	System 05 - Replace RAS Pump VFDs	$41,000
Total		$440,000

Source: Stanley Consultants, Inc.

The electrical package addresses replacing aged MCCs to updating building lighting for increased staff safety. With all electrical components being replaced at the same time, the manufacturer and setup will be consistent at each location and will be easier to operate and to keep spare parts on hand.

Similar to Table 5-7, Table 5-8 includes areas within the WRRF under the HVAC project.

Table 5-8: WRRF HVAC Package

Score	Project Name	Cost
44	System 06 - Replace MAU, Heaters & Fans	$95,000
40	Administration/ Control Building - Replace HVAC System	$91,000
36	System 90 - Modify Exhaust Fans & MAU	$70,000
32	System 01 - Replace MAU & Exhaust Fans	$90,000
32	System 03 - Replace MAU	$14,000
26	System 11 - Replace MAU, Fans, Heat Exchangers & Boiler	$380,000
Total		$740,000

Source: Stanley Consultants, Inc.

The remaining assets not included in one of the above projects are divided into process assets taken care of by City staff or contracted out to others. Table 5-9 and 5-10 lists the systems or buildings that have assets taken care of by City staff and contracted out to others.

Table 5-9: WRRF Process Package Completed In-House

Score	Project Name	Cost
66	System 05 - Replace Sidewalks	$27,000
56	System 13 - Replace Lagoon Dredger	$297,000
52	System 05 - Replace 14" Plug Valve	$20,000
48	System 01 - Replace Hydraulic Press Motor	$25,000
40	System 01 - OH Garage Door Opener	$8,000
40	Administration - Replace Garage Doors	$41,000
36	Administration - Replace Roof Over Maintenance	$105,000
36	System 05 - Replace Three Plug Valves on RAS Pumps	$12,000
32	System 05 -Skimmer Arm Replacement	$50,000
32	System 13 - Overhaul 30 HP Pumps	$22,000
28	System 03 - Overhaul 75 HP Pumps	$25,000
28	System 06 - Optimize DAF Efficiency	$0
20	System 01 - Grit Separator & Auger	$25,000
16	System 03 -Replace four 75 HP Motors	$53,000
Total		$710,000

Source: Stanley Consultants, Inc.

The process package completed in-house includes activities that City staff complete on a regular basis. This package will not be completed all at once as those projects that are contracted out, but as City staff have time to complete in their day-to-day schedule.

Table 5-10: WRRF Process Packages Contracted Out

Score	Project Name	Cost
56	System 01 - Replace & Line Underground Drain Pipes	$30,000
24	System 05 - Add Launder Cover on Final Clarifiers	$710,000

Source: Stanley Consultants, Inc.

Section 6 Lift Station Project Descriptions

Detailed project descriptions for the lift station projects are contained in this section.

6.1 Papoose Lift Station – Structural/Public Bathroom/Emergency Generator

Department: WPCP
Project Location: Riverside Park

Project Description

The project would consist of replacement of precast wall panels on lift station, and the addition of a public restroom. The public restroom roof will provide platform for replacement electrical transformers and emergency generator to provide backup power to Papoose Lift Station.

Estimated 2022 Cost:	$ 1,100,000	**Project Type:**	Replacement/ New
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	Yes – Aligned with Riverfront Master Plan

Purpose and Need for Project

A condition assessment of the Papoose Lift Station was completed in 2022. The assessment indicated that the precast concrete panels serving as the walls of the lift station are beginning to bow away from the concrete support columns. Precast panel replacement should be completed before or coincide with the anticipated Lift Station Façade Renovation project previously scheduled for fiscal year 2026. Papoose Lift Station has also been operating without a secondary source of backup power. Now that the combined sewer separation project is near completion, it is important to maintain power to the pumps to avoid sanitary sewer overflows to the Mississippi River. A part of the City's vision is to provide a public restroom facility next to the lift station and to house an emergency generator above the restrooms to serve as a secondary power source. The existing electrical transformers serving the lift station are on a deteriorating wooden support structure. The bathroom roof will also provide platform for mounting the electrical transformers.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$100,000
Construction	$210,000
Equipment	$790,000
Total	**$1,100,000**

6.2 Papoose Lift Station – Near Term Facility Updates

Department: WPCP
Project Location: Riverside Park

Project Description

Portions of the lift station are broken, deteriorating, or have reached the end of its life. Structural items that need replacement include the exterior stairs, windows and roof. The dumpster area and the entry between the screen room and the control room need to be modified. Exhaust fans, ventilation system, and MCC will be replaced. Project includes new interior and exterior lighting.

Estimated 2022 Cost:	$ 310,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF	**Estimated Completion Time:**	1 year
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

A condition assessment of the Papoose Lift Station was completed in 2022. The assessment indicated that many assets have reached the end of their service life. The exterior stairs and broken windows need replacement due to vandalism. Exterior lighting at entranceway and porch is needed to deter vandalism. The roof currently leaks in the screen room and should be replaced to prevent damage to equipment housed inside the lift station. There is currently an entryway between the screen room and the control room which is against code. Exhaust fans and unit heaters throughout the lift station need replacement because they either do not work or they are not up to code. The MCC is beyond 30 years of age, and it is difficult obtaining spare parts. Better LED lighting will be added inside the lift station for increased safety.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$30,000
Construction	$60,000
Equipment	$220,000
Total	**$310,000**

6.3 Papoose Lift Station – Stormwater Lift Station Addition

Department: WPCP
Project Location: Riverside Park

Project Description

This project modifies the Papoose Lift Station to pump and convey stormwater flows separately from sanitary flows. A stormwater lift station will be constructed to pump Papoose Creek flows over the levee if river levels are high. The three existing pumps in Papoose Lift Station will be replaced with a four-pump arrangement sized to convey sanitary flows to the WRRF.

Estimated 2022 Cost:	$3,100,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF or Sewer Collection Fund	**Estimated Completion Time:**	3 year
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	Yes – this project is considered part of the overall combined sewer separation program.

Purpose and Need for Project

Papoose Lift Station was designed to pump combined sewer flows. If stormwater flows were high and exceeded the pumping capacity, the combined sewer would overflow to the Mississippi River. Now that the City is almost finished with the combined sewer separation mandated by the DNR, it is unfavorable for the City to send excess combined sewer flow to the Mississippi River. Papoose Lift Station is not designed to pump stormwater flow separate from sanitary flow. Under low river elevations, stormwater can flow by gravity to the Mississippi River. However, under high river elevations, stormwater will either back up into the Papoose Creek sewer or combine with sanitary flows to be pumped to the WRRF and potentially overflow to the river. Both options result in either basement flooding throughout the downtown business and/or DNR permit violations. Papoose Lift Station needs to have pumps dedicated to stormwater management when river levels are high. The existing pumps are oversized for only sanitary flows and are

inefficient. The sanitary wet well is also likely two small for the peak wet weather flows coming through the separate sanitary system.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$330,000
Construction	$570,000
Equipment	$2,200,000
Total	**$3,100,000**

6.4 Isett Lift Station – Near Term Facility Updates

Department: WPCP
Project Location: 1301 Isett Ave.

Project Description

This project addresses several safety and maintenance issues with Isett Lift Station. Operating valves and the extended shafts for the pumps have unsafe access for regular maintenance and operation needs. Access platforms will be installed to provide safe access for these activities. The wet well cover will be replaced. Exhaust fans and ventilation system will be replaced. An emergency generator will be incorporated for a second power source.

Estimated 2022 Cost:	$ 460,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

The lack of accessibility to pump shafts and valves poses both a maintenance and safety risk to plant operators. Wet well cover is failing and needs replacement. HVAC equipment has exceeded its service life and should be replaced. The lift station does not have a secondary power source and adding an emergency generator will provide power backup in case of a power outage.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$45,000
Construction	$135,000
Equipment	$280,000
Total	**$460,000**

6.5 Isett Lift Station – Long Term Facility Updates

Department: WPCP
Project Location: 1301 Isett Ave.

Project Description

This project addresses longer term issues with Isett Lift Station. The three extended shaft pumps will be replaced with dry pit submersible pumps. Corroded piping and valves due to low pH industrial discharges will be replaced. Structural items that need addressed include installing pump hatches in the operating floor on in the roof and replacing the precast concrete wall panels.

Estimated 2022 Cost:	$ 1,890,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

The lack of accessibility to pumps poses both a maintenance and safety risk to plant operators. One of the pumps is original to the plant and cannot be removed as the dry pit is currently designed. The pumps will be replaced with dry pit submersibles to allow easier access for removal and maintenance. The equipment in the lift station is subjected to highly corrosive conditions due to the nature of the industrial waste received. Precast wall system will be renovated.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$190,000
Construction	$343,000
Equipment	$1,357,000
Total	**$1,890,000**

6.6 Schley Lift Station – Facility Updates

Department: WPCP
Project Location: 1321 Nebraska St.

Project Description

This project includes replacement of one shafted pump, all three pump motors, exhaust fans, and MCC. An emergency generator would be added in lieu of a single diesel operated pump.

Estimated 2022 Cost:	$160,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

Schley Lift Station requires some HVAC and electrical repairs to ensure safety and adherence to state standards. There are exhaust fans that are either non-functioning or do not have the required safety equipment. The electrical system is past its serviceable life, and it is not possible to run tests on the generator. One of the pumps is still original to the construction of the lift station and requires more maintenance then typical.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$16,000
Construction	$29,000
Equipment	$115,000
Total	**$160,000**

6.7 Houser Lift Station – Facility Updates

Department: WPCP
Project Location: 1301 Houser St.

Project Description

This project includes replacement of two shafted pumps and pump motors, the exhaust fan, unit heater, and electrical panels. An emergency generator will be added for backup power.

Estimated 2022 Cost:	$ 150,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

The pumps in Houser need to be rebuilt every couple of years. Replacement with dry pit submersible pumps would more efficient and economical in the long run. The fan in the dry well is non-functional. This fan is required for operator safety as well as cooling the control room. The unit heater is original to the lift station, which was built in 1968, and past its serviceable life. Similarly, two motors and two electrical panels need replacement due to age. Suction valves and discharge valves also need to be replaced.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$20,000
Construction	$40,000
Equipment	$90,000
Total	**$150,000**

6.8 Canon Lift Station – Facility Updates

Department: WPCP
Project Location: 317 Canon St.

Project Description

Canon Lift Station needs several improvements to ensure safety and efficiency. Project includes replacement of all HVAC and electrical equipment, new interior LED lighting, and hardware on access platform to dry well.

Estimated 2022 Cost:	$ 280,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

To provide for adequate ventilation, the damper opening between the screen room and generator/control room should be removed. A dedicated heating system should be provided for the screen room that is suitable for hazardous locations. Similarly, the wet well exhaust fan should be replaced to maintain operator safety. According to the 10 States Standards, the exhaust fan should be allowed to run independently. The supply air unit and exhaust fan in the dry well should also be replaced. Electrical equipment should be replaced due to age, including the generator, panelboard, control panel, motor control center, and two motors.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$28,000
Construction	$53,000
Equipment	$199,000
Total	**$280,000**

6.9 Lift Station Electrical Package—Sampson, Tanglefoot, Sunset, Bond, Tipton, Hershey, Slough, Mad Creek

Department: WPCP
Project Location: Various

Project Description

This project contains electrical repair and replacement projects for multiple lift stations that need to be contracted. The following lift station are included in this package: Sampson, Tanglefoot, Sunset, Bond, Tipton, Hershey, Slough and Mad Creek.

Estimated 2022 Cost:	$ 348,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

These electrical projects are rated as a high priority based on lack of serviceability and/or lack of power backup if an outage were to occur. Sampson and Bond Lift Stations require replacement of their motor control centers due to age. Slough, Mad Creek and Bond Lift Stations require new LED lighting for safety. Tanglefoot and Hershey Lift Station require a new transfer switch for power backup. Bond and Mad Creek Lift Stations require three pump motors. Bond Lift Station also requires a new emergency generator due to age and maintenance. Tanglefoot requires a new electrical service pedestal. Sunset Lift Station requires a new electrical panel, transfer switch, and emergency backup power generator. Tipton Lift Station requires new 15 HP pump buckets. This project should be completed by one contractor to reduce cost and to ensure permit compliance.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$40,000
Construction	$65,000
Equipment	$243,000
Total	**$348,000**

6.10 Lift Station HVAC Package—Bond, Mad Creek, Stewart Road, Storm Water, Tipton, Hershey, Sampson, Slough, Miles, 57th Avenue, Progress Park

Department: WPCP
Project Location: Various

Project Description

This project contains HVAC repair and replacement projects for multiple lift stations that need to be contracted. The following lift station are included in this package: Bond, Mad Creek, Stewart Road, Storm Water, Tipton, Hershey, Sampson, Slough, Miles, 57th Avenue, Progress Park.

Estimated 2022 Cost:	$ 400,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

These HVAC projects are rated as a high priority based on inoperability, service life and/or not meeting current building code. Proper ventilation is critical for worker safety and the integrity of the equipment in the lift stations. Exhaust fans need to be replaced with explosion-proof rated models for ventilation and safety purposes. Since replacement parts for several pieces of equipment are not readily available, it is safer to replace them. Unit heaters are necessary for freeze protection in wet wells. Backflow preventers are necessary to avoid leaks and cross-contamination.

Bond requires new dry and wet well exhaust fans. Mad Creek requires new exhaust fans, supply fans, and a unit heater. Stewart requires new exhaust fans, a new unit heater, and a new makeup air unit. Stormwater Lift Station requires replacement of roof vents. Tipton requires new exhaust fans. Hershey and Sampson require new unit heaters and exhaust fans. Slough requires a new wall louver. Miles and 57th Avenue Lift Stations require new exhaust fans, unit heaters, and backflow preventers. Progress Park requires exhaust

fans, new makeup air units, and new unit heaters. This project should be completed as part of the SRF loan to ensure the safety of staff, reduce energy costs and protect process equipment from corrosive gases.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$40,000
Construction	$82,000
Equipment	$278,000
Total	**$400,000**

6.11 Lift Station Process Package, In-House—Stewart Road, Mad Creek, Progress Park, Slough, Magnolia, Miles, Tipton, Stormwater, Maple Grove

Department: WPCP
Project Location: Various

Project Description

This project contains small miscellaneous projects for various lift stations that can be completed by City staff. The following lift station are included in this package: Stewart Road, Mad Creek, Progress Park, Slough, Magnolia, Miles, Tipton, Stormwater, and Maple Grove.

Estimated 2022 Cost:	$ 255,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City/SRF	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

These projects are simple enough for City staff to complete but critical to the functionality of the lift stations. Stewart Road requires cages around pump drive shafts, rebuilding one of the pumps, bar screen repair, and a new access door. The manual hoist at Mad Creek needs to be replaced to conform to Corps standards, as well as a new wet well platform and replacement of one of their pump suction valves. Progress Park requires safety cages around pump shafts, rebuilding one of the pumps, and new door hardware to the wet well. Slough requires decking with a few steps for safety reasons, and the roof needs to be replaced to allow easier access to pumps. Magnolia requires replacement of its pump system with a duplex submersible pump to have pump redundancy. Miles needs piping in its wet well replaced. Tipton needs pumps 2 and 3

replaced due to inoperability and roof repairs. Stormwater requires a new manual hoist in accordance with Corps standards and a new automatic control valve to operate the bypass gate. Maple Grove's air ejector system needs to be replaced with a duplex submersible pump station to avoid added maintenance and maintain reliability.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$0
Construction	$0
Equipment	$255,000
Total	**$255,000**

6.12 Lift Station Process Package, Contracted—Tanglefoot, Hershey, Sunset

Department: WPCP
Project Location: Various

Project Description

This project contains small miscellaneous projects for various lift stations that must be contracted. The following lift station are included in this package: Tanglefoot, Hershey, and Sunset.

Estimated 2022 Cost:	$ 70,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City/SRF	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

These projects are critical to the functionality of the lift stations. Tanglefoot requires a new electrical service pedestal and a portable pump connection to allow a means to bypass flow if lift station has a power outage. Hershey's dry well ladder and wet well hatches need to be replaced based on current OSHA regulations. There is also some façade work required. Sunset has a plugged suction line that needs to be repaired, and a portable pump connection needs to be installed to allow a means to bypass flow if lift station has a power outage.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$14,000
Construction	$12,000
Equipment	$44,000
Total	**$70,000**

6.13 Engineering Study – Sewer Master Plan & Hydraulic Modeling

Department: WPCP
Project Location: WPCP

Project Description

This project is an extensive engineering study on the City's wastewater collection system including major gravity sewers and lift stations. A hydraulic model of the collection system will be built to simulate the flows to the various lift stations and ultimately to the WRRF.

Estimated 2022 Cost:	$250,000	**Project Type:**	Study
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	TBD	**Estimated Completion Time:**	1 year
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

Papoose Lift Station can experience sanitary sewage flows that the pumps cannot keep up with. Modifications to the lift station need to be made to be able to handle the sanitary flows, but there are many lift stations that pump into the same force main to the WRRF. Putting in larger sanitary pumps at Papoose Lift Station may adversely impact the efficiency and performance of the other lift stations. Some lift stations have more than one location that they can pump to, such as Mad Creek Lift Station. Mad Creek can either pump into Papoose Lift Station or it can bypass Papoose and pump directly into the main force main to the WRRF. A hydraulic model will be a useful tool to analysis the entire collection system to determine the cause and effect of implementing changes to various lift stations and to determine the most efficient method to convey sanitary flows. The hydraulic model will also be utilized to examine capacities in the various trunk sewers with consideration for growth areas.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$250,000
Construction	$0
Equipment	$0
Total	**$250,000**

6.14 Engineering Study – Papoose Creek Reconfiguration Study

Department: WPCP
Project Location: WPCP

Project Description

This project is an engineering study to evaluate the best way to build a storm water lift station between Papoose Creek and the Mississippi River and to manage creek flows when river levels are too high to flow by gravity to the river. The study will also consider sanitary wet well expansion. Papoose Creek comes to Papoose Lift Station before flowing to the Mississippi River so modifications need to be made at Papoose Lift Station to fully separate creek flows from the sanitary collection system.

Estimated Cost:	$75,000	**Project Type:**	Study
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	TBD	**Estimated Completion Time:**	1 year
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

When Mississippi River elevations are high, stormwater will either back up into the Papoose Creek sewer or combine with sanitary flows at the Papoose Lift Station to be pumped to the WRRF and potentially overflow to the river. Both options result in either basement flooding throughout the downtown businesses and/or DNR permit violations. Dedicated storm water pumps are needed to pump storm water over the levee when river elevations are high alleviating flows at Papoose Lift Station and within Papoose Creek sewer. Space for a lift station is limited on the riverfront and the study will evaluate the best location for the storm water lift station.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$75,000
Construction	$0
Equipment	$0
Total	**$75,000**

6.15 Engineering Study – Digital Water Master Plan

Department: WPCP
Project Location: WPCP

Project Description

This project is a digital/smart utility management master planning study to evaluate select technological tools and platforms and resulting benefits to City for improving overall utility management and optimize system performance.

Estimated 2022 Cost:	$30,000	**Project Type:**	New
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City	**Estimated Completion Time:**	1 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

Digital water management is starting to be used in many communities as it is a helpful tool in managing their assets and optimizing the performance of their systems. Equipment repairs, routine maintenance, operation, etc. can be tracked digitally instead of through paper files. Digital water can be incorporated into the SCADA system to see real time operation of all assets. Digital water management can employ advance sensors, artificial intelligence, and predictive analytics to improve overall utility performance. This master plan will identify the appropriate technologies, tools, platforms, and systems that the City may want to consider implementing over time for efficiency gains.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$30,000
Construction	$0
Equipment	$0
Total	**$420,000**

6.16 Digital Water Management Implementation

Department: WPCP
Project Location: WPCP

Project Description

This project will implement digital water management systems over time in accordance with the digital water master plan to improve overall utility performance.

Estimated 2022 Cost:	$400,000	**Project Type:**	New
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City	**Estimated Completion Time:**	9 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

Digital water management is starting to be used in many communities as it is a helpful tool in managing their assets. Equipment repairs, routine maintenance, operation, etc. can be tracked digitally instead of through paper files. Digital water can be incorporated into the SCADA system to see real time operation of all assets.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$100,000
Construction	$120,000
Equipment	$180,000
Total	**$400,000**

Section 7 WRRF Project Descriptions

Detailed project descriptions for the WRRF projects are contained in this section.

7.1 UV Disinfection System

Department: WPCP
Project Location: WRRF

Project Description

The project would replace the plant's current ultraviolet (UV) system with a UV system that can be submerged in a flood situation. The downstream control gate would be replaced with a finger weir system to better control water elevations in the UV channels.

Estimated 2022 Cost:	$ 1,250,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City	**Estimated Completion Time:**	1 year
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	Yes

Purpose and Need for Project

A condition assessment of the UV system was completed in 2022. The assessment indicates that the electrical equipment is producing a safety hazard for personnel to work on and maintain. The hazardous condition is most likely due to the electrical equipment being submerged when the building flooded and/or the European voltage for the UV equipment does not line up with US standard voltage. The downstream flow control gate automatically adjusts its elevation through SCADA, and the building has occasionally flooded due to the gate not functioning properly. The gate will be replaced with a fixed weir system which will maintain a better control on water elevations in the UV building. The existing UV system is failing after a little over 10 years in operation which is much less than the typical 20-year life expectancy. The UV system equipment will be replaced with newer, more efficient technology with a track record of extend durability. Securing replacement parts for the existing UV system is difficult and the WRRF continues to receive permit violations. Updating the UV system and downstream weir is critical in order to stay in compliance with the Iowa Department of Natural Resources (DNR).

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$125,000
Construction	$245,000
Equipment	$880,000
Total	**$1,250,000**

7.2 HSW Tank Rehabilitation

Department: WPCP
Project Location: WRRF

Project Description

This project involves renovating an existing tank to be used as a second high strength waste (HSW) receiving tank. The HSW tank renovation requires concrete rehabilitation, jet mixing system, piping, valves and other associated equipment.

Estimated 2022 Cost:	$480,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF	**Estimated Completion Time:**	3 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	Yes

Purpose and Need for Project

The initial HSW/MORC project renovated one of two tanks to be used for HSW storage prior to feeding to the anaerobic digesters. Renovating the second tank would double the HSW storage volume allowing better management of the HSW for feeding into the digester.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$48,000
Construction	$93,000
Equipment	$339,000
Total	**$480,000**

7.3 Digester Complex Rehabilitation

Department: WPCP
Project Location: WRRF

Project Description

This project includes replacing two digested sludge transfer pumps in the digester control building and rehabilitating one of the abandoned digesters to increase digester capacity. Digester rehabilitation requires digester solids removal, new tank insulation, mixing system, plug flow baffle wall and heat exchanger system, slurry removal equipment, piping, valves and other associated equipment.

Estimated 2022 Cost:	$1,280,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	TBD	**Estimated Completion Time:**	3 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	Yes

Purpose and Need for Project

A condition assessment of the digester complex and sludge lagoons was completed in 2022. The two digested sludge transfer pumps require a high amount of maintenance due to struvite buildup. Pump discs are replaced frequently up to multiple times per day. Replacing the pumps with a rotary lobe style pumpswill facilitate maintenance required on digested sludge transfer pumps.

Digester tanks are close to design capacity and do not have the ability to accept more high strength waste (HSW) than what the WRRF is currently taking limiting revenues. Digestion time is currently limited to digester capacity and the lack of time that sludge and HSW have in the digesters is affecting how well sludge settles and the capacity of the sludge lagoons. The quality of digested sludge should improve if digestion time is increased. This will also allow increased volumes of HSW received and associated revenues.

The City committed to the waste-to-energy project understanding the potential in revenue. The Digester Complex Rehabilitation project will allow the waste-to-energy project to increase revenues. Increased volume will generate more biogas which will make future utilization of the biogas for electricity or natural gas.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$128,000
Construction	$253,000
Equipment	$899,000
Total	**$1,280,000**

7.4 Influent Gate Freeze Protection & Odor Control

Department: WPCP
Project Location: WRRF

Project Description

This project includes installing a cover over the influent headbox to keep wastewater contained when gas bubbles release from the force mains. The odors within the headbox will be captured and passed through an ionizer treatment system to reduce odor.

Estimated 2022 Cost:	$100,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	Yes

Purpose and Need for Project

Gas bubbles trapped within the wastewater force mains will release out the headbox and cause wastewater to explode out of the headbox and rain down and around the surrounding area causing a safety hazard. Odors from the WRRF can be noticed by the community near the City baseball fields. Neutralizing the gasses through the ionizer will minimize the smell of odors throughout the community.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$10,000
Construction	$21,000
Equipment	$69,000
Total	**$100,000**

7.5 Roughing Filter Media Replacement

Department: WPCP
Project Location: WRRF

Project Description

This project includes replacement of roughing filter media.

Estimated 2022 Cost:	$2,010,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	Yes

Purpose and Need for Project

The media inside the roughing filter was replaced in 2006 due to lower media layers failing causing the whole media system to collapse. A condition assessment of the roughing filter was completed in 2022. Media typically has a lifespan of 20 years and the assessment shows current media must be replaced. The top layer of packing is missing, and the media visually appears to be falling apart due to UV corrosion. A cover has been installed over the media to protect the media from UV rays until it can be replaced. The roughing filter is critical in treating Kraft-Heinz waste and the WRRF cannot meet Iowa DNR permit limits without reliable media.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$88,000
Construction	$78,000
Equipment	$1,844,000
Total	**$2,010,000**

7.6 Algae Phosphorus Removal

Department: WPCP
Project Location: WRRF

Project Description

This project implements phosphorus removal within the wastewater through the growth of algae. The project includes new algae basins with a greenhouse structure to house the algae and associated piping, valving and electrical. Modifications to the existing aeration basin system include replacing two blowers with smaller units, adding submersible mixers, modifying the air diffusers, and upgrading the blower instrumentation and controls.

Estimated 2022 Cost:	$5,500,000	**Project Type:**	New & Modifications
Funding Schedule:	>FY28	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	TBD	**Estimated Completion Time:**	3 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	Yes

Purpose and Need for Project

The City is mandated by the State of Iowa to decrease the effluent phosphorus concentrations to the Mississippi River to a limit of 1 mg/L or less. Typical ways to remove phosphorus from a waste stream is to modify the aeration basin to create an atmosphere that will consume phosphorus or to add chemicals to precipitate the phosphorus out. The biological option will not bring limits down to 1 mg/L due to the nature of the wastewater so chemical addition will still be required. Adding chemical is costly in the long run. Using algae is an environmentally friendly solution and has very little energy expense. The algae pilot test also shows a significant reduction in ammonia to the activated sludge system downstream which would reduce the amount of air required to the aeration basins saving the WRRF approximately a third in electricity costs, or $100,000 annually. This cost is a high-level estimate and modifications may be made to decrease the overall project cost.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$356,000
Construction	$746,000
Equipment	$4,398,000
Total	**$5,500,000**

7.7 Methane to Natural Gas Conversion

Department: WPCP
Project Location: WRRF

Project Description

This project converts the methane gas created by the anaerobic digesters into natural gas. The project includes a gas cleaning & conditioning system, cogeneration microturbines, gas compressors, microgrid system and other miscellaneous appurtenances.

Estimated 2022 Cost:	$7,700,000	**Project Type:**	Replacement
Funding Schedule:	TBD	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	Private	**Estimated Completion Time:**	3 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

The WRRF currently burns the methane gas produced by the anaerobic digesters. With the creation of the MORC the amount of methane gas that must be expelled has increased, and the more high strength waste that the digesters consume the more methane gas created. Instead of wasting the gas, this project will give the City the ability to turn the methane gas into usable energy to sell or used to fuel City assets such as boilers, turbines, vehicles, etc.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$840,000
Construction	$1,600,000
Equipment	$5,260,000
Total	**$7,700,000**

7.8 WRRF Electrical Package

Department: WPCP
Project Location: WRRF

Project Description

This project contains electrical repair and replacement projects throughout the WRRF that need to be contracted. The electrical work effects the headworks (System 01), the roughing filter (System 03), the RAS pumps (System 05), sludge thickening (System 06), the digester complex (System 11), the lab (System 90), and the garage bays.

Estimated 2022 Cost:	$440,000	**Project Type:**	Replacement
Funding Schedule:	FY '25	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

These electrical projects are rated as a high priority based on lack of serviceability and/or lack of power backup if an outage were to occur. Due to age and serviceability, the motor control centers will be replaced at System 01, 03, 06 and 11. System 01 requires a new PLC for their grit system. System 03 requires exterior lighting for safety. The RAS pump VFDs in System 05 are not reliable and require replacement. System 06 and 11 require new electrical panels. The electrical panels in System 90 need to be relocated to meet building code. The lighting in the garage bays need to be replaced with LEDs. This is considered a high priority project as all these systems have seen electrical issues that would affect process control. This project should be completed by one contractor to reduce cost and to ensure permit compliance.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$44,000
Construction	$93,000
Equipment	$303,000
Total	**$440,000**

7.9 WRRF HVAC Package

Department: WPCP
Project Location: WRRF

Project Description

This project contains HVAC repair and replacement projects throughout the WRRF that need to be contracted. The HVAC work effects the headworks building (System 01), the roughing filter building (System 03), the sludge thickening building (System 06), the digester complex (System 11), the lab (System 90), and the administration/control building.

Estimated 2022 Cost:	$740,000	**Project Type:**	Replacement
Funding Schedule:	FY '27	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	SRF	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

These HVAC projects are rated as a high priority based on inoperability, service life and/or not meeting current building code. The make-up air units in Systems 01, 03, 06 and 11 are past their service life, are maintenance intensive and should be replaced. The exhaust fans in System 01 are near the end of their expected service life and should be replaced to maintain operator safety. The unit heaters and exhaust fan in System 06 are either past their service life or are inoperable. System 11 requires new exhaust fans, heat exchangers and a boiler as they are passed their service life. The make-up air unit and exhaust fans in System 90 will be modified to improve system reliability and operation. The HVAC system in the Administration/Control Building has reached the end of its service life. This project should be completed as part of the SRF loan to ensure the safety of staff, reduce energy costs and protect process equipment from corrosive gases.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$74,000
Construction	$156,000
Equipment	$510,000
Total	**$740,000**

7.10 Headworks Building Drain Line Replacement

Department: WPCP
Project Location: WRRF

Project Description

This project includes televising the drain piping underneath the ground floor of the headworks building. If the results of the televising show pipe deterioration the piping will be lined or replaced.

Estimated 2022 Cost:	$30,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	Replacement

Purpose and Need for Project

The headworks building contains drain piping for the grit dewatering system that has lost structural integrity in many areas and needed replacement. The pipe that has been replaced is exposed and easily accessible. The condition of the piping under the ground floor of the headworks building is unknown and needs to be investigated to determine if pipe replacement is necessary.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$3,000
Construction	$6,000
Equipment	$21,000
Total	**$30,000**

7.11 Final Clarifier Launder Covers

Department: WPCP
Project Location: WRRF

Project Description

This project consists of the installation of fiberglass covers over the three final clarifier effluent launders.

Estimated 2022 Cost:	$710,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	TBD	**Estimated Completion Time:**	2 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

Algae will grow on the effluent launders and slough off accumulating on the ultraviolet bulbs downstream which effects the quality of wastewater disinfection. Keeping the effluent launders and UV bulbs free of algae buildup is maintenance intensive. Installing covers over the effluent launders will deflect the UV rays and prevent algae buildup.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$70,000
Construction	$150,000
Equipment	$490,000
Total	**$710,000**

7.12 WRRF Process Package, In-House

Department: WPCP
Project Location: WRRF

Project Description

This project contains small miscellaneous projects throughout the WRRF that can be completed by City staff. This project includes:

- replacing the hydraulic motor press, grit separator & auger, and overhead garage door under System 01,
- overhauling two pumps and replacing four pump motors under System 03,
- replacing four plug valves, final clarifier skimmer arms, and the sidewalks around the final clarifiers under System 05
- overhauling two pumps and replacing the lagoon dredger under System 13
- replacing garage doors and the roof on the Administration/Control Building.

Estimated 2022 Cost:	$710,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City/SRF	**Estimated Completion Time:**	5 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

These projects are simple enough for City staff to complete but critical to the functionality of the lift stations. The assets under System 01 are past their service life, are not functioning correctly, and/or lack a redundant unit. Under System 03, two of the four roughing filter pumps cannot operate at full capacity and need to be overhauled to provide full pump redundancy. The pump motors are from the original installation in 1985 and are past their service life. The valves under System 05 are past their service life, are not functioning correctly, and/or lack a redundant unit. The final clarifier skimmer arms are corroded and need to be replaced. The sidewalks around the final clarifiers are at an incline due to upheave and are a safety hazard to walk on. The pumps under System 13 aren't running efficiently and need to be overhauled. The lagoon dredger is past its service life, parts are no longer available, and is not reliable.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$0
Construction	$0
Equipment	$710,000
Total	**$710,000**

7.13 Gate Wells

Department: WPCP
Project Location: Various

Project Description

This project consists of the replacement of sluice gates at gate wells 5073, 6284, and 6305.

Estimated 2022 Cost:	$75,000	**Project Type:**	Replacement
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City – Collection System Fund	**Estimated Completion Time:**	1 years
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	Yes

Purpose and Need for Project

The sanitary gates in gate well 5073 and 6305 are frozen in the open position and cannot be closed. The sanitary gate in gate well 6284 does not seal properly and causes excessive leaking around the gate. These sanitary gate wells are to be compliant with the Corps of Engineers standards and need to be replaced to operate as intended.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$0
Construction	$0
Equipment	$75,000
Total	**$75,000**

7.14 Engineering Study – Phosphorus Modeling

Department: WPCP
Project Location: WRRF

Project Description

This project is an engineering study for the requirements to meet the State mandate of 1 mg/L phosphorus in the wastewater effluent.

Estimated Cost:	$50,000	**Project Type:**	Study
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City	**Estimated Completion Time:**	1 year
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	Yes

Purpose and Need for Project

The City is mandated by the State of Iowa to decrease the effluent phosphorus concentrations to the Mississippi River to a limit of 1 mg/L or less. The State had given the City a deferral as requested in their 2017 Nutrient Study, and the City needs to show the DNR that they are making progress towards achieving this standard. Now that the separation of the combined sewer system is near completion, it is time to review the plant's current flows and loads to determine how the phosphorus limits can be met based on the various alternatives that the City is exploring; biological, chemical, and algae use. Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$50,000
Construction	$0
Equipment	$0
Total	**$50,000**

7.15 Engineering Study – Solids Handling Study

Department: WPCP
Project Location: WRRF

Project Description

This project is an engineering study to review the current capacity of the sludge lagoons and what storage capacity is needed in the future. The study will evaluate various alternatives to sludge handling from expanding their lagoon system to keeping sludge handling at the WRRF.

Estimated 2022 Cost:	$40,000	**Project Type:**	Study
Funding Schedule:	See CIP	**Current Status:**	Identified as a future project; nothing completed to date
Funding Sources:	City	**Estimated Completion Time:**	1 year
Impact on Annual Operating Expenditures:	Yes	**Fulfills a Mandate or Comprehensive Plan Goal?**	No

Purpose and Need for Project

Lagoons are used to store digested sludge until the fall when it can be land applied to the nearby farm fields. The land that the lagoons are situated on are owned by Lutheran Homes and rented by the City. Lutheran Homes and the City have an agreement that the City may rent and maintain these lagoons if the City will fertilize the farm fields that Lutheran Homes is renting to local farmers. With the conception of the MORC and the continual growth of high strength waste received by the WRRF, the lagoons will exceed capacity in the future. This study will evaluate what future sludge loads could potential be and the various ways that the City could handle the sludge. The study will evaluate whether it is in the City's best interest to expand their lagoon system or if they should build sludge storage and handling at the WRRF.

Estimated Project Costs

Item	Estimated Total Cost
Planning and Engineering	$40,000
Construction	$0
Equipment	$0
Total	**$40,000**

Section 8 WRRF Capital Improvement Plan

8.1 Introduction

The WRRF Capital Improvement Plan (CIP) is a guide to measured investment over the next 10 years in WRRF, wastewater and stormwater lift stations, and gatewell assets to maintain the functionality, safety, reliability, and required treatment of the system's numerous assets. This investment guide was developed based on condition assessment of the assets, prioritization scoring based on criticality and other factors, development into discrete projects for implementation, and ranking of project priorities based on scoring and input from City operation and maintenance staff.

Table 8-1 presents the overall list of projects considered for inclusion in the 10-year CIP. A total of $29.5 million in potential asset investments have been identified.

Table 8-1: Wastewater WRRF & Lift Station Projects

Project	Estimated 2022 Cost
UV Disinfection System	$1,250,000
WRRF Electrical Package	$440,000
WRRF HVAC Package	$740,000
HSW Rehab Tank	$480,000
Lift Station Electrical Package	$348,000
Lift Station HVAC Package	$400,000
Isett Lift Station (Near Term)	$350,000
System 03 Replace Roughing Filter Media	$2,010,000
Papoose Lift Station (Near Term)	$310,000
Digester Complex - Digester Capacity & Pumping	$1,280,000
Algae Phosphorus Removal	$5,500,000
Gate Well Project	$75,000
Engineering Study - Phosphorus Modeling	$50,000
Influent Gate Freeze Protection & Odor Control	$100,000
Lift Station In-House Process Projects	$81,250
Lift Station Process Projects	$195,000
Schley Lift Station	$160,000

Project	Estimated 2022 Cost
Canon Lift Station	$280,000
System 01 Grit Replace & Line Drain Pipes	$30,000
WRRF In-House Process Projects	$185,000
WRRF Process Projects	$555,000
Engineering Study - Sewer Master Plan & Hydraulic Modeling	$250,000
Engineering Study - Papoose LS Reconfiguration	$75,000
Papoose Lift Station (Long Term-Dedicated Stormwater LS)	$3,100,000
Houser Lift Station	$150,000
Papoose Lift Station (Public Bathroom/Generator Project)	$1,100,000
Isett Lift Station (Long Term)	$1,890,000
System 05 Add Launder Cover on Final Clarifier	$710,000
Biogas to Energy Conversion	$8,380,000
Engineering Study - WRRF Solids Handling Study	$40,000
Engineering Study - SMART Utility Management Master Plan	$30,000
SMART Utility Management Implementation	$400,000
Total Capital Expenditure Incl New Loan Debt Service	$38,475,000

Source: Stanley Consultants, Inc.

Multiple draft CIPs were developed for City consideration including CIPs based solely on pay as you go from annual revenues, or a combination of single loan or multiple loan financed projects combined with pay as you go projects. The process of considering multiple CIPs facilitated City staff in developing a holistic approach to making investments in a prioritized manner while still maintaining reserve funds and avoiding user rate increases at higher than the current annual rate increases.

8.2 Methodology

The CIPs consider a 6 percent annual rate of inflation from the base 2022 cost estimate year and a 3 percent annual growth in revenues available to fund investments starting from a base 2022 amount of $450,000 annually. Project costs are spread over a single year or multiple years depending on overall project complexity and cost. These are accounted for in the Stanley Consultants CIP spreadsheet tool.

The final CIP was based on multiple iterations with City staff aligning the CIP with staff goals, condition-based prioritization and with recognition of project deferrals, debt financed projects, and potential for grant funding of select projects.

Table 8-2 presents the final overall calendar year 2023-2032 CIP for Wastewater WRRF & Lift Stations reflective of utilizing two 20-year state revolving fund loans to debt finance select projects. The first debt-financed project is anticipated to be completed no earlier than calendar year 2024-2025 with construction loan debt service starting in 2026. The first debt-financed project is anticipated to be completed no earlier than calendar year 2028-2029 with construction loan debt service starting in 2030. The remainder of the projects shown on the 2023-2032 CIP are pay as you go projects from wastewater revenues and/or reserve funds.

Table 8-2: 2023-2032 Wastewater WRRF & Lift Stations CIP

		FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032	FY 2033	
Assumed Average Annual Inflation Rate	6%	Year	Year	Year	Year	Year	Year	Year	Year	Year	Year	
Assumed Average Revenue Growth Rate	3%	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	Cumulative

Projects	Estimated 2022 Cost	1	2	3	4	5	6	7	8	9	10	Inflated Totals
UV Disinfection System	$1,250,000	$1,258,750										$1,258,750
WRRF Electrical Package	$440,000	$69,960	$420,226									$490,186
Lift Station Electrical Package	$348,000	$36,888	$351,912									$388,800
Isett Lift Station (Near Term)	$460,000	$97,520	$413,485									$511,005
Lift Station In-House Process Package	$81,250		$22,823		$25,644		$28,814		$32,375			$109,656
System 01 Grit Replace & Line Drain Pipes	$30,000					$40,147						$40,147
WRRF In-House Projects	$185,000			$55,084	$58,390		$65,607	$69,543				$248,623

Projects	Estimated 2022 Cost	1	2	3	4	5	6	7	8	9	10	Inflated Totals
Engineering Study - SMART Utility Management Master Plan	$30,000	$31,800										$31,800
SMART Utility Management Implementation	$400,000			$71,461	$75,749	$80,294	$85,111	$60,145	$63,754	$67,579	$71,634	$575,726
Total Pay As You Go Expenditures	$3,224,250	$1,494,918	$1,208,446	$126,545	$159,782	$120,440	$179,531	$129,688	$96,129	$67,579	$71,634	$3,654,493
Loan 1 Estimated Cost & Payments	$4,190,000				$143,613	$287,226	$287,226	$287,226	$287,226	$287,226	$287,226	$4,731,423
Loan 2 Estimated Cost & Payments	$4,228,750							$193,963.83	$387,928	$387,928	$387,928	$6,390,268
Total Debt Estimated Cost & Payments	$8,418,750				$143,613	$287,226	$287,226	$477,762	$671,726	$671,726	$671,726	$11,065,231
CIP Totals	$11,643,000	$1,494,918	$1,208,446	$126,545	$303,395	$407,666	$466,757	$610,878	$771,282	$742,733	$746,787	$14,776,386

8.3 Debt Financed Projects

Table 8-3 presents a summary of the projects included in the first loan.

Table 8-3: Loan 1 Projects

Project	2022 Cost	2025 Cost
WRRF HVAC Package	$740,000	$835,621
HSW Rehab Tank	$480,000	$542,025
Lift Station HVAC Package	$400,000	$451,687
System 03 Replace Roughing Filter Media	$2,010,000	$2,269,728
Papoose Lift Station (Short Term)	$310,000	$350,058
Influent Gate Freeze Protection & Odor Control	$100,000	$112,922
Houser Lift Station	$150,000	$169,383
Total Loan 1	$4,140,000	$4,731,423

Table 8-4 presents a summary of the projects included in the second loan.

Table 8-4: Loan 2 Projects

Project	2022 Cost	2029 Cost
Lift Station Process Package	$243,750	$368,342
WRRF In-House Projects	$555,000	$838,687
Schley Lift Station	$160,000	$241,784
Canon Lift Station	$280,000	$423,122
Papoose Lift Station (Public Bathroom/Generator Project)	$1,100,000	$1,662,263
Isett Lift Station (Long Term)	$1,890,000	$2,856,070
Total Loan 2	$4,228,750	$6,390,269

8.4 Pay As You Go Projects

Table 8-5 presents a summary of projects that are pay as you go projects.

Table 8-5: WRRF & Lift Station Pay As You Go Projects 2023 – 2032

Project	Estimated 2022 Cost
UV Disinfection System	$1,250,000
WRRF Electrical Package	$440,000
Lift Station Electrical Package	$348,000
Isett Lift Station (Near Term)	$460,000
System 01 Replace & Line Drain Pipes	$30,000
Lift Station Process Package	$81,250
WRRF In-House Projects	$185,000
SMART Utility Management Implementation	$400,000
Total	$3,194,250

8.5 Collection and Drainage Fund Projects

Several projects were identified as projects that should more properly be funded from the Collection and Drainage fund. These projects were removed from the CIP. Table 8-6 summarizes these projects.

Table 8-6: Collection and Drainage Funded Projects

Project	Estimated 2022 Cost
Gate Well Project	$75,000
Papoose Lift Station (Long Term-Dedicated Stormwater LS)	$3,100,000
Engineering Study - Sewer Master Plan & Hydraulic Modeling	$250,000
Engineering Study - Papoose LS Reconfiguration	$75,000
Total	$3,500,000

8.6 Alternative Funded Projects

Several projects, generally aspirational or opportunistic projects, that reduce cost, increase revenue, or improve utility performance were identified. These projects are currently removed from the CIP.

Alternative funding such as grants or private investment are being pursued. Table 8-7 summarizes these projects.

Table 8-7: Alternative Funded Projects

Project	Estimated 2022 Cost
Digester Complex - Digester Capacity & Pumping	$1,280,000
Algae Phosphorus Removal	$5,500,000
Biogas to Energy Conversion	$8,380,000
Total	$15,160,000

8.7 Engineering Studies

Several engineering studies were identified as appropriate to look at different aspects of the utility and develop improvement concepts for various identified challenges. Table 8-8 summarizes the engineering studies.

Table 8-8: Engineering Studies

Project	Estimated 2022 Cost
Phosphorus Modeling	$50,000
Sewer Master Plan & Hydraulic Modeling	$250,000
Papoose LS Reconfiguration Study	$75,000
WRRF Solids Handling Study	$40,000
SMART Utility Management Master Plan	$30,000
Total	$445,000

8.8 Deferred (Unfunded) Projects

Several projects were placed in deferred project category and not included in the CIP. These projects while beneficial did not arise to a high enough priority to implement at this time or capital cost was too high to move forward with implementation given other high priority projects. Table 8-9 summarizes the deferred/unfunded projects.

Table 8-9: Deferred, Unfunded Projects

Project	Estimated 2022 Cost
Digester Complex - Digester Capacity & Pumping	$1,280,000
Algae Phosphorus Removal	$5,500,000
Engineering Study - Phosphorus Modeling	$50,000
System 05 Add Launder Cover on Final Clarifier	$710,000
Methane to Natural Gas Conversion	$8,380,000
Engineering Study - WRRF Solids Handling Study	$40,000
Total	$15,960,000

8.9 Discussion

The wastewater WRRF and lift station assets represent a significant accumulated investment in infrastructure needed for a modern city to function and thrive. Continued reinvestment in these assets are necessary to maintain the viability of the utility, the functionality of the assets and associated systems, take care of our environment, and to keep utility staff safe in the performance of their work.

The CIP represents planned investment based on best available knowledge. Estimated budget costs included in the CIP are based on 2022 dollars based on best knowledge of market conditions and costs. Inflation is an important variable to consider; the CIP uses 6% annual inflation. Market conditions, costs, and inflation along with other economic conditions are not stagnant fluctuating over time. Confidence in out-year budgets declines especially as time passes. Annual updating of the CIP is recommended to reflect fluctuations in prices and evolving investment priorities. A major review of the CIP should occur periodically such as at 5-years to refresh perspective on asset condition, needs, and priorities.

Appendix A Condition Assessment Report

Stanley Consultants INC.

Connect. Create. Contribute.

Condition Assessment Report

Muscatine WRRF Capital Planning

City of Muscatine

Final

April 2023

MUSCATINE

Deliverable: Condition Assessment Report
Project: Muscatine WRRF Capital Planning
Client: City of Muscatine
Location: Muscatine, IA

Submittal: **Final**
Date: **April 7, 2023**

Prepared by: **Candice Bark, P.E.**
Reviewed by: **Jay Brady, P.E.**

I hereby certify that this report was prepared by me or under my direct personal supervision and that I am duly registered under the laws of the State of Iowa.

Candice Bark, P.E.	Candice Lynn Bark, P.E.	
Name	Signature	
April 7, 2023	P19910	December 31, 2023
Date	Registration Number	Expiration Date

Professional Seal:

Stanley Consultants

Table of Contents

Tables

Figures

Executive Summary

ES.1 Purpose

Stanley Consultants has been retained by the City of Muscatine to perform a condition assessment of their Water & Resource Recovery Facility (WRRF) process equipment, mechanical and electrical equipment, building systems, and structures. In addition to the WRRF, the condition assessment includes 22 lift stations, 12 gate well structures, and associated mechanical and electrical equipment, building systems, and structures. The goal of the assessment is to establish the general condition of the existing facilities and overall functionality. The condition assessment will be used to develop a prioritized capital improvement plan as a part of this project.

ES.2 Facility Design Criteria

Each facility was assessed based on form, function, redundancy, and safety. The form, or physical condition and configuration, and function of each asset is captured in the risk of failure rating discussed in Section 1.3 Assessment Methodology. Asset redundancy is reviewed to determine not only if an asset has a backup in case of failure but if that backup is reliable. Safety covers personnel's health and the conditions that the assets are operating under. Recognized safety risks are identified throughout the assessment; however, this is not intended to be a review of safety programs and compliance.

Each asset is also rated based on the consequences of its failure.

The sum of each risk of failure rating is multiplied with the consequence of failure rating to calculate the asset risk rating. The risk rating of each asset is then used to judge overall impact that asset has on the system.

ES.3 Gatewell Condition Assessment

Gate wells are used to control the flow of water in strategic locations. The Muscatine sanitary and storm water collection systems contain 12 gate wells (GW). The two major gate wells are in Papoose Lift Station and near Musser Park for treated wastewater effluent. There are ten minor gate wells located along Mad Creek. The gatewells assessed include 5073, 5071, 6305, 6285, 6284, 3813, 3811, 3804, E. 4th Street Gatewell, 3876, Papoose Gatewell and 2125.

The following gatewells are inoperable and need repair or replacement: GW5073, GW6305, GW6284.

The following gatewells are operable and need continued maintenance: GW5071, GW6285, GW3813, GW3811, GW3904, E. 4th Street Gatewell, GW3876, Papoose Gatewell, GW2125.

ES.4 Lift Station Condition Assessment

The following pump stations were assessed:

- Papoose Creek Lift Station
- Mad Creek Storm Water Lift Station

- Mad Creek Lift Station
- Canon Lift Station
- Tipton Lift Station
- Houser Lift Station (minor)
- Arbor Commons Lift Station (minor)
- Bond Lift Station
- Slough Lift Station
- Sampson Lift Station
- Schley Lift Station
- Miles Lift Station
- Stewart Road Lift Station
- 57th Street Lift Station (minor)
- Progress Park Lift Station
- Hershey Lift Station (minor)
- Isett Lift Station
- Airport Lift Station (minor)
- HNI Stormwater Lift Station
- Magnolia Lift Station (minor)
- Maple Grove Lift Station (minor)
- Sunset Lift Station (minor)
- Tanglefoot Lift Station (minor)

ES.5 Lift Station Condition Assessment Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed are summarized in Table ES-1. Lift stations that require electrical equipment replacement may include pump panels, electrical panels, motor control centers, and/or pump motors.

Table ES-1: Summary of Lift Station Recommended Improvements

Location	Recommended Improvements
Papoose Lift Station	Replace the three sewage pumps. Replace pump VFDs and motors. Install stairs and platform to access valves and pump shafts. Modify entry between screen room and control room. Replace exterior stairs, roof, and windows. Seal air gaps in walls. Replace/Modify exhaust fans in dry well and restroom. Provide wet well safety ventilation system. Install emergency generator.
Stormwater Lift Station	Replace actuated control valve. Replace roof vents.
Mad Creek Lift Station	Replace exhaust fans in wet well, dry well and control room. Replace unit heater. Replace electrical equipment beyond its serviceable life.
Canon Lift Station	Replace air supply units and exhaust fans in dry well, wet well, and control room. Provide dedicated heating system in screen room. Replace electrical equipment beyond its serviceable life.
Tipton Lift Station	Replace the two inoperable sewage pumps. Replace exhaust fans in wet well and generator room. Repair roof leak in generator room.
Arbor Commons Lift Station	No Recommended Improvements
Houser Lift Station	Replace the two sewage pumps and add safety cages around shafts. Replace exhaust fan and unit heater. Replace electrical equipment beyond its serviceable life. Install emergency generator.
Bond Lift Station	Replace exhaust fans in dry well and wet well. Replace electrical equipment beyond its serviceable life. Install emergency generator.
Slough Lift Station	Replace roof. Replace door and seal air gaps in walls. Replace wall louver and add bird screen.
Sampson Lift Station	Replace electric unit heater and exhaust fan. Replace electrical equipment beyond its serviceable life.

Location	Recommended Improvements
Schley Lift Station	Replace one of the sewage pumps. Replace exhaust fans in dry well and wet well. Replace electrical equipment beyond its serviceable life. Install emergency generator.
Miles Lift Station	Replace exhaust fans in control room and wet well/screen room. Replace backflow preventer. Replace unit heater.
Steward Road Lift Station	Replace makeup air units in dry well and screen room. Replace exhaust fans in dry well, wet well, generator room and screen room. Replace backflow preventer and sanitary piping in dry well. Replace unit heater in dry well. Remove mold on walls in screen room. Replace worn parts on mechanical bar screen. Add cages around sewage pump shafts.
57th Street Lift Station	Replace exhaust fans and unit heater in wet well and generator room. Replace backflow preventer.
Progress Park Lift Station	Replace one of the sewage pumps. Add cage around one of the sewage pump shafts. Replace exhaust fans in wet well, dry well and screen room. Replace exhaust fans in generator room and control room. Replace makeup air units in wet well, dry well and screen room. Replace unit heaters.
Hershey Lift Station	Replace exhaust fans and unit heater. Replace electrical equipment beyond its serviceable life. Replace fixed ladder to dry well.
Isett Lift Station	Replace all three sewage pumps and pump motors. Replace wet well cover. Seal air gaps in walls. Replace exhaust fans in dry well and control room. Replace floor drains. Install emergency generator.
Airport Lift Station	No Recommended Improvements.
HNI Stormwater Lift Station	No Recommended Improvements.
Magnolia Lift Station	Replace entire simplex pump system.
Maple Grove Lift Station	Replace entire air ejector system.

Location	Recommended Improvements
Sunset Lift Station	Install emergency generator.
Tanglefoot Lift Station	No Recommended Improvements.

ES.6 WRRF Condition Assessment

The Muscatine Water & Resource Recovery Facility (MWRRF) treatment train consists of preliminary treatment (screening and grit removal), primary clarification, optional roughing filter, a two-train aerated activated sludge system, three final clarifiers and UV disinfection.

Solids processing consists of dissolved air flotation thickening of the waste activated sludge (WAS) and anaerobic digestion of the combined thickened waste activated sludge and primary clarification settled solids. The plant receives septage, fats, oils, grease (FOG) loads, and food waste from the Muscatine Organics Recycling Center (MORC) that are fed directly to the anaerobic digesters. Anaerobic digester decanting is not practiced.

Digested solids are pumped to a sludge lagoon system remote from the treatment plant. The biosolids in the sludge lagoon are land applied to cropland seasonally. Plant recycle flows are limited to plant drain system and the DAF WAS thickening supernatant. Clarified supernatant from the sludge lagoon intermittently but routinely returned to the WRRF for treatment as sludge lagoon water levels become too high.

The City divides their WRRF assets into systems. Table ES-2lists the treatment processes and/or structures that are associated with each system. The condition assessment is based on the defined system and not on treatment process sequence.

Table ES-2: WRRF System Description

System	Process/Structures
1	Grit Building – Screening & Grit Removal
2	Primary Control Building, Primary Clarifiers
3	Roughing Filter
4	Blower Building, Aeration Basins
5	WAS/RAS Pumping, Final Clarifiers
6	Dissolved Air Flotation (DAF)
11	Digesters, Digester Control Building
13	Digested Sludge Storage
14	UV Disinfection
15	Effluent Pumps

System	Process/Structures
20	HVAC Units
32	Muscatine Organics Recycling Center (MORC)
90	Lab

Critical assets to be addressed at the MWRRF are summarized in Table ES-3.

Table ES-3: Summary of Lift Station Recommended Improvements

Location	Recommended Improvements
System 01 Grit Building	Replace grit pumps and pump motors. Replace augers on the two grit washing units. Replace grit drain piping throughout building. Replace makeup air units and exhaust fans on 1st and 3rd floors. Replace control panel and power panels. Replace hydraulic press motor.
System 02 Primary Control Building	No Recommended Improvements.
System 03 Roughing Filter	Replace roughing filter media. Replace motor control centers. Overhaul two of the roughing filter pumps. Replace all four pump motors. Replace makeup air unit. Install walkway over roughing filter.
System 04 Blower Building	Replace blower. Replace actuated control valves.
System 05 Final Clarifiers	Replace VFDs on all three RAS pumps.
System 06 DAF	Replace makeup air units, unit heaters and supply fan. Replace motor control center, switchgear and electrical panels. Evaluate DAF thickening efficiency.
System 11 Digester Complex Building	Increase digester capacity. Replace boiler. Replace the two sludge pumps. Replace the two motor control centers and electrical panels. Replace three of the heat exchangers. Replace two of the makeup air units and the roof exhaust fan.

Location	Recommended Improvements
System 13 Digested Sludge Storage & Sludge Lagoon	Overhaul or replace the two sludge pumps. Replace the two sludge pump motors. Replace the motor control center. Replace sludge dredger.
System 14 Ultraviolet (UV) Disinfection	Replace automatic flow control gate. Replace UV equipment including electrical panels and power distribution center.
System 15 Effluent Pumps	Replace HVAC equipment in building.
System 32 MORC	No Recommended Improvements.
System 90 Lab	Modify or replace air handling unit system. Replace fan drive belts and bearing on lab fume hood. Replace electrical panels.
Admin/Control Building	Replace HVAC equipment in building.

Section 1 Condition Assessment Methodology

1.1 Purpose

Stanley Consultants has been retained by the City of Muscatine to perform a condition assessment of their Water & Resource Recovery Facility (WRRF) process equipment, mechanical and electrical equipment, building systems, and structures. In addition to the WRRF, the condition assessment includes 22 lift stations, 12 gate well structures, and associated mechanical and electrical equipment, building systems, and structures. The goal of the assessment is to establish the general condition of the existing facilities and overall functionality. The condition assessment will be used to develop a prioritized capital improvement plan as a part of this project.

1.2 Facility Design Criteria

Each facility was assessed based on form, function, redundancy, and safety. The form, or physical condition and configuration, and function of each asset is captured in the risk of failure rating discussed in Table 1-1 in Section 1.3 Assessment Methodology. Asset redundancy is reviewed to determine not only if an asset has a backup in case of failure but if that backup is reliable. Safety covers personnel's health and the conditions that the assets are operating under. Recognized safety risks are identified throughout the assessment; however, this is not intended to be a review of safety programs and compliance.

1.2.1 NFPA and NEC Safety Considerations

Regulatory criteria apply throughout the facility including National Fire Protection Association (NFPA) and National Electrical Code (NEC) provisions. The various above and below grade environments in the wastewater treatment facility area are subject to National Fire Protection Association (NFPA) 820, "Standard for Fire Protection in Wastewater Treatment and Collection Facilities" as they relate to the National Electric Code (NEC) definitions for hazardous locations.

The presence or potential for the presence of flammable gases or vapors is identified as a "Class 1" location. In addition to the type of hazardous location, NEC also specifies the "conditions" under which the hazard is present, i.e., "normal" conditions or "abnormal" conditions. Normal conditions would represent the condition wherein during the normal, everyday operation or during frequent repair and maintenance, the hazard would be expected to be present. When the hazard is expected to be confined within closed containers or conduits and would only be present in the event of accidental rupture, breakage or unusual facility operation, this is considered the abnormal condition. Normal conditions are designated as "Division 1" areas, and abnormal conditions are designated as "Division 2" environments.

Some of a wastewater treatment facility is classified as a hazardous environment, and the facility requires specific explosion proof equipment and electrical provisions along with ventilation requirements for additional operator safety. Predominant risks in a wastewater treatment facility include accumulation of hazardous gases such as hydrogen sulfide, or methane or the absence of oxygen created by sewage. The same gases are explosive or flammable at higher concentrations. Fumes generated from a release of a flammable or explosive material into the sewer can also create a hazardous condition. A common example is gasoline spilled into the sewer resulting in fumes released into pump stations or wastewater treatment facilities.

Throughout the condition assessment are references to these criteria and identification of specific risks to operations staff resulting from these conditions.

1.3 Assessment Methodology

Prior to the site visits, the team reviewed the City's existing asset inventory and collected information on each lift station and each process at the WRRF. The assessment team spent two days visiting the lift stations and two days visiting the processes and buildings at the WRRF. During the site visits the assessment team visually inspected and rated the assets based on age, visual condition, maintenance history, capacity/functionality, and external risks as presented in Table 1-1. Examples of external risks include high hydrogen sulfide concentrations in room causing surface deterioration or water dripping on a motor ultimately causing the unit to fail.

Table 1-1: Risk of Failure Rating and Description

Risk of Failure	0	1	2
Age of asset	Less than 5 years old	Between 5 and 20 years old	Greater than 20 years old
Visual Condition	Like new	Some corrosion or signs of age	Significant corrosion or visually identified degradation
Maintenance History	Regularly maintained No known issues	Some operational disruptions	Multiple historic operational disruptions
Unit capacity	Meets current and future needs	Will not meet future needs	Does not meet current needs
External risks to asset	No external risks to asset	Limited risks to asset	Moderate or higher external risks to asset

Source: Stanley Consultants, Inc.

The ratings are based on a numerical scale of 0-2 where 0 would be a minimal risk of failure and a 2 would be a great risk of failure. The total Risk of Failure is the summation of all five components resulting in a score of 0 to 10.

Each asset is also rated based on the consequences of its failure. Table 1-2 presents the rating scale and a description of impact based on each rating.

Table 1-2: Consequence of Failure Rating and Impact

Rating	Impact
0	No impacts
2	Minor impacts to operations Redundancy available
4	Moderate impacts to operations including temporary outages and moderate financial impacts
6	Significant impacts to operations including extended outage and major financial impacts
8	Permit violation or loss of service, unsuitable environmental conditions
10	Harm of utility staff or WWTP operations

Source: Stanley Consultants, Inc.

The consequence of failure scale ranges from 0-10. A rating of 0-2 would indicate that the asset has minimal impact to operations or that there is a redundant asset available as a backup in case of failure. A rating of 4-6 would indicate a moderate to significant disruption to operations and would acquire financial burden. A rating of 8-10 is a serious impact to operations that could result in discharge permit violations, a risk to staff health and safety, and/or conditions that may cause deterioration of process equipment.

The sum of each risk of failure rating is multiplied with the consequence of failure rating to calculate the asset risk rating. Table 1-3 presents the asset risk rating scale and the action required.

Table 1-3: Asset Risk Rating and Impact

Rating	Impacts
0-30	Low risk asset - No risk-based action is required
31-60	Moderate risk asset - Consider replacement/upgrades or A risk mitigation plan within a 10-year planning period
61-100	High risk asset - Replace or mitigate risk as soon as possible

Source: Stanley Consultants, Inc.

Section 2 Gatewell Condition Assessment

Gate wells are used to control the flow of water in strategic locations. The Muscatine sanitary and storm water collection systems contain 12 gate wells (GW). The two major gate wells are in Papoose Lift Station and near Musser Park for treated wastewater effluent. There are ten minor gate wells located along Mad Creek. The gatewells assessed include 5073, 5071, 6305, 6285, 6284, 3813, 3811, 3804, E. 4th Street Gatewell, 3876, Papoose Gatewell and 2125. The Papoose Gatewell is discussed under the Papoose Lift Station condition assessment in Section 3.

The following gatewells are inoperable and need repair or replacement: GW5073, GW6305, GW6284.

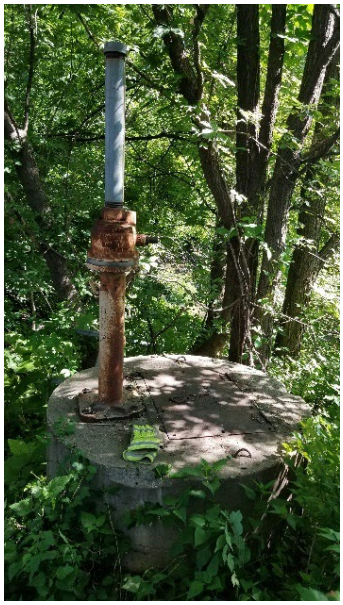
The following gatewells are operable and need continued maintenance: GW5071, GW6285, GW3813, GW3811, GW3904, E. 4th Street Gatewell, GW3876, Papoose Gatewell, GW2125.

2.1 Gatewell 5073

GW5073 is a sanitary gatewell. The gate is in the open position but inoperable. The actuator shows significant corrosion. It is located on the east side of the Kraft-Heinz Production Facility, facing Mad Creek. The sewer line crosses Mad Creek and the gate would close if there was a break in the sanitary line causing wastewater flows to enter into the creek. Age of gate is unknown. Its downstream and upstream pipe was installed in 1954. The gate was originally built by the U.S. Army Corps of Engineers (USACE). Our understanding is that there is no Federal government jurisdictional levee at this location. The gate may therefore no longer be required by the Federal government. The USACE should be contacted to confirm whether the gate is required by Federal government. If the gate is required to be operable then the gate should be replaced. Not withstanding any Federal government requirement, the City may want to consider repairing the gate as a emergency shutoff in the event a sewer break in Mad Creek occurred.

Figure 2-1: GW5073 Interior

Figure 2-2: GW5073 Exterior



2.2 Gatewell 5071

GW5071 is an open storm gatewell that is in good operating condition. It is located on the east side of the Kraft-Heinz Production Facility, facing Mad Creek. The date of the storm sewer installation is not known. The riser stem and actuator show mild to moderate corrosion, but the structure is adequate. It is located in a levee, connected to a gravity-flow storm sewer. The gate is exercised annually.

Figure 2-3: GW 5071 Interior

Figure 2-4: GW 5071 Exterior

2.3 Gatewell 6305

GW6305 is a sanitary gatewell. It is on the west side of the Kraft-Heinz Production Facility at the intersection of Bidwell Road and Isett Avenue. The gate is in the open positoin but inoperable. The gate does not slide, and the lifting ring is broken off. The age of gate is unknown. The pipe upstream and downstream of the gatewell was installed in 1954 and 1980. Closing the gate would block sanitary flow from upstream neighborhoods and the City does not have reason to close the gate. The gate was originally built by the USACE. If the USACE still requires the gate to be operable then the gate should be replaced.

2.4 Gatewell 6285

GW6285 is a sanitary gatewell, located on the north side of the Kraft-Heinz Production Facility, facing Isett Avenue. The riser stem, actuator, and access hatch show mild to moderate corrosion, but the gate is operable and normally in the open position. The age of gate is unknown. The pipe upstream and downstream was installed in 1967 and 1980. The gate is in adequate condition and is exercised annually.

Figure 2-5: GW 6285 Interior

Figure 2-6: GW 6285 Exterior

2.5 Gatewell 6284

Gatewell 6284 is a sanitary gatewell located alongside Isett Avenue in a nearby levee on the north side of the Kraft-Heinz Production Facility. The gate is operable and is normally in the open position. The riser stem, actuator, and access hatch show mild to moderate corrosion. The gate does not have a good seal, leading to significant leakage when in the closed position. The age of gate is unknown. The pipe upstream and downstream was installed in 1958 and 1980. The gate was originally built by the USACE. If the USACE still requires the gate to be operable then the gate should be replaced.

Figure 2-7: GW 6284 Interior

Figure 2-8: GW 6284 Exterior

2.6 Gatewell 3813

GW3813 is a storm gatewell located along Mad Creek, south of E. 6th St. The gate is operable and typically in the open position. Age of gate is unknown. The piping upstream and downstream was installed in 1984. It is exercised annually and is in good working condition.

Figure 2-9: GW 3813 Interior

Figure 2-10: GW 3813 Exterior

2.7 Gatewell 3811

GW3811 is a sanitary gatewell located along Mad Creek, south of E. 6th Street. The actuator and access hatch show moderate corrosion. The concrete top has some corrosion and the inside concrete walls show spalling. Age of gate is unknown. The piping upstream and downstream were installed in 1983. The gatewell is exercised annually and is in operable condition based on City staff comments.

Figure 2-11: GW 3811 Interior

Figure 2-12: GW 3811 Exterior

2.8 Gatewell 3804

GW3804 is a sanitary gatewell located south of E. 5th St. along Mad Creek. The sewer line crosses Mad Creek downstream of the gatewell and the gate would close if there was a break in the sanitary line causing wastewater flows to enter into the creek. A new sluice gate was installed in 2012 as part of the levee construction project. The structure, riser stem, and actuator are in good condition. It is exercised annually and is in good working condition.

Figure 2-13: Gatwell 3804 Interior

Figure 2-14: Gatewell 3804 Exterior

2.9 UNNAMED Gatewell at E. 4th St.

This gatewell is a storm gatewell located on E. 4th St along Mad Creek. No pictures are available for this structure due to inaccessibility. However, the gate is operable and typically in the open position. Age of gate is unknown. The piping upstream and downstream was installed in 1957. It is exercised annually and is in good working condition.

2.10 GW3876

GW3876 is a sanitary gatewell located behind the HNI Manufacturing Facility, south of E. 2nd St, along Mad Creek. Two new sluice gates were installed in 2011 as part of the levee construction project. One gate diverts flow to the creek and the other date diverts flow to Mad Creek Lift Station. The gates are operable and in good condition.

Figure 2-15: Gatewell 3876 Interior

Figure 2-16: Gatewell 3876 Exterior

2.11 GW2125

Gatewell 2125 is a gatewell near Musser Park that discharges treated effluent from the Water & Resource Recovery Facility to the Mississippi River. The access hatch and the handrail show mild to moderate corrosion. The gate is approximately 10-15 years old and is typically in the closed position. It is exercised annually and is in good working condition.

Figure 2-17: Gatewell 2125 Interior

Figure 2-18: Gatewell 2125 Exterior

Section 3 Lift Station Condition Assessment

3.1 Introduction

The following pump stations were assessed:

- Papoose Creek Lift Station
- Mad Creek Storm Water Lift Station
- Mad Creek Lift Station
- Canon Lift Station
- Tipton Lift Station
- Houser Lift Station (minor)
- Arbor Commons Lift Station (minor)
- Bond Lift Station
- Slough Lift Station
- Sampson Lift Station
- Schley Lift Station
- Miles Lift Station
- Stewart Road Lift Station
- 57th Street Lift Station (minor)
- Progress Park Lift Station
- Hershey Lift Station (minor)
- Isett Lift Station
- Airport Lift Station (minor)
- HNI Stormwater Lift Station
- Magnolia Lift Station (minor)
- Maple Grove Lift Station (minor)
- Sunset Lift Station (minor)
- Tanglefoot Lift Station (minor)

3.2 Papoose Creek Lift Station

3.2.1 Facility Purpose and Design Criteria

The building was constructed in 1964. It is a single-story facility that consists of a poured foundation/basement, a concrete building frame with a precast concrete panel exterior, and flat roof. The windows on the exterior are aluminum framed.

The basement houses three vertical-shafted pumps with four automated control valves (ACVs) in the dry well and a mechanical bar screen in the wet well. The main floor consists of the electrical control room, the bar screen and compactor room, a janitorial room, a restroom, and the wet wells that separate Papoose Creek from the sanitary sewer collection system.

Figure 3-1: Exterior of Papoose Creek Lift Station

3.2.2 Process & Equipment Condition and Capacity Evaluation

The pumps, one 75 horsepower (hp) 2,800 gallon per minute (gpm) pump and two 250 hp, 8,600 gpm pumps, are original to the lift station but have been overhauled in the past. The pumps were originally sized to handle combined sewer flows from Papoose Creek. The combined sewer has been partially separated into separate sanitary and storm sewers with complete separation anticipated by 2029. A change in operation has resulted in the lift station only receiving flow from Papoose Creek to relieve pressure within the storm sewer if water levels in the creek are high and when storm flows cannot gravity flow to the Mississippi River. All three pumps are oversized for normal flow, but the higher pumping capacity is needed for flood and storm flows. The 8,600 gpm pumps (PMP500102 and PMP500103) are used infrequently.

The three pumps are shafted pumps with the motors located on the operating floor above flood levels and the pump assembly itself located at the bottom of the dry well. The shafted pumps are configured to allow rebuilds in place. The 2,800-gpm pump (PMP500101) was overhauled recently. During this process, the rotating assembly and packing volute were replaced. Accessing the rotating assembly and the actuated control valves (ACVs) was challenging and a safety hazard until new access platforms were installed in 2022. One of the ACVs requires higher maintenance and routine staff attention.

The bar screen and press were installed in 2009. The rake assembly, motor and the bearings were replaced recently and have no major issues with the equipment. The screening press was not present at the time of our site visit as it was being overhauled.

The bridge crane was installed in 2003. The ribbon and cable were replaced in 2020 and there are no reported concerns.

There is a gate structure that diverts flows to the Mississippi River if water elevations in Papoose Creek are too high. The gate was installed in 2021 and there are no maintenance or operational issues with the gate. The gate is exercised annually and is in good working condition.

3.2.3 Structure, Electrical and HVAC Evaluation

3.2.3.1 Structural

The structure overall is in relatively good condition with some minor deficiencies. Daylight was observed around the precast panels which require some caulking. The roof is original to the structure and there is visible leaking in the bar screen/compactor room. Roof replacement is advised. Some of the windows are broken due to vandalism that need to be replaced. The exterior stairs leading to the main floor have lost their support and need to be replaced. It was noted the screen room door was open to the adjacent control room which presents a code and safety concern.

Figure 3-2: Papoose Exterior Stairs

Figure 3-3: Papoose Exterior Walls

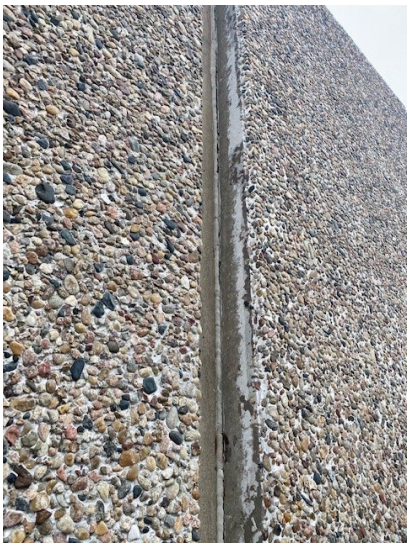


Figure 3-4: Papoose Windows

3.2.3.2 HVAC

Wet Well/Screen Room: the wet well area and screen room HVAC system consists of natural ventilation only with manually operated dampers. No mechanical ventilation is provided to either space. Since there is a screen in the wet well area that has to be accessed routinely for operation and maintenance, permanent ventilation consisting of supply and exhaust air systems is required.

Control Room: the control room HVAC consists of electric unit heaters and natural ventilation for cooling. Intake dampers are manually operated, and the space has had no issues with overheating in summer. The control room is open to the dry well below. The exhaust fan serving the janitor's room and restrooms appears to discharge into the control room instead of to the outdoors. The electric unit heaters appear original and have exceeded their service life. They should be replaced as some of the heaters are non-operational in addition to the age concerns.

Dry Well: the dry well exhaust fan is located above in the control room, with ductwork extending to the floor of the dry well. The fan was operational at the time of assessment, but operators noted concerns about high fume levels even when the fan is operating. Fan should be replaced due to both age and safety concerns. The associated ductwork was broken in places and should be replaced.

Janitor Room/Restrooms: radiant heaters in all rooms appeared original and in need of replacement. Some fixtures appeared non-operational or not in use.

3.2.3.3 Electrical

Two 250 HP and one 75 HP pumps are controlled by 480V wall mounted starters and fed by a 480V panelboard.

The electrical transformers facility by Muscatine Power and Water (MPW) needs to be replaced and upgraded due in part to deteriorating structural supports of the elevated transformer facility. The building is not properly grounded. The lift station only has a single power source with no generator backup.

The MCCs are beyond 30 years of age and have difficulty in obtaining spare parts.

3.2.4 Condition Assessment Rating and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-1. Some items are not tied to a specific asset and do not have an asset risk rating. Those items are discussed following the table.

Table 3-1: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Dry Well Exhaust Fans	60	Code/Safety issue	Replace/upsize exhaust fan
Restroom Exhaust Fan	50	Safety issue	Discharge to outdoors
Utility Transformer & Support Structure	42	Age/Safety Issue	Replace Unit
MCC500101	36	Age	Replace Unit
Wet Well/Screen Room Ventilation	30	Safety issue	Provide 10 states standards safety ventilation
Centrifugal Pump/ PMP500101	24	Oversized pump	Replace/Downsize pump
Centrifugal Pump/ PMP500102	12	Oversized pump	Replace/Downsize pump
Centrifugal Pump/ PMP500103	12	Oversized pump	Replace/Downsize pump
MTR500103	10	Age	Replace Unit
VFD500101	10	Age	Replace Unit
VFD500102	10	Age	Replace Unit
VFD500103	10	Age	Replace Unit
MTR500101	8	Age	Replace Unit
MTR500102	8	Age	Replace Unit

Source: Stanley Consultants, Inc.

The following improvements at Papoose Creek Lift Station should be considered to maintain its current functionality. Dedicated stormwater pumps should be considered with the combined sewer separation near completion. Accommodating storm water pumps will be addressed in a separate study.

- Install an emergency generator to ensure the lift station will maintain operation if a power failure occurs.
- Replace PMP500101, PMP500102 and PMP500103 with smaller capacity pumps to meet current flow demands. PMP500101 is operating most of the time and the two larger pumps only operate on occasion because they are oversized and are inefficient to run. If all three pumps were comparable in size, then pumps can alternate operation reducing pump wear and provide adequate redundancy. Mad Creek Lift Station is connected to Papoose Lift Station force main and Mad Creek Lift Station will on occasion divert flow to the Papoose Lift Station wet well. A hydraulic

study should be conducted on how the pump stations are connected to understand how each lift station can be optimized without negatively impacting other lift stations.

- Pump VFDs and motors are currently operable and are not considered critical items, but due to age, efficiency, and availability of replacement parts, these assets should be replaced in the near future. A City implemented motor replacement program is recommended to make sure all motors are replaced in a timely manner before a failure occurs. Replacement motors should be premium high efficiency motors.
- Building Updates: Modify the entry between the screen room and control room to meet building code criteria. Replace exterior stairs, roof, and windows. Seal air gaps in walls.
- Replace exhaust fans in the dry well and modify exhaust fan discharge in restroom to provide a safe atmosphere for staff to maintain equipment.
- Provide wet well safety ventilation system consisting of exhaust fan(s) and makeup air unit(s).

3.3 Storm Water Lift Station

3.3.1 Facility Purpose and Design Criteria

The building was constructed in 1957 by the USACE to pump storm water from Mad Creek over the levee to the Mississippi River when river levels are high. The City has maintained the lift station since it has been built. It consists of a concrete building that serves as the electrical/control room with a concrete wet well underneath, and a flat roof. The lift station houses two 16,000 gpm propeller pumps that are original to the building. The building is in good condition and there are no known structural issues.

Figure 3-5: Exterior of Stormwater Lift Station

3.3.2 Process & Equipment Condition and Capacity Evaluation

The two 100 hp, 16,000 gpm propeller pumps were installed in 1957 and are in good condition. The pumps are only used during wet weather conditions when river levels are high. The pumps are exercised routinely,

and they have not had any major maintenance issues. The gate well has an automated control valve but is not in operation. The gate must be opened manually using a handwheel actuator.

3.3.3 Structural, Electrical and HVAC Evaluation

3.3.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.3.3.2 HVAC

The control room and wet well below both appear to be naturally ventilated. All associated dampers or access dampers require operators to open them as needed. The roof-mounted vents appear original to the building. No building heating system was observed, but a plug-in space heater is used for freeze protection of the space. No concerns with space overheating were reported.

3.3.3.3 Electrical

The two 100 HP pumps are controlled by 480V wall mounted starters and fed by a 480V panelboard. Automatic control valve is non-functional and should be replaced.

3.3.4 Condition Assessment Rating and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-2. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-2: Critical Asset Risk Scores and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Roof vents	40	Age	Replace
ACV620101	24	Age	Replace

- Replace automatic control valve.
- While the two turbine pumps are 87 years old, they function properly and are reliable. If parts are still readily available to purchase, then it is not necessary to replace the pumps at this time.

3.4 Mad Creek Lift Station

3.4.1 Facility Purpose and Design Criteria

Mad Creek Lift Station was constructed in 1948 to mitigate combined sewage and stormwater flowing to Mad Creek. The lift station is a circular concrete structure with a flat roof. The main floor houses four pump motors and controls. The four extended shaft pumps sit underneath the control room in the dry well.

Figure 3-6: Exterior of Mad Creek Lift Station

3.4.2 Process & Equipment Condition and Capacity Evaluation

Pumps 1, 2, and 3 are 1,000 gpm capacity and pump 4 is 5,000 gpm capacity. Pumps 1-3 were replaced in 2000. Slight corrosion can be seen on the pumps and piping; however, pumps are in good condition. Bearings and seals have either been replaced or are scheduled to be replaced on each pump. Pump 4 is original to the station except for the rotating assembly. Staff have no issues with pump capacity and operation. Pumps are adequate capacity and an increase in flow to Mad Creek Lift Station is not anticipated.

3.4.3 Structural, Electrical and HVAC Evaluation

3.4.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.4.3.2 HVAC

Wet Well: the wet well area HVAC consists of an exhaust fan with a roof-mounted makeup intake. The exhaust fan has not been operational in at least ten years and should be replaced to maintain operator safety. It is noted the NFPA 820 and 10 States Standards require the addition of a supply fan safety ventilation for wet wells. No heating is provided to the wet well.

Control Room: the control room HVAC consists of electric unit heaters and a temperature-controlled exhaust fan. Intake dampers are electrically operated. The control room is open to the dry well below. The age of the exhaust fan and unit heaters is unclear, but all appear in relatively good condition. However, if replacement parts are not readily available for the equipment, it is recommended to replace the exhaust fan to ensure operator safety.

Dry Well: the dry well exhaust fan is located above in the control room, with ductwork extending to the floor of the dry well. The fan was operation at the time of assessment. Fan should be replaced due to both age and safety concerns.

3.4.3.3 Electrical

Three 100 HP pumps and one 75 HP pump are controlled by MCC530101. The 100 HP pumps are fed by VFD's, and the 75 HP comes off a Soft Starter. The pump station has dual feeds through an Automatic Transfer Switch to increase power reliability. The lighting and gas monitor detectors are either in poor condition or inoperable. Most electrical equipment in the pump station is beyond its serviceable life.

3.4.4 Condition Assessment Rating and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-3. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-3: Critical Asset Risk Scores and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Wet Well Exhaust Fan	60	Safety	Replace exhaust fan
Dry Well Exhaust Fan	30	Age/Safety	Replace exhaust fan
Control Room Exhaust Fan	30	Age	Replace exhaust fan
Unit heater	4	Age	Replace unit heater

The following improvements at Mad Creek Lift Station should be considered:

- Replace the wet well, dry well, and control room exhaust fans.
- Replace electrical equipment that is beyond its serviceable life.
- Pump motors are currently operable and are not considered critical items, but due to age, efficiency, and availability of replacement parts, these assets should be replaced in the near future. A City implemented motor replacement program is recommended to make sure all motors are replaced in a timely manner before a failure occurs.

3.5 Canon Lift Station

3.5.1 Facility Purpose and Design Criteria

Canon Lift Station was constructed in 1974 to serve the sanitary sewer in the general area. The building is a single-story concrete and brick structure with a sloped roof. The basement houses two 1,500 gpm vertical-shafted pumps in the dry well and a mechanical bar screen in the wet well. The main floor consists of the electrical control room, the bar screen room, and the generator room.

Figure 3-7: Exterior of Canon Lift Station

3.5.2 Process & Equipment Condition and Capacity Evaluation

One of the 1,500 gpm shafted pumps (PMP520102) was replaced in 2019. The drive shaft is scheduled for replacement later this year. Pump #1 (PMP520101) is original to the building and requires significant routine maintenance; however, it is scheduled to be replaced later this year. The bar screen is original to the building but is in good condition and requires minimal maintenance. Both pumps are adequate capacity and an increase in flow to Canon Lift Station is not anticipated. Minor corrosion can be observed on equipment.

3.5.3 Structural, Electrical and HVAC Evaluation

3.5.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.5.3.2 HVAC

Wet Well/Screen Room: the wet well area and screen room HVAC system consists of an exhaust fan for ventilation, with makeup air provided via a damper to the adjacent generator/control room. The exhaust fan

is non-operational and shows significant signs of corrosion due to the environment. The damper penetration between the screen room and generator room should be removed to separate the rated screen room from the non-rated generator room, and a separate makeup air system should be provided to meet 10 States Standards and NFPA 820. Space heating should also be provided.

Control/Generator Room: the control/generator room HVAC consists of a heating and ventilation unit and electric unit heaters. The heating and ventilation unit is original to the building and has been disabled for at least ten years, so no ventilation cooling is provided to the room. A unit heater was added to provide space heating to the space since the heating and ventilation unit is disabled. A diesel fuel storage tank serves the generator and is in good condition since it has been recently replaced. The unit heater equipment replacement date is within five years. The exhaust fan that serves the control room has not been functional for ten years.

Dry Well: the dry well exhaust fan is located above in the control/generator room, with ductwork extending to the floor of the dry well. The fan was interlocked with the heating and ventilation unit in the control/generator room and is nonfunctional. The exhaust fan should be replaced and allowed to run independently to meet 10 States Standards and ensure operator safety. There is a unit heater serving the dry well and appears original to the building and it is unused.

3.5.3.3 Electrical

The electrical system is fed by two sources, Utility and a 200 KW Genset. This feeds the Motor Control Center for the building and distributes the power to the system. The Motor control Center houses two across the line starters and feeds two 60 HP motors and a panelboard. All equipment in this building is from 1974 and is beyond its serviceable life.

3.5.4 Condition Assessment Scoring and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-4. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-4: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Wet Well Exhaust Fan	60	Safety	Replace exhaust fan
Dry Well Exhaust Fan	50	Age/Safety	Replace exhaust fan
Dry Well Makeup Air Unit	50	Age/Safety	Replace makeup air unit
Gen520101	24	Age	Replace Unit

Equipment Name/ID	Risk Rating	Problem	Recommendations
Motor Control Center	18	Age	Replace Unit
Basement Unit Heater	12	Age	Replace unit heater
Panelboard	8	Age	Replace Unit
Control Panel	8	Age	Replace Unit
MTR520101	6	Age	Replace Unit
MTR520102	6	Age	Replace Unit

The following improvements at Canon Lift Station should be considered:

- Remove the damper opening between the screen room and the generator/control room. Provide a dedicated heating system for the screen room suitable for hazardous locations.
- Replace the wet well exhaust fan to maintain operator safety.
- Add wet well makeup air unit to supply air to the wet well containing mechanical screen.
- Replace the supply air unit and exhaust fan for the dry well and the generator/control room to maintain a safe environment for City staff.
- Replace electrical equipment that is beyond its serviceable life.
- Pump motors are currently operable and are not considered critical items, but due to age, efficiency, and availability of replacement parts, these assets should be replaced in the near future. A City implemented motor replacement program is recommended to make sure all motors are replaced in a timely manner before a failure occurs.

3.6 Tipton Lift Station

3.6.1 Facility Purpose and Design Criteria

Tipton Lift Station was completed in 2003 to serve sanitary sewers in the general area. It is a one-story concrete and brick building with a flat roof. It contains a diesel generator room and a control room that sits above the wet well and the four submersible pumps.

Figure 3-8: Exterior of Tipton Lift Station

3.6.2 Process & Equipment Condition and Capacity Evaluation

Pumps 2 and 3 are 56 gpm capacity and pumps 1 and 4 are 404 gpm capacity. Pumps 2 and 3 do not operate and need to be replaced. Pumps 1 and 4 are used regularly since the two low flow pumps are not operable. These pumps are oversized and inefficient for this application. Pumps are adequate capacity if all four are operable.

3.6.3 Structural, Electrical and HVAC Evaluation

3.6.3.1 Structural

Operators have noted roof leak issues around the exhaust fan opening. A tarp has been temporarily placed over the electrical panels below, but it is recommended to fix the roof curb to prevent future leaks.

3.6.3.2 HVAC

Wet Well: the wet well area HVAC system consists of an exhaust fan with electrically operated inlet dampers. The fan is original to the building and appears to operate intermittently instead of continuously. The unit is at end of life and should be replaced. It is noted the 10 States Standards now require the addition of a supply fan safety ventilation for wet wells. No heating is provided to the wet well.

Generator Room: the generator room HVAC consists of electric unit heaters and a roof-mounted exhaust fan for cooling. Both are original to the building and are at end of life. Intake dampers are electrically operated, and the space has had no issues with overheating in summer.

3.6.3.3 Electrical

Building power is supplied by two sources, a 60 KW Genset and Utility. This feeds the Motor Control Center that provides power to the control panel and two 15 HP Motors. The Motors are fed by a VFD and a soft starter that was converted from a VFD. All equipment is close to twenty years old. It is recommended to start planning upgrades.

3.6.4 Condition Assessment Scoring and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts or the lift station does not operate as originally intended. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-5. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-5: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Roof Leak	12	Safety/Operations	Fix roof leak around exhaust fan
Wet Well Exhaust Fan	8	Unreliable Operation	Replace exhaust fan
Generator Room Exhaust Fan	8	Age	Replace exhaust fan
PMP690102	6	Inoperable	Replace Pump
PMP690103	6	Inoperable	Replace Pump

The following improvements at Tipton Lift Station should be considered:

- Replace pumps 2 (PMP690102) and 3 (PMP690103) so the larger capacity pumps do not operate as frequently. This will reduce wear on the larger pumps and increase pump efficiency,
- Replace the wet well exhaust fan to maintain a safe environment for City staff.
- Replace the generator room exhaust fan and repair roof leak to maintain a safe environment for City staff.

3.7 Arbor Commons Lift Station

3.7.1 Facility Purpose and Design Criteria

Arbor Commons Lift Station was completed in 2020 to serve sanitary sewers in the general area. It is a one-story concrete and CMU building with a sloped metal roof. Control panels and two suction lift pumps are housed inside the building. A natural gas generator sits outside behind the lift station.

Figure 3-9: Exterior of Arbor Commons Lift Station

3.7.2 Process & Equipment Condition and Capacity Evaluation

The station was built for a new housing development and contains two 100 gpm suction lift pumps with self-priming belts. Only a few houses have been development at this point, so flow is minimal. The pumps run under high net pressure suction head and on occasion get air locked. Both pumps are adequate capacity for when subdivision is fully developed. Bearing and seals may need replacement more frequently until flows increase.

3.7.3 Structural, Electrical and HVAC Evaluation

3.7.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.7.3.2 HVAC

The room HVAC consists of an electric unit heater and an exhaust fan for cooling. Both are functioning as intended and are new as of 2020. There was no intake air louver available on the building. There could be issues in the future with temperature control if no makeup air is available to cool the space.

3.7.3.3 Electrical

Power is supplied by an 18 KW genset and a Utility feed. There are two 3 HP motors that have across the line starters. All equipment was installed in 2020 and appears in good condition.

3.7.4 Condition Assessment Scoring and Recommending

No recommendations for repair or replacements are currently necessary.

3.8 Houser Lift Station

3.8.1 Facility Purpose and Design Criteria

Houser Lift Station was completed in 1968 to serve sanitary sewers in the general area. It is a one-story concrete and brick building with a flat roof. The station is a wet well/dry well arrangement with the control room and pump motors located above the dry well. The extended shaft pumps are located in the dry well.

Figure 3-10: Exterior of Houser Lift Station

3.8.2 Process & Equipment Condition and Capacity Evaluation

The two 300 gpm pumps are original to the lift station. The pumps are higher maintenance since the seals need to be repacked and pumps rebuilt every couple of years. The pump shafts do not have cages which poses a safety hazard. Both pumps are adequate capacity for normal conditions and an increase in flow to Houser Lift Station is not anticipated. The lift station receives high wet weather flows that lead to sewer surcharging and periodic basement backups. It is not known whether the pumps are too small for the peak wet weather flows or if the sewers cannot adequately convey the flow to the lift station to avoid surcharging. If pumps are replaced, sizing should be evaluated.

3.8.3 Structural, Electrical and HVAC Evaluation

3.8.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.8.3.2 HVAC

Control Room: the control room HVAC consists of an electric unit heater. The unit is original to the building and has exceeded its service life. The control room is open to the dry well below. The space cooling is provided by the dry well exhaust fan.

Dry Well: the dry well exhaust fan is located above in the control room, with ductwork extending to the floor of the dry well. The fan was non-operational at the time of assessment, but the fan is needed for both the required ventilation of the dry well and the space cooling for the control room above. The fan should be replaced to maintain operator safety.

Wet Well: Wet well is not mechanically ventilated.

3.8.3.3 Electrical

Power distribution is supplied from a single Utility source and feeds a 480V panel. The panel then feeds locally wall mounted across the line starters that power two 15 HP motors. Equipment in this building is from 1968 and is beyond its service life.

3.8.4 Condition Assessment Scoring and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-6. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-6: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Exhaust Fan	60	Age/Safety	Replace Exhaust Fan
480V Panel	18	Age	Replace Unit
120V Panel	12	Age	Replace Unit
Unit Heater	12	Age	Replace Unit Heater
Centrifugal Pump 1/ PMP570101	10	Maintenance/Safety	Replace Pump
Centrifugal Pump 2/ PMP570102	10	Maintenance/Safety	Replace Pump
MTR570101	6	Age	Replace Unit
MTR570102	6	Age	Replace Unit

The following improvements at Houser Lift Station should be considered:

- Install an emergency generator to ensure the lift station will maintain operation if a power failure occurs.
- Replace aged pumps with ones that use mechanical seals rather than packing to reduce maintenance costs. Pump size should be evaluated prior to replacement.
- Install cages around pump shafts to maintain safe environment for City staff.
- Replace the exhaust fan and unit heater to maintain a safe environment for City staff.
- Replace electrical equipment that is beyond its serviceable life.
- Pump motors are currently operable and are not considered critical items, but due to age, efficiency, and availability of replacement parts, these assets should be replaced in the near future. A City implemented motor replacement program is recommended to make sure all motors are replaced in a timely manner before a failure occurs.

3.9 Bond Lift Station

3.9.1 Facility Purpose and Design Criteria

Bond Lift Station was completed in 1957 to serve sanitary sewers in the general area. It is a one-story concrete and brick building with a sloped metal roof. Roof was replaced in 2012. The station is a wet well/dry well arrangement with the control room and pump motors located above the dry well. The extended shaft pumps are in the dry well.

Figure 3-11: Exterior of Bond Lift Station

3.9.2 Process & Equipment Condition and Capacity Evaluation

The three 1,020 gpm pumps and associated valves were replaced in 2009. The drive shafts have not been replaced. Pumps have been low maintenance and there are no operational concerns. The City is building a splash pad nearby so the lift station will see an increase in flow. Pump 1 has a natural gas-powered engine in case of emergency. The City plans to replace Pump 1 with a larger size pump to accommodate seasonal higher flows.

3.9.3 Structural, Electrical and HVAC Evaluation

3.9.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.9.3.2 HVAC

Wet Well: the wet well HVAC system consists of an exhaust fan. The fan appears original to the building and past its service life. No intake louvers were observed that allowed makeup air into the space. It is noted the 10 States Standards now require the addition of a supply fan for safety ventilation in wet wells. No heating is provided to the wet well.

Control Room: the control room HVAC consists of a gas-fired furnace. The furnace was installed in 2012 and appears in good condition. The control room is open to the dry well below and utilizes the dry well exhaust fan for ventilation cooling.

Dry Well: the dry well exhaust fan is located above in the control room, with ductwork extending into the dry well. The fan appears original to the building and only operates during maintenance operations. The intake louver is blanked off during winter operation to minimize the heating loads. It is noted the fan should run continuously to maintain a non-rated space per NFPA 820. The fan appears past its service life and should be replaced to maintain operator safety.

3.9.3.3 Electrical

Power distribution is fed by two sources, a natural gas-powered engine and utility. Distribution is done through a Motor Control Center and feeds two 25 HP motors and one 15 HP motor that are operated by soft starters. Electrical equipment is still original from 1957 and is beyond its serviceable life.

3.9.4 Condition Assessment Scoring and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-7. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-7: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Wet Well Exhaust Fan	60	Age/Safety	Replace Exhaust Fan
Dry Well Exhaust Fan	40	Age/Safety	Replace Exhaust Fan
MCC540101	18	Age	Replace Unit
ENG540301	16	Age	Replace Unit
MTR540101	6	Age	Replace Unit
MTR540102	6	Age	Replace Unit
MTR540103	6	Age	Replace Unit

The following improvements at Bond Lift Station should be considered:

- Replace the dry well and wet well exhaust fans to maintain a safe environment for City staff.
- The natural gas-powered engine is not a generator backed system and must be started manually if a power failure occurs. Install an emergency generator to ensure the lift station will automatically maintain operation if a power failure occurs.
- Replace electrical equipment that is beyond its serviceable life.
- Pump motors are currently operable and are not considered critical items, but due to age, efficiency, and availability of replacement parts, these assets should be replaced in the near future. A City implemented motor replacement program is recommended to make sure all motors are replaced in a timely manner before a failure occurs.

3.10 Slough Lift Station

3.10.1 Facility Purpose and Design Criteria

The Slough Lift Station was constructed prior to 1965 to manage the water elevation in the slough. It is a single-story concrete and CMU block building with a shingled roof. The structure houses two vertical turbine pumps and pump controls.

Figure 3-12: Exterior of Slough Lift Station

3.10.2 Process & Equipment Condition and Capacity Evaluation

Pump capacity is 6,000 gpm and both pumps are original to the lift station. The pumps operate a few times per year when the slough is high. The station is not on SCADA, so City staff turn the pumps on by hand. The City does not have any operational or maintenance issues with the pumps. Pump capacity is adequate.

3.10.3 Structural, Electrical and HVAC Evaluation

3.10.3.1 Structural

The building needs a new roof, a new door, steps and approach platform to the building. Pumps are difficult to pull out with the low roof clearance. City plans to install a new removable roof to allow easier access to pull pumps. Air gaps need to be closed to prevent pests from entering. A wasp nest was present inside the building during site visit. Wood steps to access door should be inspected for safety.

3.10.3.2 HVAC

Control Room: the control room HVAC consists of natural ventilation for cooling. No space heating is provided to the building. No temperature issues were noted, but it is recommended to replace the louver and add a bird screen to prevent entrance of unwanted wildlife.

3.10.3.3 Electrical

Power supply is provided by a single source from the utility and feeds a motor control center. The Motor control center feeds two 25 HP motors.

3.10.4 Condition Assessment Scoring and Recommendations

The following improvements at Slough Lift Station should be considered:

- Replace roof to seal gaps in building and to allow easier access to pull pumps for maintenance.
- Replace door and seal gaps around structure to prevent pests from entering.
- Replace steps and approach platform for safety.
- Replace wall louver and add bird screen to prevent pests from entering.

3.11 Sampson Lift Station

3.11.1 Facility Purpose and Design Criteria

Sampson Lift Station was completed in 1999 to serve sanitary sewers in the general area. It is a one-story concrete and CMU block building with a flat roof. It contains a diesel generator room and a control room that sits above the wet well and two submersible pumps.

Figure 3-13: Exterior of Sampson Lift Station

3.11.2 Process & Equipment Condition and Capacity Evaluation

Both pumps have a capacity of 980 gpm and are original to the lift station. City staff have no operational or maintenance concerns with the pumps. Pump capacity is adequate.

3.11.3 Structural, Electrical and HVAC Evaluation

3.11.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.11.3.2 HVAC

Wet Well: the wet well area and screen room HVAC system consists of an explosion-proof exhaust fan with motorized intake dampers and an explosion-proof electric unit heater. The exhaust fan is non-operational, and the intake damper is missing the actuator needed to open or close the damper. The exhaust fan is also near the end of service life and should be replaced. Heating is provided by an explosion-proof electric unit heater. The unit heater is original and is near the end of service life.

Generator/Control Room: the generator/control room HVAC consists of two exhaust fans for cooling and electric unit heaters for heating. All equipment appears to be original and is near the end of service life.

3.11.3.3 Electrical

Power distribution is fed by two sources, a 125kw generator and the utility. A motor control center provides power to the pumping operation and controls. Electrical equipment is original to the building and was installed in 1999 and is beyond its serviceable life.

3.11.4 Condition Assessment Scoring and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-8. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-8: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Wet Well Exhaust Fan	50	Safety	Replace exhaust fan
MCC63	18	Age	Replace Unit
Unit Heaters	12	Age	Replace unit heater
DSL630101	12	Age	Replace Unit

The following improvements at Sampson Lift Station should be considered:

- Replace the wet well exhaust fan to maintain a safe environment for City staff.
- Add a makeup air unit to supply air to the wet well containing mechanical screen.
- Replace the electric unit heaters to maintain freeze protection for the facility.
- Replace electrical equipment that is beyond its serviceable life.

3.12 Schley Lift Station

3.12.1 Facility Purpose and Design Criteria

Schley Lift Station was constructed in 1957 to serve sanitary sewers in the general area. It is a one-story concrete and brick building with a sloped metal roof. Roof was replaced in 2012. The station is a wet well/dry well arrangement with the control room and pump motors located above the dry well. Three extended shaft pumps are in the dry well. One of the pumps has a natural gas powered motor in case of emergency. Wet well can also overflow to Miles Lift Station in case of pump failure.

Figure 3-14: Exterior of Schley Lift Station

3.12.2 Process & Equipment Condition and Capacity Evaluation

Each pump has a capacity of 1,020 gpm. Pumps 1 and 2 have new drive shafts and have been rebuilt in 2019. Pump 3 shows signs of leaking around the packing gland and the pump casing appears corroded. The pump is original to the lift station.

3.12.3 Structural, Electrical and HVAC Evaluation

3.12.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.12.3.2 HVAC

Wet Well: the wet well HVAC system consists of an exhaust fan. The fan appears original to the building and past its service life. No intake louvers were observed that allowed makeup air into the space. It is noted

the 10 States Standards now require the addition of a supply fan for safety ventilation in wet wells. No heating is provided to the wet well.

Control Room: the control room HVAC consists of a gas-fired furnace. The furnace was installed in 2012 and appears in good condition. The control room is open to the dry well below and utilizes the dry well exhaust fan for ventilation cooling.

Dry Well: the dry well exhaust fan is located above in the control room, with ductwork extending into the dry well. The fan appears original to the building and only operates during maintenance operations. The intake louver is blanked off during winter operation to minimize the space heating loads. It is noted the fan should operate continuously to maintain a non-rated space per NFPA 820. The fan appears past its service life and should be replaced to maintain operator safety.

3.12.3.3 Electrical

Power is provided by two sources, the utility and natural gas powered pump engine. The operator has never seen the natural gas-powered engine run, and monthly run tests have not been performed. A Motor control center provides power to the three 15 HP motors and their soft starters. The electrical equipment is original to the building and was installed in 1957. The equipment is beyond its serviceable life.

3.12.4 Condition Assessment Scoring and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-9. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-9: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Dry Well Exhaust Fan	40	Age/Safety	Replace Fan
Wet Well Exhaust Fan	40	Age/Safety	Replace Fan
MCC550101	18	Age	Replace Unit
ENG550301	8	Age	Replace Unit
Pump 3/ PMP550103	8	Age	Replace Pump
MTR550101	6	Age	Replace Unit
MTR550102	6	Age	Replace Unit
MTR550103	6	Age	Replace Unit

The following improvements at Schley Lift Station should be considered:

- Replace aged pump with one that uses mechanical seals rather than packing to reduce maintenance costs.
- Replace dry well and wet well exhaust fans to maintain a safe environment for City staff.
- The natural gas-powered engine is not a generator backed system and must be started manually if a power failure occurs. Install an emergency generator to ensure the lift station will automatically maintain operation if a power failure occurs.
- Electrical equipment is beyond its serviceable life and should be replaced.
- Pump motors are currently operable and are not considered critical items, but due to age, efficiency, and availability of replacement parts, these assets should be replaced in the near future. A City implemented motor replacement program is recommended to make sure all motors are replaced in a timely manner before a failure occurs.

3.13 Miles Lift Station

3.13.1 Facility Purpose and Design Criteria

Miles Lift Station was completed in 2000 to serve sanitary sewers in the general area including domestic flow from GPC. The structure is a one-story concrete and CMU block building with a flat roof. It contains a diesel generator room and a control room that sits above the wet well and two submersible pumps. GPC waste is tested regularly using an automated sampler located in control room.

Figure 3-15: Exterior of Miles Lift Station

3.13.2 Process & Equipment Condition and Capacity Evaluation

Both pumps have a capacity of 350 gpm and are original to the lift station. City staff have no operational or maintenance concerns with the pumps. Pump capacity is adequate.

3.13.3 Structural, Electrical and HVAC Evaluation

3.13.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.13.3.2 HVAC

Generator/Control Room: the generator/control room HVAC consists of a two-speed exhaust fan for cooling and electric unit heaters for heating. All equipment appears to be original and is near the end of service life.

3.13.3.3 Electrical

Power is supplied by a 60kw generator and the utility to a motor control center. The motor control center supplies power to the rest of the building loads including motor, controls, and lighting. The electrical equipment is original to the building that was installed in 2000.

3.13.4 Condition Assessment Scoring and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-10. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-10: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Backflow Preventer	24	Corrosion	Replace backflow preventer
Unit Heaters	12	Age	Replace unit heaters
Control Room Exhaust Fan	12	Age	Replace exhaust fan

The following improvements at Miles Lift Station should be considered:

- Add makeup air unit to supply air to wet well containing screen.
- Replace the backflow preventer to avoid leaks and maintain cross-contamination protection.
- Replace unit heaters to maintain freeze protection for the facility.

3.14 Stewart Road Lift Station

3.14.1 Facility Purpose and Design Criteria

Stewart Road Lift Station was completed in 2000 to serve sanitary sewers in the general area. It is a one-story concrete and CMU block building with a flat roof. Windows are glass block. Structure contains a diesel generator room, a motor control room, and a screening room. The basement houses two vertical-shafted pumps in the dry well and a mechanical bar screen in the wet well.

Figure 3-16: Exterior of Steward Road Lift Station

3.14.2 Process & Equipment Condition and Capacity Evaluation

Each pump has a capacity of 1,680 gpm. Both pumps were rebuilt in 2019.The drive shaft for pump 2 was replaced in 2019. Pumps show signs of leaking around the packing gland and the pump casing appears corroded. The drive shafts are missing cages.

The mechanical bar screen is original to the lift station and shows signs of corrosion. Bar screen still operates adequately but cannot pull the floating debris out of the wet well. The debris occasionally causes the pump floats to trip, so staff need to manually rake out the debris. The screening room has no air exchange units in operation and the hydrogen sulfide levels are too high to enter the room causing a corrosive atmosphere.

3.14.3 Structural, Electrical and HVAC Evaluation

3.14.3.1 Structure

One of the access door handles is broken and a rope is tied from the door handle to the bar screen railing to keep the door shut.

Air exchange units are inoperable and the lack of ventilation in the screening room is allowing mold to grow on the walls.

Figure 3-17: Screening Room at Steward Road Lift Station

3.14.3.2 HVAC

Wet Well/Screen Room: the wet well area and screen room HVAC system consists of makeup air units and explosion-proof exhaust fans. The makeup air unit is non-operational, and one exhaust fan is currently out for service at the wastewater treatment plant. The other exhaust fan is non-operational and is scheduled to be removed for service. All units are original to the building and are past service life.

Control Room: the wet well area and screen room HVAC system consists of a makeup air unit, an exhaust fan, and unit heater. The makeup air unit and exhaust fan are non-operational. The backflow preventer showed signs of corrosion, and hydrogen sulfide odors were present in the space. All units are original to the building and are past service life. Subsequent to the finalization of the condition assessment report, the City replaced the HVAC in March 2023.

Dry Well: the dry well exhaust fan is located on the roof, with ductwork extending to the floor of the dry well. The fan was nonfunctional at the time of assessment. A cast iron sanitary line from the restroom above showed signs of leaking. All units are original to the building and are past service life.

Generator Room: the generator room HVAC consists of an exhaust fan and unit heater for cooling and heating, respectively. All units are original to the building and are past service life.

3.14.3.3 Electrical

Power is supplied from a 125kw genset and utility through an automatic transfer switch to the motor control center. The motor control center feeds two 60 HP motors and one 10 HP motor. The 60 HP motors are driven by soft starters that were converted from VFDs and the 10 HP motor is driven by an across the line starter. The electrical equipment is original to the building and installed in 2000.

3.14.4 Condition Assessment Scoring and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-11. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements. Some items to be addressed are not tied to a specific asset and do not have an asset risk rating. Those items are discussed following the table.

Table 3-11: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Dry Well and Screen Room Makeup Air Units	60	Age/Safety	Replace makeup air units
Dry Well/Screen Room/Wet Well Exhaust Fans	60	Age/Safety	Replace exhaust fans
Dry Well Sanitary Pipe	50	Safety	Repair leak or replace cast iron pipe
Bar Screen/ BAR640201	42	Atmosphere/ Safety	Replace worn parts
Generator Room Exhaust Fan	20	Age	Replace exhaust fan
Backflow Preventer	16	Corrosion	Replace backflow preventer
Unit Heaters	12	Age	Replace unit heaters
Pump 1/ PMP640301	12	Safety	Add cage on drive shaft
Pump 2/ PMP640302	12	Safety	Add cage on drive shaft

The following improvements at Steward Lift Station should be considered:

- Add cages around pump drive shafts. Pumps require higher maintenance due to packing glands however pumps were rebuilt recently. In the future pumps should be replaced with ones that use mechanical seals rather than packing to reduce maintenance costs.
- Replace worn parts on mechanical bar screen due to age and corrosive environment.
- Repair or replace access door to maintain building safety.
- Remove mold from walls in screening room to prevent a health and safety hazard for personnel.
- Replace the exhaust fans for the dry well, wet well, screen room, and generator room.
- Replace the unit heaters, backflow preventer, and repair the exposed sanitary piping in the dry well.

3.15 57th Street Lift Station

3.15.1 Facility Purpose and Design Criteria

57th Street Lift Station was completed in 2002 to serve sanitary sewers in the general area. It is a one-story concrete and CMU block building with a flat roof. It contains a diesel generator and two submersible pumps.

Figure 3-18: Exterior of 57th Street Lift Station

3.15.2 Process & Equipment Condition and Capacity Evaluation

The two 480 gpm submersible pumps were installed in 2002 and are in good condition. Staff have no issues with pump capacity and operation. Both pumps are adequate capacity and an increase in flow to 57th Street Lift Station is not anticipated.

3.15.3 Structural, Electrical and HVAC Evaluation

3.15.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.15.3.2 HVAC

Generator/Control Room: the generator/control room HVAC consists of an exhaust fan for cooling and an electric unit heater for heating. All equipment appears to be original and is near the end of service life.

3.15.3.3 Electrical

Power is supplied by a 60kw generator and utility. The motor control center is powered from an automatic transfer switch and provides power distribution to the motors and control panels. Electrical equipment is original to the building and was installed in 2002.

3.15.4 Condition Assessment Scoring and Recommendation

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-12. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-12: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Generator Room Exhaust Fan	12	Age	Replace Exhaust Fan
Backflow Preventer	12	Corrosion	Replace/Repair Backflow Preventer
Unit Heaters	12	Age	Replace Unit Heaters

The following improvements at 57th Street Lift Station should be considered:

- Add makeup air unit for wet well containing screen.
- Replace the unit heaters in the facility.
- Replace the backflow preventer.

3.16 Progress Park Lift Station

3.16.1 Facility Purpose and Design Criteria

Progress Park Lift Station was completed in 2002 to serve sanitary sewers in the general area. It is a one-story concrete and CMU block building with a flat roof. Windows are glass block. Structure contains a diesel generator room, a motor control room, and a screening room. The basement houses two vertical-shafted pumps in the dry well and a mechanical bar screen in the wet well.

Figure 3-19: Exterior of Progress Park Lift Station

3.16.2 Process & Equipment Condition and Capacity Evaluation

Each pump has a capacity of 2,510 gpm. Pump 1 and drive shaft were rebuilt in 2019. Pump 2 has a bad seal and casing shows corrosion. The City plans to rebuild pump 2 in the near future. Pumps capacities are adequate at this time.

The mechanical bar screen is original to the lift station and appears in good condition. City staff have no maintenance or operation concerns.

3.16.3 Structural, Electrical and HVAC Evaluation

3.16.3.1 Structural

One of the access door handles is broken and a rope is tied from the door handle to the bar screen railing to keep the door shut.

3.16.3.2 HVAC

Wet Well/Screen Room: the wet well area and screen room HVAC system consists of a makeup air unit and explosion-proof exhaust fans for the wet well and screen room. The makeup air unit and exhaust fans are non-operational. All units are original to the building and are past service life.

Control Room: the wet well area and screen room HVAC system consists of a makeup air unit, an exhaust fan, and unit heater. The makeup air unit and exhaust fan are non-operational. The backflow preventer showed signs of corrosion. All units are original to the building and are past service life. The unit heater appeared to be operational but is also past service life.

Dry Well: the dry well exhaust fan is located on the roof, with ductwork extending to the floor of the dry well. The fan was nonfunctional at the time of assessment. All units are original to the building and are past service life.

Generator Room: the generator room HVAC consists of an exhaust fan and unit heater for cooling and heating, respectively. All units are original to the building and are past service life.

3.16.3.3 Electrical

Power is supplied by a 120kw generator and utility and feeds an automatic transfer switch. The Motor control center provides power to two 75 HP motors that used to have VFD's but have since been converted to soft starters. The electrical equipment minus the soft starters is original to the building and was installed in 2002.

3.16.4 Condition Assessment Scoring and Recommendation

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts or an asset not meeting safety requirements. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-13. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-13: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Wet Well/ Dry Well Makeup Air Units	60	Safety	Replace makeup air units
Dry Well/Wet Well/Screen Room Exhaust Fans	40	Safety	Replace exhaust fans
Generator Room/Control Room Exhaust Fans	12	Age/Safety	Replace exhaust fans
Unit Heaters	12	Age	Replace unit heaters

Equipment Name/ID	Risk Rating	Problem	Recommendations
Pump 2/ PMP660302	12	Age/Maintenance	Rebuild/Replace Pump
Pump 1/ PMP660301	8	Safety	Add cage on drive shaft

The following improvements at Progress Park Lift Station should be considered:

- Replace or rebuild pump 2 using mechanical seals rather than packing to reduce maintenance costs.
- Add cage around pump 1 drive shaft for safety.
- Replace Exhaust fans serving the wet well, screen room, and dry well areas to maintain a safe environment for City staff.
- Replace the makeup air units serving the wet well, screen room, and dry well to maintain a safe environment for City staff.
- Replace the exhaust fans serving the generator room and control room to maintain space temperatures suitable for equipment operation.
- Replace unit heaters to maintain freeze protection of the facility.

3.17 Hershey Lift Station

3.17.1 Facility Purpose and Design Criteria

Hershey Lift Station was completed in 1964 to serve sanitary sewers in the general area. It is a one-story precast concrete panel building with a flat roof. The station is a wet well/dry well arrangement with the control room and pump motors located above the dry well. Two extended shaft pumps are in the dry well.

Figure 3-20: Exterior of Hershey Lift Station

3.17.2 Process & Equipment Condition and Capacity Evaluation

Each pump has a capacity of 310 gpm. The original pumps had been replaced with the current installed pumps. The pumps have been rebuilt in the last few years. The City has no maintenance or operation concerns. Pumps capacities are adequate.

3.17.3 Structural, Electrical and HVAC Evaluation

3.17.3.1 Structural

A fixed vertical ladder provides access to the dry well. Ladder should be reviewed to make sure it meets current OSHA requirements. A safety cage or a landing may be required due to the vertical distance between the operating floor and the dry well.

3.17.3.2 HVAC

Control Room: the control room HVAC consists of an electric unit heater for heating and an exhaust fan for cooling. Intake dampers are electrically operated, and the space has had no issues with overheating in summer. The control room is open to the dry well below. Both the unit heater and exhaust fan appear original to the building and are past service life.

Dry Well: the dry well exhaust fan is located above in the control room, with ductwork extending to the floor of the dry well. The fan was operation at the time of assessment. Fan should be replaced due to both age and safety concerns.

Wet well is not mechanically ventilated.

3.17.3.3 Electrical

Power is supplied by two different utility sources through an automatic transfer switch. The two 15 HP motors have wall mounted across the line starters and are powered from a 480V panelboard. Electrical equipment is original to the building and was installed in 1968. The electrical equipment is beyond its service life and should be replaced.

3.17.4 Condition Assessment Scoring and Recommendation

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 3-14. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements. Some items to be addressed are not tied to a specific asset and do not have an asset risk rating. Those items are discussed following the table.

Table 3-14: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Dry Well/ Control Room Exhaust Fans	30	Age/Safety	Replace exhaust fans
Unit Heater	12	Age	Replace unit heater
MTR570101	6	Age	Replace Unit
MTR570102	6	Age	Replace Unit

The following improvements at Hershey Lift Station should be considered:

- Replace fixed ladder if current ladder does not meet OSHA standards.
- Replace exhaust fans to maintain a safe environment for City staff.
- Replace the unit heater to maintain freeze protection of facility.
- Pump motors are currently operable and are not considered critical items, but due to age, efficiency, and availability of replacement parts, these assets should be replaced in the near future. A City implemented motor replacement program is recommended to make sure all motors are replaced in a timely manner before a failure occurs.

3.18 Isett Lift Station

3.18.1 Facility Purpose and Design Criteria

Isett Lift Station was completed in 1967 to serve sanitary sewers in the general area but predominately the Kraft Heinz plant. It is a single-story facility that consists of a poured foundation/basement, a concrete building frame with a precast concrete panel exterior, and flat roof. The basement houses three vertical-shafted pumps. The main floor consists of the electrical control room and pump motors. Wet well can overflow to Mad Creek Lift Station if levels get too high. The Heinz plant accidently filled the bypass line with concrete and are working to replace the bypass line.

Figure 3-21: Exterior of Isett Lift Station

3.18.2 Process & Equipment Condition and Capacity Evaluation

Pumps 1 and 2 have a capacity of 3,900 gpm. Pump 3 has a capacity of 6,400 gpm. Pump 1 was replaced in 2003 and then rebuilt in 2021. The suction line has a hole and causes excessive leaking. The area is difficult to access and fix. Pump 2 and the drive shaft were replaced in 2013. Pump 3 is original to the lift station and is inoperable. The discharge valve is broken and there is no platform to access the drive shaft so pump cannot be replaced. Pump 1 and 2 alternate operation and will operate together under high flow conditions. If pump 1 and 2 cannot keep up with flows the lift station currently does not have a bypass line or a redundant/high flow pump. All pumps and piping appear corroded.

3.18.3 Structural, Electrical and HVAC Evaluation

3.18.3.1 Structural

The precast panels appear to be bowing out from the concrete wall and require reinforcement. Figure 3-22 illustrates the gap between the panel and the wall.

Figure 3-22: Isett Exterior Wall

The wet well is covered by a piece of plywood and should be replaced with corrosion resistant cover and hatch.

Figure 3-23: Isett Wet Well Cover

3.18.3.2 HVAC

Control Room: the control room HVAC consists of electric unit heaters for heating and exhaust fans for ventilation cooling. The exhaust fans are functional, but one fan requires the motor bearings to be replaced, and both units are past service life. Door louvers provide makeup air, but these were closed during the assessment. Two unit heaters were installed new last year after an old unit caused an arc flash fire. A third unit heater is yet to be installed. Thermostats were not secured to the wall yet either.

Dry Well: the dry well exhaust fan is located above in the control room, with ductwork extending to the floor of the dry well. The fan, which is original to the building, only operates when staff is present. The ductwork in the dry well showed minor signs of deterioration and corrosion. Operators noted the floor drains are plugged at the bottom of the dry well, and standing water was noted. Operators also noted short service life of the floor drains, which have been replaced two to three times already due to corrosion.

The wet well is not mechanically ventilated.

3.18.3.3 Electrical

Power is supplied by a single utility source and feeds a motor control center that feeds a 125 HP motor and soft starter, a 150 HP motor and soft starter, and a 200 HP motor and across the line starter. The motor control center recently had a critical failure and has since been replaced in 2021. The rest of the electrical equipment is original to the building and was installed in 1967 and is beyond its serviceable life.

3.18.4 Condition Assessment Scoring and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be

addressed that have asset risk ratings are summarized in Table 3-15. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements. Some items are not tied to a specific asset and do not have an asset risk rating. Those items are discussed following the table.

Table 3-15: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Floor Drains	60	Plugged/Corrosion/Safety	Clear drain lines and replace floor drains
Pump 3/ PMP510103	60	Inoperable Pump	Replace Pump
Pump 1/ PMP510101	42	Excessive Leaking	Replace Pump
Pump 2/ PMP510102	36	Safety	Replace Pump
Dry Well Exhaust Fans	30	Age/Safety	Replace exhaust fans
Control Room Exhaust Fan	12	Age	Replace exhaust fan
MTR510101	6	Age	Replace Unit
MTR510102	6	Age	Replace Unit
MTR510103	6	Age	Replace Unit

The following improvements at Isett Lift Station should be considered:

- Replace all three pumps with dry pit submersible pumps since staff cannot access the drive shafts safely or continue to use shafted pumps but install platforms in the dry well for shaft and valve access.
- Building Updates: Replace wet well cover. Seal air gaps and reinforce walls.
- Replace the dry well and control room exhaust fans to provide a safe environment for City staff.
- Install an emergency generator to ensure the lift station will maintain operation if a power failure occurs.
- Clear the drain lines in the dry well and replace the floor drains with more corrosion resistant type products.

3.19 Airport Lift Station

3.19.1 Facility Purpose and Design Criteria

Airport Lift Station was constructed in 2002 to serve sanitary sewers in the general area. It is duplex submersible lift station with a concrete and fiberglass structure that houses the controls.

Figure 3-24: Exterior of Airport Lift Station

3.19.2 Process & Equipment Condition and Capacity Evaluation

Both pumps have a capacity of 100 gpm and are original to the station. Pump 2 had the moisture sensors replaced four years ago. No other major maintenance has been required. Pump capacity is adequate and flow to the lift station is projected to remain the same.

3.19.3 Structural, Electrical and HVAC Evaluation

3.19.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.19.3.2 HVAC

Control Room: the control room HVAC consists of an electric space heater and a unit heater for heating and natural ventilation for cooling.

Wet well is not mechanically ventilated.

3.19.3.3 Electrical

Power is supplied by a single utility source and feeds an Motor Control Center that feeds two Motors and a Control Panel.

3.19.4 Condition Assessment Scoring and Recommendations

No recommendations for repair or replacements are currently necessary.

3.20 HNI Stormwater Lift Station

3.20.1 Facility Purpose and Design Criteria

HNI Stormwater Lift Station was constructed in 2019 to mitigate stormwater flows into Mad Creek. Lift station pumps flow over levee into Mad Creek when river level is above 10 feet. It is duplex turbine lift station with pump motors and controls mounted outdoors on a concrete pad. The lift station was constructed by HNI with the intent of the City taking over maintenance, but no formal agreement has been signed as of April 2023.

Figure 3-25: Exterior of HNI Stormwater Lift Station

3.20.2 Process & Equipment Condition and Capacity Evaluation

Both pumps have a capacity of 18,000 gpm. The lift station has not experienced much flow since being built, but pumps seem to be adequate size and are in good condition.

3.20.3 Structural, Electrical and HVAC Evaluation

3.20.3.1 Structural

The structure appears in good condition, and there are no reported issues by City staff.

3.20.3.2 HVAC

There are no HVAC systems located in this lift station. No HVAC is provided to this facility.

3.20.3.3 Electrical

Power is supplied by a single source and utilized Locally mounted starters for operating the motors.

3.20.4 Condition Assessment Scoring and Recommendations

No recommendations for repair or replacements are currently necessary.

3.21 Magnolia Lift Station

3.21.1 Facility Purpose and Design Criteria

Magnolia Lift Station was constructed prior to 1965 to serve sanitary sewers in the general area. It is simplex submersible lift station with a brick riser that houses the controls.

Figure 3-26: Exterior of Magnolia Lift Station

3.21.2 Process & Equipment Condition and Capacity Evaluation

The single pump has a capacity of 100 gpm and is original to the station. There is no redundancy, and the station is not viewable on SCADA. However, pump capacity is adequate and flow to the lift station is projected to remain the same. The city plans to replace lift station with a new duplex system this year. The control panel will be removed from the riser structure and will be mounted aboveground. Subsequent to the finalization of the condition assessment report, the City replaced the simplex system with a duplex system and added a new control panel with alarm near the curb. The City plans to remove the building and pave over surface in the spring of 2023.

3.21.3 Structural, Electrical and HVAC Evaluation

3.21.3.1 Structural

The structure appears in adequate condition, and there are no reported issues with the roof or building by City staff.

3.21.3.2 HVAC

There are no HVAC systems located in this lift station.

3.21.3.3 Electrical

Power is supplied by a single source and utilizes a locally mounted starter to power the 1.5 HP motor.

3.21.4 Condition Assessment Scoring and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. These assets are summarized in Table 3-16. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-16: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Pump/ PMP590101	36	Age & No Redundancy	Install Two New Pumps
Control Panel	28	Safety	Relocate panel outside

The following improvements at Magnolia Lift Station should be considered:

- Replace simplex submersible pump system with a duplex submersible pump station to provide redundancy and to reduce maintenance costs.

3.22 Maple Grove Lift Station

3.22.1 Facility Purpose and Design Criteria

Maple Grove Lift Station was constructed in the 1970s to serve sanitary sewers for a small subdivision. It is an air ejector system with a metal riser that houses the controls.

Figure 3-27: Exterior of Maple Grove Lift Station

3.22.2 Process & Equipment Condition and Capacity Evaluation

Both air compressors are original to the station. One air compressor is scheduled to be replaced this year. The station is not viewable on SCADA, and City staff need to visit the site three times per week to manually turn on system to empty wet well. The lift station goes through overloads, and contacts and capacitors need to be replaced every couple of years. The wet well used to be able to bypass to Steward Lift Station but cannot gravity flow through anymore.

3.22.3 Structural, Electrical and HVAC Evaluation

3.22.3.1 Structural

Other than some minor corrosion, the structure appears in adequate condition, and there are no reported issues by City staff.

3.22.3.2 HVAC

There are no HVAC systems located in this lift station.

3.22.3.3 Electrical

Power is supplied by a single source and utilizes a locally mounted starter to power the two 5 HP motors.

3.22.4 Condition Assessment Scoring and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. These assets are summarized in Table 3-17. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 3-17: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Air Ejector System	6	High Maintenance	Replace with Submersible Pumps

The following improvements at Maple Grove Lift Station should be considered:

- Replace air ejector system with a duplex submersible pump station to provide a handsfree operation and to reduce maintenance costs.

3.23 Sunset Lift Station

3.23.1 Facility Purpose and Design Criteria

Sunset Lift Station was constructed in 1981 to serve sanitary sewers in the general area. The system has a wet well/dry well configuration. Prior to two years ago the controls were mounted underground and access to the panel was through a metal riser structure. City staff have now moved the control panel aboveground into a fiberglass shed. Dry well currently has two active pumps with space for a third pump.

Figure 3-28: Exterior of Sunset Lift Station

3.23.2 Process & Equipment Condition and Capacity Evaluation

The two installed pumps have two-speed motors with a capacity of 200 gpm. Pump 1 is original to the station but has a new rotating assembly. Pump 2 is a dry pit submersible that was installed in 2021. Staff need to use a retrieval system to enter the confined space dry well and only enter twice a year unless unexpectant maintenance is required. An increase in flow is expected from Phelps and Lutheran Homes. City staff plan to install a spare dry pit submersible pump on the third volute so the station can accommodate future flows.

3.23.3 Structural, Electrical and HVAC Evaluation

3.23.3.1 Structural

The structure appears in good condition, and there are no reported issues with the roof or building by City staff.

3.23.3.2 HVAC

Control Room: the control room HVAC consists of natural ventilation for cooling. An electric unit heater is assumed for freeze protection but was not observed in the pictures received.

Wet well is not mechanically ventilated.

3.23.3.3 Electrical

Power is supplied by a single utility source to the motor control center and feeds two 20 HP motors.

3.23.4 Condition Assessment Scoring and Recommendations

The following improvements at Sunset Lift Station should be considered:

- Install an emergency generator to ensure the lift station will maintain operation if a power failure occurs.

3.24 Tanglefoot Lift Station

3.24.1 Facility Purpose and Design Criteria

Tanglefoot Lift Station was completed in 1972 to serve sanitary sewers in the general area. It is a concrete structure with two submersible pumps.

Figure 3-29: Exterior of Tanglefoot Lift Station

3.24.2 Process & Equipment Condition and Capacity Evaluation

The pumps have a capacity of 200 gpm and are original to the station. Staff have no operation and maintenance concerns with the pumps.

3.24.3 Structural, Electrical and HVAC Evaluation

3.24.3.1 Structural

The structure appears in good condition, and there are no reported issues by City staff.

3.24.3.2 HVAC

There are no HVAC systems located in this lift station.

3.24.3.3 Electrical

Power is supplied by a single utility source to a motor control center that supplies power to two 2 HP motors.

3.24.4 Condition Assessment Scoring and Recommendations

No recommendations for repair or replacements are currently necessary.

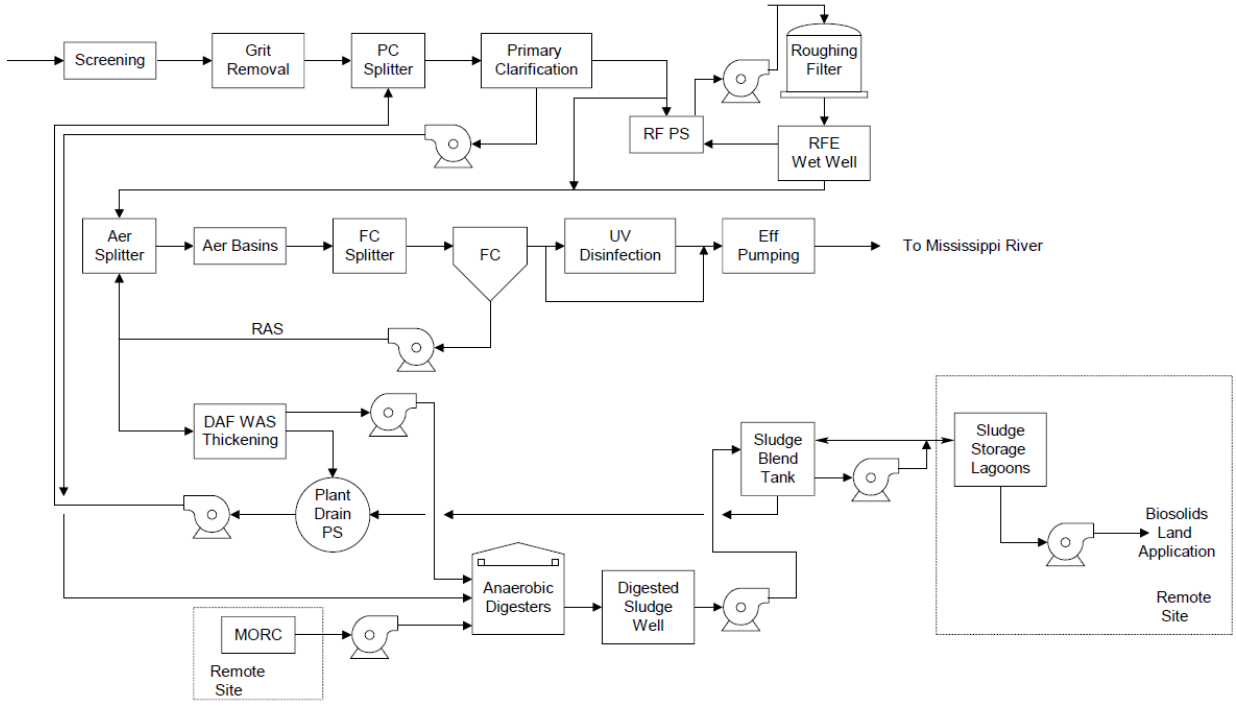
Section 4 WRRF Condition Assessment

4.1 Introduction

The Muscatine Water & Resource Recovery Facility (WRRF) was originally configured for primary treatment consisting of screening and primary clarification in the 1960s. A secondary treatment system including a high purity oxygen system designed to receive high strength wastewater from a corn wetmill and tannery was constructed in the 1970s. After these two high strength wastewater producing industries discontinued discharges to the treatment plant, the plant was reconfigured to a traditional aerated activated sludge plant in the 1980s. Additional upgrades occurred throughout the 1990s; and the plant underwent a major $18 million renovation in 2009-2011. The city is reaching the end of their combined sanitary and storm sewer system separation program and the reduction in wet weather flows has resulted in some of their processes being oversized and are affecting their treatment performance.

The treatment train consists of preliminary treatment (screening and grit removal), primary clarification, optional roughing filter, a two-train aerated activated sludge system, three final clarifiers and UV disinfection. Solids processing consists of dissolved air flotation thickening of the waste activated sludge (WAS) and anaerobic digestion of the combined thickened waste activated sludge and primary clarification settled solids. The plant receives septage, fats, oils, grease (FOG) loads, and food waste from the Muscatine Organics Recycling Center (MORC) that are fed directly to the anaerobic digesters. Anaerobic digester decanting is not practiced. Digested solids are pumped to a sludge lagoon system remote from the treatment plant. The biosolids in the sludge lagoon are land applied to cropland seasonally. Clarified supernatant from the sludge lagoon is returned routinely returned to the treatment plant as sludge lagoon water levels become too high. Plant recycle flows are limited to plant drain system and the DAF WAS thickening supernatant.

Figure 4-1: WRRF Process Flow Diagram



The City divides their WRRF assets into systems. Table 4-1 lists the treatment processes and/or structures that are associated with each system. The condition assessment is based on the defined system and not on treatment process sequence.

Table 4-1: WRRF System Description

System	Process/Structures
1	Grit Building – Screening & Grit Removal
2	Primary Control Building, Primary Clarifiers
3	Roughing Filter
4	Blower Building, Aeration Basins
5	WAS/RAS Pumping, Final Clarifiers
6	Dissolved Air Flotation (DAF)
11	Digesters, Digester Control Building
13	Digested Sludge Storage
14	UV Disinfection
15	Effluent Pumps
20	HVAC Units
32	Muscatine Organics Recycling Center (MORC)
90	Lab

4.2 System 01 Grit Building

4.2.1 Facility Purpose and Design Criteria

System 1 consists of the grit building and the screening, grit removal and grit dewatering within the grit building. The facility was built in 1999 and has two mechanical bar screens and two vortex grit removal units each capable of treating up to 12 mgd of flow. Bar screenings are dewatered through a screening press and conveyed to a hopper for disposal. The grit is pumped to two grit washing units where the grit is dewatered and conveyed to a hopper for disposal.

The functional purpose of the headworks screening facility is removal of non-biodegradable debris and rags from the influent wastewater to prevent material from plugging downstream equipment and accumulating in process tanks.

Ten State Standards design guidelines include the following applicable criteria:

- Mechanical process equipment shall be provided in multiple units so when one unit is taken out of service the peak design flow may still be passed.
- Screens shall be enclosed, and housing shall be designed as a NEC, Class 1, Division 1 location.
- Screen capacity shall handle the maximum anticipated hourly flow.
- Enclosed spaces shall be provided with forced ventilation. Ventilation shall provide a minimum 12 air changes per hour.

Grit removal units are designed to remove sand and small material that may cause wear on piping and pumps downstream. Ten State Standards guidelines require a minimum of two grit units with provisions for grit washing & dewatering for each grit unit.

4.2.2 Process & Equipment Condition and Capacity Evaluation

Each bar screen and grit removal unit can pass the peak hourly flow providing full redundancy if one unit is out of service. Process equipment is twenty-three years old but operate well. Bar screens components are original to the unit and both units need to be overhauled to keep the units operating efficiently. Parts to be replaced include a new gearbox, chain, hydraulic motor and bars where needed. The screenings press has a difficult time passing leaves and sand, so the unit needs to be cleaned out on occasion. The perforated bottom plate was replaced in 2017 due to wear.

Since sewer separation has progressed, the amount of sand received at WRRF has declined. The WRRF now receives more fine sand than coarse sand. As a result, the grit unit motors are not used. Only one grit unit was operating at the time due to low flow conditions. Each grit unit has two grit pumps. Maintenance is typical for a grit pump as parts can wear from pumping abrasive grit. Three of the four pumps were replaced with older but more durable pumps that plant staff had on hand. These pumps are 38 years old and replacement parts are difficult to find. Most parts are only found and purchased off Ebay. All three pumps were overhauled in 2019. The cyclone separator for one grit washer was replaced in 2012 and is operating well. The second cyclone separator is original to the building and is scheduled for replacement this year. The augers on both units need to be replaced due to wear. Grit drain piping is heavily deteriorated and should be replaced to maintain the integrity of the system. Subsequent to the finalization of the condition assessment report, the worn cyclone separator has been replaced. The east classifier has been replaced with a stainless-steel unit and there is a stainless steel classifier ready to be installed on the west side in 2023.

4.2.3 Electrical and HVAC Evaluation

4.2.3.1 HVAC

The building HVAC systems consists of gas-fired Makeup Air Units (MAU) with interlocked exhaust fans. MAU200103 serves the bar screen room. It was installed in 2020 and functions as desired. Operators did note the high utility cost of gas during winter operation. The other MAUs, which serve the 1st floor and 3rd floors function, but are maintenance intensive and past service life. The MAU serving the 3rd floor experiences overheating of spaces when gas-fired heater becomes stuck in high-fire during summer month operation. This unit must maintain the space at the correct temperature to prevent the hydraulic units from over pressurizing and tripping off the bar screen. Exhaust fans (EF-200131, EF-200132, and EF-200133) are near the end of their expected service life and should be replaced to maintain operator safety. Operators

did note the exhaust fans are difficult to access due to height. The electrical room in the facility has its own dedicated heating and air conditioning unit that was installed around 2017. The unit functions as intended, but the unit experiences some refrigerant leaks and corrosion due to gases.

4.2.3.2 Electrical

Power distribution is fed through MCC 13 to pumps and panelboards. Spare parts for MCC-13 are no longer produced and plat staff have to source spare parts from eBay which has gotten increasingly more difficult with time. The Grit building utilizes across the line starters for motors except for the VFD used for the Azure Unit which was tripped during our data collection visit. There are 2 other VFD's that are in Master/Slave setup, but the Master unit failed and the Slave unit is non-operational without the Master Functional.

4.2.4 Condition Assessment Rating and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 4-2. Some items are not tied to a specific asset and do not have an asset risk rating. Those items are discussed following the table.

Table 4-2: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
MAU-200132	60	Age/Safety	Replace Unit
EF-200133	50	Age/Safety	Replace Unit
EF-200132	30	Age/Safety	Replace Unit
Hydraulic Press Unit	30	Age	Replace Unit
MAU-200131	20	Age/Safety	Replace Unit
MCC-180508	16	Age	Replace Unit
Grit Washer/ AUG010701	10	Worn Separator & Auger	Replace Separator & Auger
MTR-0106011	10	Age	Replace Unit
MTR-0106022	10	Age	Replace Unit
MTR-010801	10	Age	Replace Unit
MTR-0106012	10	Age	Replace Unit
MTR-0106021	10	Age	Replace Unit
PLC-010101	8	Age	Replace Unit

Equipment Name/ID	Risk Rating	Problem	Recommendations
Grit Pump/ PMP0106021	8	Age	Replace Pump
Grit Pump/ PMP0106022	8	Age	Replace Pump
Grit Pump/ PMP0106011	6	Age	Replace Pump
EF-200131	6	Age/Safety	Replace Unit
Grit Washer/ AUG010702	4	Worn Auger	Replace Auger

Source: Stanley Consultants

The following improvements should be considered:

- Replace the aged grit pumps & motors as replacement parts become obsolete. Pumps are operating well at this time and serve as redundancy so replacement is only recommended once replacement parts cannot be obtained.
- Replace the augers on the two grit washing units and the cyclone separator on AUG010701 to maintain efficient and proper redundancy.
- Replace grit drain piping throughout the building as pipe integrity is questionable in many areas.
- Replace the 1st and 3rd floor makeup air units to maintain a safe environment for City staff.
- Replace the exhaust fans associated with the makeup air units to maintain a safe environment for City staff.
- Replace the control panel and power panels in the near future due to the panels being 20+ years in age.
- Recommend replacing the Hydraulic Press Motor as soon as possible due to age and its critical function in the grit building with new redundant spare.

4.3 System 02 Primary Control Building

4.3.1 Facility Purpose and Design Criteria

System 2 consists of primary clarification, the primary control building, and associated pumping within the building. The facility was built in 2011 and has three 80-ft diameter primary clarifiers with 12-ft side water depth, two sludge pumps, two scum pumps, and two drainage pumps.

The functional purpose of primary clarification is to remove readily settable solids and floating material to reduce suspended solids content. According to Ten State Standards at least two tanks with a minimum side water depth of 10 feet should be provided to maintain treatment while one tank is out of service. Scum and sludge removal is required.

4.3.2 Process & Equipment Condition and Capacity Evaluation

All pumps are 2011 and have no operation or maintenance concerns. They all appear in good condition. At the time of the site visit two of the primary clarifiers were drained due to low flow conditions. Skimmer arms, scrapers, feed well, scum hopper, and concrete tank itself visually look in good condition.

4.3.3 Structure, Electrical and HVAC Evaluation

4.3.3.1 HVAC

The building basement is served by an energy recovery unit and unit heaters. The energy recovery unit provides the cooling ventilation air, and the unit heaters provide supplemental heat to protect against freezing. The first floor is ventilated with an exhaust fan and heated with unit heaters. All equipment is original and appears in good condition. No operational issues were noted.

4.3.3.2 Electrical

All equipment in the Primary Pump room is 11 years old and appears to be in good condition. No electrical improvements identified.

4.3.4 Condition Assessment Scoring and Recommendations

All assets seem to be performing adequately. No improvements are recommended at this time.

4.4 System 03 Roughing Filter

4.4.1 Facility Purpose and Design Criteria

System 3 consists of the roughing filter and the roughing filter pump station. The facility was built in 1985 for treating higher-strength industrial wastewater. It was taken out of service for a period, but more recently high strength waste from Kraft-Heinz Production Facility has increased requiring the roughing filter to be put back into service. The pump station has four turbine flow pumps that lift primary effluent to a rotary distributor that sprays the wastewater over the top of the roughing filter media. The wastewater trickles through the media to the bottom of the filter where gravity flows out.

The roughing filter size should consider peak organic load conditions according to Ten State Standards. Wastewater should be distributed evenly over the filter by a rotary distributor and collected by an underdrainage system to an effluent pipe. The system should be designed to permit free passage of air. The media shall be structurally capable of supporting a person’s weight or a suitable access walkway shall be provided to allow for distributor maintenance.

4.4.2 Process & Equipment Condition and Capacity Evaluation

The four vertical turbine solids handling pumps are original to the pump station. Pump 3 and pump 4 were overhauled in 2008. Pump 1 and pump 2 have reduced capacity and need to be overhauled. All four check valves need replacement, and the City plans to complete in the near future. Pumps 3 and 4 are used interchangeably to operate the roughing filter. If the media needs flushing, then pump 1 or 2 is turned on in

addition to pump 3 or 4. Despite the reduced pumping capacity, the combined flow during a flushing cycle is adequate.

The center column and arms of the rotary distributor were replaced in 2011. The media was replaced in 2006 and typically has a lifespan of 20 years. The top layer of packing is missing, and the media visually appear to be falling apart due to UV degradation. There is no walkway to access the rotary distributor and it is a safety hazard to walk across the media to grease bearings every week. The City has purchased a cover that fits over the filter to protect the media from UV rays and is safe for personnel to walk on to access the rotary distributor. Cover has been delivered and will be installed this year.

4.4.3 Electrical and HVAC Evaluation

4.4.3.1 HVAC

The building HVAC system consists of an electric heat Makeup Air Unit (MAU). It was installed in 1986 and is past the end-of-life service. The unit experiences some issues, with only half the electric heating coil working as intended.

4.4.3.2 Electrical

The building electrical distribution is served by MCC-11A and MCC-11B and feeds four 75 HP motors with across the line starters. Motors and MCC's were installed in 1986 and is past the end of service life.

4.4.4 Condition Assessment Rating and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 4-3.

Table 4-3: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Roughing Filter/ DIS030301	42	Deteriorated Media/ Safety	Install Walkway/ New Media
MCC-180502	20	Age	Replace Unit
MCC-1805011	20	Age	Replace Unit
Makeup Air Unit	10	Age	Replace unit
Pump 1/ PMP030301	8	Reduced Capacity	Overhaul Pump
Pump 2/ PMP030302	8	Reduced Capacity	Overhaul Pump
MTR-030301	8	Age	Replace Unit
MTR-030302	8	Age	Replace Unit

Equipment Name/ID	Risk Rating	Problem	Recommendations
MTR-030303	8	Age	Replace Unit
MTR-030304	8	Age	Replace Unit

Source: Stanley Consultants

The following improvements should be considered:

- Install a suitable access walkway to the center of the roughing filter to maintain rotary distributor in a safe manner.
- Replace media in the next five years to maintain reliable industrial waste treatment.
- Replace the makeup air unit to maintain freeze protection of the building.
- Consider replacing MCC to be able to source spare parts and increase reliability.
- Consider replacing 40-year-old motors.

4.5 System 04 Blower Building

4.5.1 Facility Purpose and Design Criteria

System 4 consists of the activated sludge tanks and blowers for secondary treatment. The City's secondary treatment is a conventional aerated activated sludge system. It is a two-train system with each train divided into three sections. Each train is 71 feet wide and 210 feet long with a side water depth of 13 feet. Five multistage centrifugal blowers supply air to the diffused aeration system in the aeration basins. The activated sludge process design allows for seasonal nitrification. The two tanks are covered, and the blowers and control are housed in the blower building.

The functional purpose of the activated sludge system is to produce an environment that fosters the growth of organisms to consume the biological oxygen demand (BOD), suspended solids, and nutrients in the wastewater. At a minimum, an aeration system consists of a basin(s), diffusers in the basin to supply air, and blowers to supply the air. Systems require additional features such as internal recycle pumping, static mixers, and anaerobic/anoxic basins depending on the wastewater characteristics and the nutrient removal requirements. Ten State Standards design guidelines include the following basic criteria:

- Total aeration volume shall be divided among two or more trains. Each train shall be designed to carry the design peak instantaneous flow in case the other tank is out of service.
- Oxygen requirements will be based on the design peak hourly BOD and shall be capable of always maintaining a minimum of 2.0 mg/L of dissolved oxygen in the mixed liquor.
- Diffuser systems shall be capable of providing for 200 percent of the design average day oxygen demand.

4.5.2 Process & Equipment Condition and Capacity Evaluation

The blower building has three 150 HP blowers (Blower 1-3) and two 250 HP blowers (Blowers 4-5). They were installed in 2011 so the blowers have little to no maintenance issues. Blower 4 was overhauled in

2021. The actuators on the suction side of the blowers have been problematic. The City has Auma actuators that overheat and are slow to operate. Aeration diffusers were also installed in 2011 and have no operation and maintenance issues for the City.

Only one of the two trains was in operation during the site visit due to low flow conditions. The plant has difficulty reducing blower air supply to meet low process air demands. Consequently, air is overfed increasing operating cost.

4.5.3 Electrical and HVAC Evaluation

4.5.3.1 HVAC

The building HVAC system consists of exhaust fans for ventilation cooling and unit heaters for heating. All equipment is original and appears in good condition. The exhaust fans that serve the blower room are temperature controlled but are always operating. The other exhaust fan serves to cool the electrical room. Two unit heaters are present, one for the blower room and one for the electrical room.

4.5.3.2 Electrical

The building electrical power distribution is fed from two sources through and ATS to MCC-4. MCC-4 powers three 150 HP and two 250 HP motors through soft starters. Equipment was installed in 2011 and is in good repair.

4.5.4 Condition Assessment Rating and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Condition assessment scoring critical assets to be addressed for the most critical elements that have asset risk ratings are summarized in Table 4-4. Some items are not tied to a specific asset and do not have an asset risk rating. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements. Those items are discussed following the table.

Table 4-4: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Asset Risk Rating	Problem	Recommendations
ABL040201	2	Oversized	Install Smaller Blower

Source: Stanley Consultants

The following improvements should be considered:

- Replace one or two of the 150 HP blowers with smaller capacity blowers to better match air supply to air demand and improve overall blower/aeration system controls.
- Replace Auma actuators on suction piping to improve operations.

4.6 System 05 Final Clarifiers

4.6.1 Facility Purpose and Design Criteria

System 5 consists of the final clarifiers, return activated sludge (RAS) pumping and waste activated sludge (WAS) pumping. The WRRF has three 100-ft diameter final clarifiers with a 12-ft side water depth. Activated sludge settles to the bottom of the clarifiers. Three RAS pumps recycle activated sludge back to the aeration tanks. Two WAS pumps send the wasted activated sludge to the dissolved air floatation system for thickening. The RAS and WAS pumps are located in the Thickener Building.

The functional purpose of final clarification is to settle out the activated sludge and floating material from the treated wastewater before disinfection and final discharge. The activated sludge settles to form a sludge blanket at the bottom of the clarifier. A portion of the sludge is returned to the aeration process and the remaining sludge is wasted. According to Ten State Standards at least two tanks should be provided to maintain treatment while one tank is out of service.

- Final clarifier side water depth must be at least 12 feet.
- Scum removal shall be provided for each clarifier.
- RAS pumping should be sized for the maximum return sludge capacity with the largest pump out of service.
- WAS pumping should be sized to convey at least 25 percent of the design average flow.

4.6.2 Process & Equipment Condition and Capacity Evaluation

All RAS and WAS pumps are 2011. RAS pump 1 was overhauled in 2020. Its bearings fail chronically. RAS pump 3 was overhauled 2014. All three pumps need new check valves. The pumps alone seem to be operating well at this point. Subsequent to the finalization of the condition assessment report all check valves were repaired in 2023 and are now operational.

All three clarifiers had sludge rakes and skimmer arms replaced between 2009-2011. The center well for clarifier 2 was replaced in 2010. At the time of the site visit, two of the clarifiers were drained due to low flow conditions. Staff clean the tanks when out of service. The tank drain is not located near the center of the tank so settled sludge accumulates on the floor and takes more time than typically necessary to clean. The clarifiers experience algae and scum buildup on the weirs and in the effluent troughs. The weirs were painted in 2012 to minimize algae growth; however, algae still accumulate. Skimmer arms, scrapers, feed well, scum hopper, and concrete tank itself visually look in good condition. Structure, Electrical and HVAC Evaluation

4.6.3 Electrical and HVAC Evaluation

4.6.3.1 HVAC

No HVAC systems were associated with this system.

4.6.3.2 Electrical

The electrical power distribution is fed from a Motor Control Center and feeds three RAS pumps and two WAS pumps. The RAS pump VFD's are believed to be a faulty design and fail often and randomly. Staff has looked at replacing the VFD's, but the equivalent replacement does not fit in the existing enclosure. It is recommended to replace the VFD's in wall mounted enclosures. Subsequent to the finalization of the condition assessment report, the City has ordered new RAS VFDs in spring 2023 and are waiting delivery.

4.6.4 Condition Assessment Scoring and Recommendations

Condition assessment scoring for the most critical elements are summarized in Table 4-5. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements.

Table 4-5: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
VFD050401	12	Defective	Replace
VFD050402	12	Defective	Replace
VFD050403	12	Defective	Replace

Source: Stanley Consultants

The following improvements should be considered:

- Replace RAS VFD's to avoid future failures.

4.7 System 06 DAF

4.7.1 Facility Purpose and Design Criteria

System 6 consists of the sludge thickening process. The WRRF has two dissolved air flotation (DAF) tanks that are 20-ft wide and 75-ft long with an 8-ft side water depth. A service water pump conveys plant effluent water through a pressure vessel to form bubbles to float the sludge. Each tank has an upper and lower collector system to collect the sludge that either floats to the surface or sinks to the bottom of the tank. The collected sludge is pumped to the anaerobic digesters by one of two thickened waste activated sludge (TWAS) pumps.

The functional purpose of sludge thickening is to reduce the volume of sludge to be handled downstream. Ten State Standards does not have specific criteria for sludge thickening other than storage and handling should be considered. TWAS from the DAF is pumped to the anaerobic digesters and any change in TWAS quantity and/or characteristics can alter the digestion performance.

4.7.2 Process & Equipment Condition and Capacity Evaluation

At the time of the site visit one of the DAF tanks was empty due to low flow conditions. Tank 1 was in operation and is in good condition. Both the upper and lower chain assemblies were replaced in 2011. Tank 2 has a new upper chain assembly. The chain for the lower assembly was repurposed from another process and operates well. The service water pumps (PMP060201 & PMP060202) are in good condition. One concern is the lack of redundancy. When solid loadings spike both pressurization pumps and DAF tanks need to be operating. TWAS pumps were replaced in 2017 and are in good condition.

4.7.3 Structure, Electrical and HVAC Evaluation

4.7.3.1 HVAC

The building HVAC system primarily consists of unit heaters and exhaust fans. The unit heaters in the basement were installed around 2016. All other HVAC equipment appears original to the building and is past end of service life. Some older unit heaters have not worked in 27 years based on discussion with operators. There is a non-functional makeup air unit in the chemical storage area of the building. Two air compressors were installed in 2020 and 2022 and appear in good condition. A supply fan supplies air in summertime through the basement and out through the DAF tank room.

4.7.3.2 Electrical

The building electrical power distribution is fed from a switchgear that serves Motor Control Center 5, 6, and 7. Motor Control Center 6, the switchgear, and panelboards were installed in 1964 and are beyond their expected life.

4.7.4 Condition Assessment Rating and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 4-6.

Table 4-6: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
Makeup Air Unit	60	Safety	Replace Unit
MCC180510	30	Age	Replace Unit
Switchgear (No Tag)	30	Age	Replace Unit
Unit Heaters	24	Age	Replace Units
Panel 2P	20	Age	Replace Unit
Panel 5L	20	Age	Replace Unit
Panel 6L	20	Age	Replace Unit

Equipment Name/ID	Risk Rating	Problem	Recommendations
Basement Supply Fan	8	Age	Replace fan
DAF Tank 2/ AFT060802	8	No Redundancy	Increase Capacity/ Efficiency
DAF Tank 1/ AFT060801	2	No Redundancy	Increase Capacity/ Efficiency

Source: Stanley Consultants

The following improvements should be considered:

- Reevaluate the efficiency of the DAF system to increase sludge capacity through each tank. One option may be to use polymer to flocculate solids and promote quicker settling.
- Electrical equipment that is 20 years of age or over should be considered for replacement due to age and difficulty of sourcing parts.
- Mechanical HVAC equipment that is 20 years of age or over should be considered for replacement due to age.
- Storage makeup air unit should be considered for replacement to maintain a safe environment for City staff when storing chemicals in the storage room.

4.8 System 11 Digester Complex Building

4.8.1 Facility Purpose and Design Criteria

System 11 accounts for sludge digestion, sludge recirculation pumping and digested sludge pumping to the sludge holding tanks. The WRRF has two 55-ft diameter anaerobic digesters with a 24.5-ft liquid level in digester 1 and 24-ft liquid level in digester 2. Primary sludge, TWAS, and high strength waste (HSW) are pumped to the digesters for further processing. Three 7.5 HP pumps recirculate sludge through the digesters or can drain the digesters if needed. Each digester has a draft tube mixer to keep sludge in suspension. Two 10 HP pumps convey the digested sludge to the sludge holding tanks or to the lagoon pump.

Anaerobic digestion involves the decomposition of organic and inorganic matter in the absence of molecular oxygen. Anaerobic digestion provides the benefit of energy conservation and recovery of digester gas. Some important factors in anaerobic digestion include solids retention time, hydraulic retention time, temperature, alkalinity, pH, the presence of inhibitory substances, and the bioavailability of nutrients and trace metals. The Ten State Standards provides these guidelines:

- Multiple units or alternate methods of sludge processing shall be provided.
- The tank bottom shall slope to drain toward the withdrawal pipe. For tanks equipped with a suction mechanism for sludge withdrawal, a bottom slope not less than 1 to 12 should be provided.
- Sludge withdrawal to disposal should be from the bottom of the tank. The bottom withdrawal pipe should be interconnected with the necessary valving to the recirculation piping to increase operational flexibility when mixing the tank contents.

- An unvalved vented overflow shall be provided to prevent damage to the digestion tank and cover in case of accidental overfilling. This emergency overflow shall be piped to an appropriate point and at an appropriate rate in the treatment process or side stream treatment facilities to minimize the impact on process units.
- For raw sludge that is derived from ordinary wastewater, a digestion temperature is to be maintained in the range of 85°F to 95°F, 40-50% volatile matter in the digested sludge, and that the digested sludge will be removed frequently from the process.
- For completely mixed digestion systems, the system may be loaded up to 80 pounds of volatile solids per 1000 cubic feet of volume per day.

4.8.2 Process & Equipment Condition and Capacity Evaluation

The digesters and associated pumps were installed in 2011. The digesters and mixers are in good condition, but struvite build up in the pumps and the piping is an issue. The two digested sludge pumps (PMP110201 & PMP110202) require a high amount of maintenance due to struvite buildup. Discs are replaced frequently up to multiple times per day. The top ends of the pumps were overhauled in 2021. The lower ends of the pumps are overhauled every 90 days. The sludge recirculation pumps (PMP110501-PMP110503) have never been overhauled and are not affected by struvite.

The digested sludge pumps run simultaneously when the primary sludge pumps are in operation. The digesters do not have storage capacity so when primary sludge is pumped to the digesters an equal amount of flow is pushed out of the digesters. The digested sludge flows into a wet well and the digested sludge pumps convey the sludge to the holding tanks. The digested sludge pumps cannot handle pressures greater than 35 psi, so both digested sludge pumps need to operate to keep up with the flow into the wet well. The wet well does not have a long retention time before it overflows onsite which occurs often.

Digester tanks are close to design capacity and do not have the ability to accept more HSW than what the WRRF is currently taking. Digestion time is currently limited to digester capacity. The quality of digested sludge may improve if digestion time is increased.

4.8.3 Electrical and HVAC Evaluation

4.8.3.1 HVAC

The building HVAC systems consists of Makeup Air Units (MAU) with hydronic heating coils and an exhaust fan. ASU-3 serves the digester control room. The unit is original and at the end of service life. Operators noted the hydronic heating coil is almost never in use due to the heat generated from the boilers located in the space. The other MAU is located above the ceiling in the office and is manually operated. This unit is also at the end of its service life. Exhaust fans also serve to cool the building and are original to the building.

Two boilers heat the process water to the anaerobic digesters. BOI111201 is the newer of the two, installed in 2011. BOI111202 is an original Kewanee boiler and provides supplemental heat when BOI111201 is unable to meet the demand. BOI111202 is past its useful life and should be replaced to maintain the process flow and provide redundancy.

Heat exchangers are also present and serve to transfer heat between the boilers and the process water. All heat exchangers are original to the building. Operators noted the heat exchangers can get clogged due to plastic residue.

4.8.3.2 Electrical

The digester control building is served by two Motor Control Centers, MCC-12A & MCC-12B. There were issues with a recently installed VFD that caused a temporary enclosure to be installed to troubleshoot the problem. The issue was resolved by up sizing the VFD, but the enclosure remains in the room. The Electrical equipment in the room is mostly from 1986 and should be replace.

4.8.4 Condition Assessment Rating and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Condition assessment scoring critical assets to be addressed for the most critical elements that have asset risk ratings are summarized in Table 4-7. Some items are not tied to a specific asset and do not have an asset risk rating. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements. Those items are discussed following the table.

Table 4-7: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
BOI111202	56	Age	Replace Unit
PMP110201	42	Pump Capacity/ Struvite	Struvite Control
PMP110202	42	Pump Capacity/ Struvite	Struvite Control
MCC-12A	24	Age	Replace Unit
MCC-12B	24	Age	Replace Unit
Panel 12L	20	Age	Replace Unit
Panel 12L XFMR	20	Age	Replace Unit
HTX110702, HTX110703, HTX110704	18	Age/Scaling	Replace Unit
Roof Exhaust Fan	8	Age	Replace Unit

Equipment Name/ID	Risk Rating	Problem	Recommendations
Control Room Makeup Air Unit	6	Age	Replace Unit
ASU-3 Makeup Air Unit	2	Age	Replace Unit

Source: Stanley Consultants

The following improvements should be considered:

- Implement struvite control solution to regain better performance through digester piping and sludge pumps PMP110201 and PMP110202. A decrease in pumping capacity may be related to struvite buildup in suction piping. Optimizing the sludge pump performance will reduce maintenance costs and minimize digester overflows.
- Increase digester capacity to improve quality of digested sludge, to have capacity to accept industrial growth or expansion of the HSW program.
- Electrical equipment that is 20 years of age or over should be considered for replacement due to age and difficulty of sourcing parts.
- Mechanical HVAC equipment that is 20 years of age or over should be considered for replacement due to age.
- BOI111202 should be replaced both due to age and the availability of replacement parts.

4.9 System 13 Digested Sludge Storage & Sludge Lagoons

4.9.1 Facility Purpose and Design Criteria

System 13 accounts for the sludge holding tanks and pumping to the sludge lagoons. There are two progressive cavity pumps that pump sludge 1.75 miles off site to two sludge lagoons (north and south). The sludge lagoons are used for storage and solids settling. When sludge is ready to be land applied, two large pumps convey sludge from the lagoon wet well to a pipe manifold connected to a tractor. Supernatant is pumped to Sunset Lift Station and eventually back to the WRRF. The lagoons are dredged in the fall and the sludge is land applied as fertilizer on farm fields.

Sludge lagoons are a common form of sludge management and disposal in rural areas. The Ten State Standards provides these guidelines:

- Sludge lagoon bottoms and embankments shall be sealed to prevent leaching into adjacent soils or ground water.
- Provisions shall be made for pumping or heavy equipment access for sludge removal from the sludge lagoon on a routine basis.
- Lagoon supernatant shall be returned to the WRRF at appropriate points and rates. Sampling equipment shall be provided as needed to monitor supernatant waste streams.

4.9.2 Process & Equipment Condition and Capacity Evaluation

The sludge transfer pumps (PMP130101 & PMP130102) were installed in 1986. Pump 1 was overhauled in 2016 and pump 2 was overhauled in 2020. Both pumps need to be overhauled again due to typical wear. The lagoons have clay liners and are reported by city staff to be in good condition. The liners could not be observed due to sludge in the lagoons. The south lagoon has a concrete embankment to prevent erosion. The two lagoon pumps (PMP81001 & PMP81002) were installed in 1986. Pump 1 was overhauled in 2017. Pump 2 has had bearing and steel replacement. Staff have no operation or maintenance issues with these pumps. The increase in HSW is filling the lagoons quicker. Scum and solids are not readily settling in the south lagoon. Supernatant samples show high ammonia concentrations.

The WRRF has a 1986 dredge to remove and apply solids that settle in the lagoon. The vehicle breaks down on a regular basis and replacement parts are not readily available. A local metal manufacturer has made replacement parts for the vehicle in the past. In recent years it has broken down multiple times in a season and has made it difficult to transport all the sludge to the farm fields before winter.

4.9.3 Electrical and HVAC Evaluation

4.9.3.1 HVAC

No HVAC systems were evaluated at this location.

4.9.3.2 Electrical

The building electrical power distribution is fed from a single source to the motor control center. The motor control center appears to be in rough condition and should be replaced. The motor control center feeds power to two 125 HP Motors, MTR810101 & MTR810102).

4.9.4 Condition Assessment Rating and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Condition assessment scoring critical assets to be addressed for the most critical elements that have asset risk ratings are summarized in Table 4-8. Some items are not tied to a specific asset and do not have an asset risk rating. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements. Those items are discussed following the table.

Table 4-8: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
MCC	36	Age	Replace Unit
PMP130101	10	Age	Overhaul or Replace Pump
PMP130102	10	Age	Overhaul or Replace Pump
MTR810101	10	Age	Replace Unit

Equipment Name/ID	Risk Rating	Problem	Recommendations
MTR810102	10	Age	Replace Unit

Source: Stanley Consultants

The following improvements should be considered:

- Overhaul PMP130101 and PMP130102 to optimize pump performance and extend pump life. If pumps cannot be overhauled, pumps should be replaced.
- Lagoon performance may be a function of digester performance, and digested sludge characteristics should be analyzed to determine if volatile solids content is high. Solids may continue to digest in the lagoon causing an increase in ammonia concentrations.
- Replace 1986 dredge with a model that is reliable and can be easier repaired with better available spare parts.

4.10 System 14 Ultraviolet (UV) Disinfection

4.10.1 Facility Purpose and Design Criteria

System 14 consists of the ultraviolet disinfection process. Final clarifier effluent flows through an open channel and six UV modules that kill pathogens and sterilize viruses that may still be present in the wastewater. The disinfected wastewater passes through a flow-controlled gate to the effluent pumps. In the winter months the final clarifier effluent can pass through a bypass channel around the disinfection building.

UV radiation is an effective bactericide and virucide for wastewater, while not contributing to the formation of toxic byproducts. The germicidal portion of the UV radiation is between 220 and 320 nm. The Ten State Standards have described the following guidelines for UV disinfection:

- Open channel designs with modular UV disinfection units that can be removed from the flow are required. At least two banks in series shall be provided in each channel for disinfection reliability and to ensure uninterrupted service during tube cleaning or other required maintenance.
- This process should have at least 65 percent UV radiation transmittance at 254 nm wavelength, and BOD, and suspended solids concentration no greater than 30 mg/L at any time.
- UV dose shall be based on the design peak hourly flow. UV dosage not less than 30 mW*s/cm2 may be used after adjustments for maximum tube fouling, lamp output reduction after 8,760 hours of operation, and other energy absorption losses.
- Operator safety and tube cleaning frequency shall be considered. An alarm system shall be provided to separately indicate lamp failure, low UV intensity, and other cause of UV disinfection unit failure.

4.10.2 Process & Equipment Condition and Capacity Evaluation

The UV system was installed in 2011. The bulbs are positioned vertically in the water and bulbs can be removed through the module hatch. The bulbs have automatic wipers to keep the sleeves clean however the air compressor is undersized and the wipers do not operate properly. The air cylinders leak and requires a

third of the bulbs in the ballast to be removed to access the air cylinder. The disinfection building has flooded multiple times and have caused wear on the modules. Staff occasionally get electric shock when opening the module hatches.

The effluent weir gate is constantly adjusting its elevation based on water levels near the effluent pumps. Oil leaks out of the commonly used gears and teeth, and the gears tend to seize up. The gears are difficult to access to re-oil. At times the gate controls do not react to WRRF flows fast enough and the gate elevation causes water elevations to rise and flood the disinfection building. The UV system is sized to disinfect up to 12 mgd of flow. The WRRF is currently averaging 3.5 mgd. The final clarifier effluent has had low transparency and the tested effluent is not meeting E. Coli bacteria limits. Half the UV bulbs had been replaced and the other half are ordered and waiting shipment.

4.10.3 Electrical and HVAC Evaluation

4.10.3.1 HVAC

The building HVAC system consists of an exhaust fan and unit heater. The exhaust fan provides cooling and ventilation, while the unit heater provides freeze protection. All equipment is original to the building and appears to be in good condition.

An air compressor serves the UV building processes. Operators noted the air compressor is too small.

4.10.3.2 Electrical

Power for the UV system A&C Phases have no Neutral, C phase is the high leg and B phase is 120 volts with Neutral. The UV Power Distribution Center has scorch marks showing a previous high heat event and operators complain of electrical shocks when operating the UV system. The Bulbs on the system are well past due for changing which is decreasing the efficiency of the system. It is recommended to re-evaluate the UV system for performance savings and to reduce the risk to personnel operating the system.

4.10.4 Condition Assessment Rating and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Condition assessment scoring critical assets to be addressed for the most critical elements that have asset risk ratings are summarized in Table 4-9. Some items are not tied to a specific asset and do not have an asset risk rating. The equipment ratings are used along with visual condition and professional judgement to develop the following recommended repairs and replacements. Those items are discussed following the table.

Table 4-9: Critical Asset Risk Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Rating	Problem	Recommendations
PDC140101	48	Safety	Replace Unit
Air Compressor	32	Undersized	Replace and Upsize Unit

Equipment Name/ID	Risk Rating	Problem	Recommendations
PNL14R	32	Safety	Replace Unit
PNL14R XFMR	32	Safety	Replace Unit
Panel 12L XFMR	32	Safety	Replace Unit

Source: Stanley Consultants

The following improvements should be considered:

- Electrical equipment is producing a safety hazard for personnel to work on and maintain. Equipment should be replaced with a safer system.
- Replace the automatic flow control gate with a fixed weir system to prevent flooding of the disinfection building.
- The effluent quality after disinfection may be due to poor settling in the final clarifiers. Final clarifier and aeration basin performance should be further evaluated.
- The air compressor is undersized and should be replaced with a larger unit capable of supporting the process demands.

4.11 System 15 Effluent Pumps

4.11.1 Facility Purpose and Design Criteria

System 15 consists of final effluent pumping located in the Administration/Control Building. The disinfected final effluent flows to the effluent wet well and is pumped over the levee to the Mississippi River. Pumping system consists of four vertical shafted pumps in the dry well. The pump motors and associated controls sit above the dry well in the control room.

4.11.2 Process & Equipment Condition and Capacity Evaluation

The pumps were installed in 2011. City staff have no operational or maintenance concerns with the pumps. Pump capacity is adequate.

4.11.3 Electrical and HVAC Evaluation

4.11.3.1 HVAC

The effluent pump room is part of the Administration/Control building. The effluent pump room is served by electric unit heaters and appear original to the building. Operators noted the room stays warm enough that two of the three units do not have to run during the heating season. The effluent pump room exhaust fans provide ventilation cooling and are interlocked with intake dampers. Fans appear original to the building and are past service life.

There is a tunnel system off the effluent pump room that is ventilated with three exhaust fans. One fan isn't used much unless there is standing water in the pump room/old primary system room. The second fan does

run and was installed one to two years ago. The third fan is used very infrequently. The first and third fans are assumed original to the building and are past the service life.

4.11.3.2 Electrical

The Effluent Room is served by three 150 HP motors and one 100 HP Motor that are fed from two motor control centers in the room. Power to the motor control centers comes from a switchgear in the room as well. Staff noted that due to the capacity of the pumps, the motors do not run often.

4.11.4 Condition Assessment Rating and Recommendations

The following improvements should be considered:

- Mechanical HVAC equipment that is 20 years of age or over should be considered for replacement due to age.

4.12 System 32 MORC

4.12.1 Facility Purpose and Design Criteria

System 32 is the Muscatine Organics Recycling Center (MORC) located at the Muscatine County Recycling Center and Transfer Station. The MORC takes packaged food waste, extracts the waste from its container, and pumps the waste to the anaerobic digesters at the WRRF. The food waste is considered a high strength waste (HSW) which fuels the sludge digestion process and creates more methane production. The system also provides a means for industries to dispose of unwanted product.

4.12.2 Process & Equipment Condition and Capacity Evaluation

The MORC was constructed in 2020. Two pumps regulate the flow of HSW into the digesters. PMP320202 is located in the Administration/Control Building and PMP320201 is in the Digester Control Building. Pump capacity is 60 gpm. Pump 2 keeps the line pressurized, while pump1 serves as a backup. Pumps are in good condition and staff have had no major operation or maintenance issues. The depackaging system at the transfer station has had some maintenance repairs experimenting with different packaged products but repairs have been simple and quick to get system back online.

4.12.3 Electrical and HVAC Evaluation

4.12.3.1 HVAC

No HVAC systems were evaluated at this location.

4.12.3.2 Electrical

System 32 is a new system and no issues have been identified for electrical.

4.12.4 Condition Assessment Rating and Recommendations

All assets seem to be performing adequately. No improvements are recommended at this time.

4.13 System 90 Lab

4.13.1 Facility Purpose and Design Criteria

Based on 10 State Standards, all treatment plants shall include a laboratory for making the necessary analytical determinations and operating control tests, except for plants utilizing only processes not requiring laboratory testing for plant control where satisfactory off-site laboratory provisions are made to meet the permit monitoring requirements. For plants where a fully equipped laboratory is not required, the requirements for utilities, fume hoods, etc., may be reduced. The laboratory shall have sufficient size, bench space, equipment, and supplies to perform all self-monitoring analytical work required by discharge permits, and to perform the process control tests necessary for good management of each treatment process included in the design.

4.13.2 Electrical and HVAC Evaluation

4.13.2.1 HVAC

The building HVAC system consists of a 100% Variable Air Volume (VAV) air handling unit and the associated exhaust fans and fume hoods. The air handling unit (AHU) has DX cooling and gas fired reheat for space heating and humidity control. The AHU also has a heat recovery preheat coil that recovers energy from the lab fume hoods. The unit was installed in 2013 and looks in good condition, but the operators noted several concerns:

- The energy recovery system coil fins in the fume hoods have corroded away due to the fumes exhausted. This reduces the amount of energy recovered by the system.
- The gas burner cycles frequently, especially in the shoulder seasons. The gas burner starts on full-fire and rapidly overheats the space, causing the controls system to shut off the burner. Cold air then is supplied to the room, overcooling the space and causing condensation on the floor. The gas burner is unavailable to turn back on until the purge cycle is complete. With the gas burner unavailable, the AHU is unable to reheat and temper the air and maintain relative humidity. Operators noted the purge cycle was six minutes originally and has since been reduced to ninety seconds to mitigate the amount of time without heat.
- The Variable Frequency Drive (VFD) for the AHU supply fan was locked out at a set speed. Operators indicated this was due to inconsistent operation.
- Operators noted the repairs to the AHU can approach $10,000 per year, with the majority of that spent on refrigerant costs.
- Fume hood exhaust fans are seeing a decrease in airflow performance. Fume hoods exhaust levels must be kept at their required levels to maintain their certification.

4.13.2.2 Electrical

Panelboards feeding the lab are installed at a height where personnel must use chairs to reach the breakers. This is against code and the panels should be relocated to an appropriate elevation.

4.13.3 Condition Assessment Rating and Recommendations

Critical assets that need to be addressed are determined based on their asset risk rating and professional judgement. Some assets score low on the asset risk rating scale but are still recommended to be replaced because the ratings do not capture the difficulty in obtaining replacement parts. Critical assets to be addressed that have asset risk ratings are summarized in Table 4-10.

Table 4-10: Critical Asset Risk Scores Rating and Recommended Repairs and Replacements

Equipment Name/ID	Risk Score	Problem	Recommendations
Panel L1B	20	Mounted too high per code	Relocate Unit
Panel L2B	10	Mounted too high per code	Relocate Unit
Lab Fume Hood Exhaust Fans	8	Reduced performance	Replace drive belts and bearings
AHU-1/ACCU-1	8	Performance/Controls	Modify/Replace System

Source: Stanley Consultants

The following improvements should be considered:

- Replace the fan drive belts and bearings to improve exhaust fan performance to maintain certification of fume hoods.
- The air handling unit system should be modified or replaced to improve system reliability and operation to control space temperature, humidity, and pressurization required by lab design standards.
- Panels are mounted higher than what the NEC allows for and personnel are using chairs to access the breakers. The panels should be moved down to a more reasonable level to avoid injuries from operating the breakers.

4.14 Additional Mechanical Asset Conditions

Admin/Control Building: The main building is served with a combination of split system air conditioners, gas furnaces, gas unit heaters, and exhaust fans. The split system and gas furnaces serving the office are all newer and appear in good condition. The unit heaters, exhaust fans, and fume hood fan serving the shop areas of the control buildings appear original to the building and are past service life. Six identical gas fired unit heaters that were installed in 2003 serve the old process area next to the old lab. These units appear in good condition but are nearly twenty years old and at the end of their service life.

Mechanical HVAC equipment that is 20 years of age or over should be considered for replacement due to age.

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WRRF CAPITAL PLANNING

Date: April 13, 2023

Presenter: Jay Brady, PE, Stanley Consultants

Stanley Consultants INC.

MUSCATINE

WRRF CIP Objectives

- Data-driven capital improvement plan
- Guide City investments in wastewater treatment and lift station assets
- 5- and 10-year horizons.

- 22 Lift Stations (305 assets)
- 12 Gate Wells
- Water & Resource Recovery Facility (270 assets)

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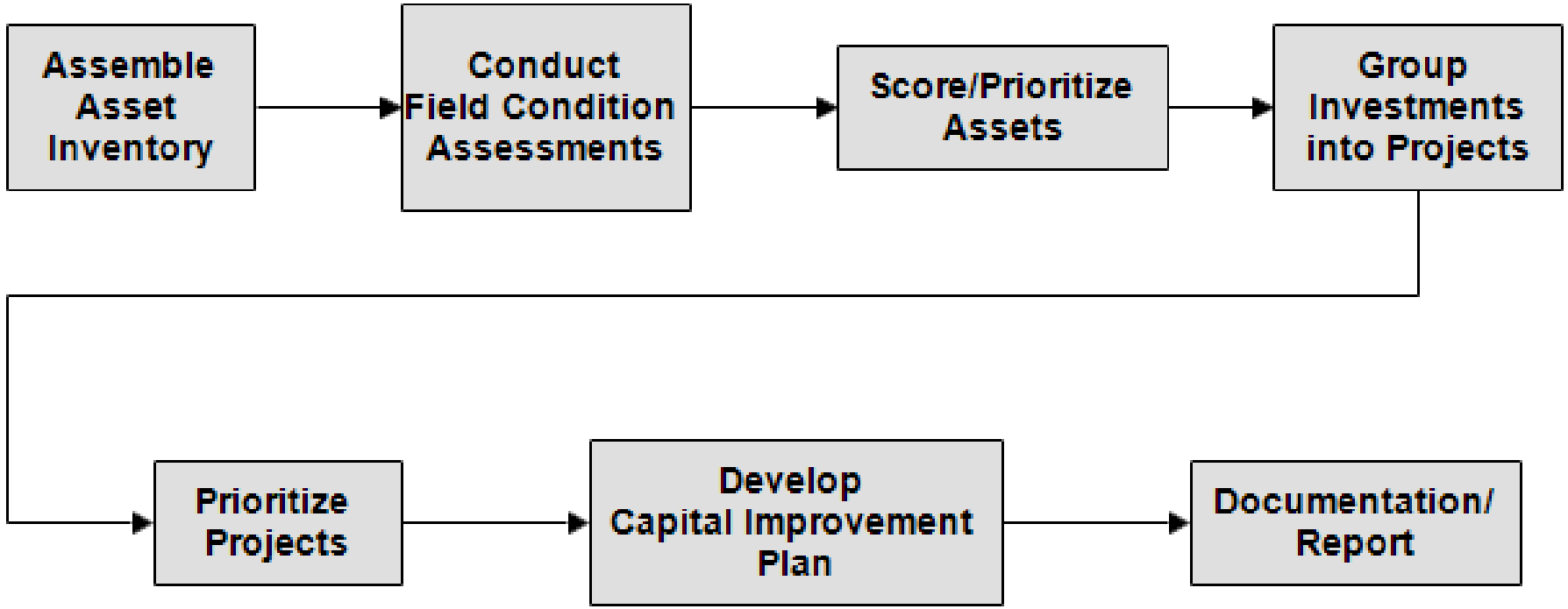
WRRF CIP Process



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WRRF Condition Assessment

Asset Condition Assessment		
Asset - Building		Isett basement, Isett Control Room, Isett Lift Station
Inspected Feature		200 Centrifugal Pump
Tag / IS Number		
Asset Installation Date		June 1, 2022
Notes		**Discharge valve broken Can't access drive shaft, so pump cannot be replaced**
Risk of Failure		
Asset Age (0<5 Years Old , 1< 20 Years Old, 2 > 20 Years Old)	2	
Asset Visual Condition (0 = Like New, 1 =Some Corrosion or Signs of Age, 2 = Significant Corrosion or visually identified degradation)	2	
Asset Maintenance Records (0 = Regularly Maintained, No Known Issues, 1= Some Operational Disruptions, 2 = Multiple Operational Disruptions)	2	
Hydraulic or Process Capacity (0 = Meets Current and Future Process or Hydraulic Needs, 1 = Will not meet future process or hydraulic needs, 2 = Does not meet current Process or Hydraulic Needs)	2	
External Risks to Asset (0 = No External Risks to Asset, 1 = Limited Risks to Asset, 2 = Moderate or Higher External Risks to Asset)	2	
Asset Risk of Failure	10	
Consequence of Failure	6	Significant Impact to Operations including extended outage and major financial impacts
Asset Risk (Risk of Failure x Consequence of Failure)	60	

Low Risk Asset – No Risk Based Action Required	0-30
Moderate Risk Asset – Consider Replacement / Upgrades or Risk Mitigation Plan within a 10-year Planning Period	31-60
High Risk Asset – Replace or Mitigate Risk as Soon As Possible	61-100

WRRF Project List

32 Projects

Project List	Estimated 2022 Cost
UV Disinfection System	$ 1,250,000
WRRF Electrical Package	$ 440,000
WRRF HVAC Package	$ 740,000
HSW Rehab Tank	$ 480,000
Lift Station Electrical Package	$ 348,000
Lift Station HVAC Package	$ 400,000
Isett Lift Station (Near Term)	$ 350,000
System 03 Replace Roughing Filter Media	$ 2,010,000
Papoose Lift Station (Near Term)	$ 310,000
Digester Complex - Digester Capacity & Pumping	$ 1,280,000
Algae Phosphorus Removal	$ 5,500,000
Gate Well Project	$ 75,000
Engineering Study - Phosphorus Modeling	$ 50,000
Influent Gate Freeze Protection & Odor Control	$ 100,000
Lift Station In-House Process Projects	$ 81,250

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WRRF Project List

Project List (Cont.)	Estimated 2022 Cost
Lift Station Process Projects	$ 195,000
Schley Lift Station	$ 160,000
Canon Lift Station	$ 280,000
System 01 Grit Replace & Line Drain Pipes	$ 30,000
WRRF In-House Process Projects	$ 185,000
WRRF Process Projects	$ 555,000
Engineering Study - Sewer Master Plan & Hydraulic Modeling	$ 250,000
Engineering Study - Papoose LS Reconfiguration	$ 75,000
Papoose Lift Station (Long Term-Dedicated Stormwater LS)	$ 3,100,000
Houser Lift Station	$ 150,000
Papoose Lift Station (Public Bathroom/Generator Project)	$ 1,100,000
Isett Lift Station (Long Term)	$ 1,890,000
System 05 Add Launder Cover on Final Clarifier	$ 710,000
Biogas to Energy Conversion	$ 8,380,000
Engineering Study - WRRF Solids Handling Study	$ 40,000
Engineering Study - SMART Utility Management Master Plan	$ 30,000
SMART Utility Management Implementation	$ 400,000
Total Capital Expenditure	$ 38,475,000

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WRRF Priority 1 Projects

Priority 1 Projects	
Project	**2022 Cost**
WRRF HVAC Package	$ 740,000
HSW Rehab Tank	$ 480,000
Lift Station HVAC Package	$ 400,000
System 03 Replace Roughing Filter Media	$ 2,010,000
Papoose Lift Station (Short Term)	$ 310,000
Influent Gate Freeze Protection & Odor Control	$ 100,000
Houser Lift Station	$ 150,000
Total Priority 1	**$ 4,140,000**

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WRRF Priority 2 Projects

Priority 2 Projects	2022 Cost
Lift Station Process Package	$ 243,750
WRRF In-House Projects	$ 555,000
Schley Lift Station	$ 160,000
Canon Lift Station	$ 280,000
Papoose Lift Station (Public Bathroom/Generator Project)	$ 1,100,000
Isett Lift Station (Long Term)	$ 1,890,000
Total Priority 2	**$ 4,228,750**

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WRRF Discretionary Projects

Project	Estimated 2022 Cost
Digester Complex - Digester Capacity & Pumping	$ 1,280,000
Algae Phosphorus Removal	$ 5,500,000
Engineering Study - Phosphorus Modeling	$ 50,000
System 05 Add Launder Cover on Final Clarifier	$ 710,000
Methane to Natural Gas Conversion	$ 8,380,000
Engineering Study - WRRF Solids Handling Study	$ 40,000
Total	**$ 15,960,000**

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City of Muscatine

ITEM NUMBER 2023-976

IN-DEPTH ITEM - CITY COUNCIL

DATE: 4/13/2023

STAFF

Jon Koch

SUBJECT FOR DISCUSSION

Sewer Rate Study results presentation - A presentation by Bob Veenstra of Veenstra and Kim on the latest Sewer Rate Study.

EXECUTIVE SUMMARY

Bob Veenstra of Veenstra and Kim will present the findings of the latest Sewer Rate Study for the Sewer User Rates and Collection and Drainage Rates.

GENERAL DIRECTION SOUGHT AND SPECIFIC QUESTIONS TO BE ANSWERED

Direction is sought on whether to proceed with requesting formal approval of the new rates as presented.

BACKGROUND/DISCUSSION

The current sewer rate structure is expiring on June 30th, 2023. The last Sewer Rate Study was conducted in 2018 and set rates for the next five years. The latest Sewer Rate Study was started in September of 2022 and has concluded that a continuation of the 3% annual increase to the rates will satisfy inflation-driven cost increases as well as new capital needs at the Water and Resource Recovery Facility and lift stations.

Collection and Drainage rates are not currently sufficient to fund mandated projects like the Redundant Line Project. It is being recommended that the rate be increased to 5% for 4 years then reduced down to 3% for the final year.

ATTACHMENTS

1. Sewer Enterprise Fund Overview and Recommendations.230317
2. Muscatine Sewer Rate Study PP.230413
3. Overview and Recommendations

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March 20, 2023

Nancy Lueck
City of Muscatine
215 Sycamore
Muscatine, Iowa 52761-3840

MUSCATINE, IOWA
SEWER RATE STUDY – 2022
SEWER ENTERPRISE FUND
OVERVIEW AND RECOMMENDATIONS

This letter presents an overview of the 2022 Sewer Rate Study related to the Sewer Enterprise Fund. This letter sets forth recommendations for rate adjustments for the five year period from FY 2023-2024 (FY 24) through FY 2027-2028 (FY 28).

The last sewer rate study for the City of Muscatine was completed in 2018. The 2018 rate study recommended the City continue the program of annual increases in both the monthly availability charge and the commodity charge. That rate study recommended a 3% annual increase in each of the two components of the rate structure. The City Council subsequently adopted the recommendation.

The first aspect of the rate study was to compare the projected revenues and expenses for FY 19 through FY 22 with the actual revenues and expenditures. Because the current fiscal year ending June 30, 2023 is not complete, the rate study does not compare the 2018 rate study projection to the current fiscal year.

The following table shows a comparison of the projection to actual for each of the four fiscal years.

Category	Projected	Actual
FY 19		
Total Revenue	$5,252,786	$5,018,345
Total Expenditures	$5,412,159	$5,082,734
Gain/Loss	-$159,373	-$64,389
Year End Fund Balance	$1,066,072	$1,784,198
FY 20		
Total Revenue	$5,526,301	$5,338,572
Total Expenditures	$5,793,492	$5,026,818
Gain/Loss	-$267,191	$311,754
Year End Fund Balance	$798,881	$2,078,012
FY 21		
Total Revenue	$5,815,586	$5,631,872
Total Expenditures	$6,064,693	$5,404,112
Gain/Loss	-$249,107	$227,760
Year End Fund Balance	$549,774	$2,456,315
FY 22		
Total Revenue	$6,121,573	$5,721,184
Total Expenditures	$5,867,456	$5,437,165
Gain/Loss	$254,117	$284,019
Year End Fund Balance	$803,890	$2,511,019

The projected year end for the fiscal year ending June 30, 2023.

Category	Projected
FY 23	
Total Revenue	$5,873,507
Total Expenditures	$5,378,890
Gain/Loss	$498,617
Year End Fund Balance	$3,009,907

During the four year period FY 19 through FY 22 the Sewer Enterprise Fund performed better than anticipated. The 2018 rate study projected during the four year period FY 19 through FY 23 the fund would experience a loss in three of the four years and would only experience a gain in the final fiscal year FY 22. The fund balance was projected to decrease over the four year period by approximately $421,500.

During the four year period the fund experienced a small loss in FY 19 and noticeable gains in FY 20 through FY 22. Rather than declining, the fund balance actually increased over the four year period and ended on June 30, 2022 with a balance of $2,511,019.

Over the four year period the actual revenue trailed the 2018 revenue projection. The actual revenue of $21,709,973 was $1,006,273 less than the revenue of $22,716,246 projected in the 2018 rate study. Over the four year period the total revenue lagged the projection by 4.43%.

During the four year period the expenditures were lower than the projected expenditures in the 2018 rate study. The actual four year expenditures totaled $20,950,829. The 2018 rate study projected expenditures during the four fiscal year period were $23,137,800. The actual expenditures were $2,186,971 less than the 2018 rate study projection. This lower expenditures translated to 9.45% of the projected expenditures.

Over the four fiscal year period the expenditures were a net 5% lower than the expected expenditures when adjusted for the lag in revenue. It is the lower expenditures in relationship to revenue that result in an increase in the year end fund balance.

It is noted while it is possible to compare the annual gain and loss, the year end fund balance is not as easily trackable. The year end fund balance on June 30, 2018 was only a projection as that fiscal year was not complete at the time of the 2018 rate study. The performance of the fund during the fiscal year ending June 30, 2018 exceeded the projection and resulted in a fund balance on June 30, 2018 that was greater than projected in the rate study. Also, there are adjustments that are made through the four year period that result in deviations between the

theoretical fund balance and the actual fund balance. For purposes of the rate study the focus should be on the actual fund balance at the end of each fiscal year and not on a numeric tracking of the fund balance based on annual gain and loss.

The fund balance on June 30, 2022 of $2,511,019 translates to 46% of the expenditures in FY 22. Historically, the City has targeted a fund balance in the range of 30% of annual revenue.

The City has identified a series of capital improvement projects to be implemented over the next several years, including the Priority 1 and Priority 2 projects. When embarking on an aggressive capital improvement program it is always prudent to have a strong fund balance. The fund balance provides the City the option to absorb unexpected increases in capital project costs while still maintaining the long term rate setting strategy the City has utilized for the last 20 years.

One of the significant factors affecting the revenue projection is the number of monthly minimums paid and the number of commodity units billed on an annual basis. Periodically it is appropriate to reassess both the number of bills as well as the commodity volume for each of the class users. An assessment of billing units was completed as part of the 2018 rate study as there appeared to be deviations from the levels projected in the 2013 rate study.

A review of the units billed for the last four fiscal years indicate there have been changes in the usage levels since the last adjustment in 2018. The 2018 rate study reviewed the actual number of monthly minimums and commodity units to adjust the levels for the Class 1, Class 1 - Senior, Class 2, Class 3, Class 5 and City billed industrial users.

The following tabulation shows the utilization levels used for the 2018 rate study compared to the number of units used for the 2022 rate study.

User/Classification	2018 Annual Units	2018 Annual Minimums	2022 Annual Units	2022 Annual Minimums
Class 1	650,000	95,000	617,800	98,250
Class 1 - Senior	46,000	13,000	41,400	12,100
Class 2	79,000	268	58,200	281
Class 3	6,000	168	3,735	160
Class 5	33,000	802	28,200	760
GPC	60,000	12	52,000	12
Lutheran Homes	7,800	12	11,230	12
Linde	22,000	12	41,850	12
Union Tank Car	11,000	12	6,425	12
Phelps	15,000	12	20,200	12
Ripley's	34,176	12	34,176	12

For most categories the 2022 rate study number of units was based on the actual number of units for FY 22.

As noted in the tabulation there was an overall decline in the number of units between 2018 and 2022. There are some exceptions to the overall decline. For example, the number of minimum units for Class 1 increased between the two rate studies.

Some of the industrial users showed an increase in the number of units between the 2018 rate study and the 2022 rate study. Other industrial users showed a decrease in the overall number of units between the 2018 rate study and the 2022 rate study.

In aggregate, there was a decline in the number of billing units between 2018 and 2022. As noted earlier the revenue over the four year period FY 19 through FY 22 was lower than projected in the 2018 rate study. The decrease in revenue is attributable to the decrease in the number of aggregate billing units.

The aggregate decline in the number of billing units between 2018 and 2022 is a continuation of the trend that started with the 2013 rate study. For example, in the 2013 rate study the number of Class 1 billing commodity units was 700,000. That number of billing units has decreased by slightly more than 10% over the last 10 years.

Over the 10 year period the number of Class 2 billing units decreased from a projected 107,000 in 2013 to 58,200 in the 2022 rate study. There were some exceptions to the trend of decreasing higher class user units.

The following table shows a comparison of the revenues projected for Kraft Heinz for the five fiscal years FY 2018 through FY 2022 compared to the actual revenue.

Fiscal Year	2018 Rate Study Projection	Actual Revenue
FY 2018	$509,535.00	$502,208.40
FY 2019	$601,589.00	$574,940.70
FY 2020	$613,620.78	$649,856.52
FY 2021	$625,893.20	$710,647.68
FY 2022	$638,411.06	$786,368.82

A major source of increased revenue over the five year period is the Kraft Heinz billings. In FY 18 and FY 19 the Kraft Heinz revenue was relatively close to the rate projection. Starting in FY 20 and continuing through FY 22 the Kraft Heinz revenue was noticeably higher than the revenue projected in the 2018 rate study.

The Kraft Heinz revenue is based on the block rate agreement concept the City and Kraft Heinz have utilized for over 20 years. The Kraft Heinz revenue is directly related to a combination of its annual volume of flow and annual biological loading (BOD_5). The increased revenue is attributable to either an increase in flow, an increase in biological loading or a combination of increases in flow and biological loading.

Over the 10 year period since 2013 the Kraft Heinz revenue has increased noticeably. In the timeframe of the 2013 rate study the annual Kraft Heinz revenue was projected to be about $180,000 per year. Adjusted for the annual rate increases the 2013 Kraft Heinz revenue of $180,000 would translate to a revenue in 2022 of approximately $240,000. The increased flow and loading from Kraft Heinz over the last 10 years have directly translated to an increase in review of approximately $540,000 annually.

This rate study utilized the same basic concept for projecting revenues and expenses based on prior years used in the previous rate studies. Sewer user charge revenue from the various users are projected based on the annual number of units and the rate established by the rate ordinance. Charges for miscellaneous income sources remain relatively stable and are based on the prior year level of revenue.

The 2018 rate study added a new revenue source from fat, oil and grease charges. The 2018 rate study projected the revenue from the fat, oil and grease charges would be in the range of $200,000 per year. In FY 18 and FY 19 the actual revenue was just over $100,000, or noticeably less than the revenue projected in the 2018 rate study. In FY 20, FY 21 and FY 22 the revenue exceeded the projection with the revenue in FY 20 and FY 22 averaging around $250,000 per year. The revenue in FY 21 of approximately $418,000 is considered an anomaly.

For purposes of this rate study the fat, oil and grease charge revenue is projected to increase annually above the actual revenue in FY 22. The baseline revenue in FY 22 was $255,598. This revenue is slowly projected to increase to about $300,000 in FY 28.

The 2018 rate study added a new category of high strength waste charges. The 2018 rate study projected the high strength waste charges would be average about $100,000 per year.

The first separately identified high strength waste charge revenue was experienced in FY 20 at just under $16,000. By FY 22 the revenue had increased to $120,398.75.

For purposes of this rate study the high strength waste revenue is projected to increase at a rate of 2% per year of the baseline revenue in FY 2022. By FY 28 the high strength waste revenue is projected to reach about $135,000.

The 2018 rate study projected the total revenue from fat, oil and grease and high strength waste to total $300,000 per year. The 2022 rate study projects the revenue to be approximately $385,000 in FY 23 and increasing to $440,000 per year in FY 28.

The expenditures for the Sewer Enterprise Fund consist of the operating and administrative expenditures, the transfers to reserve funds and the debt service from the previous WPCP capital improvement project. Historically, the City has projected increases in operating expenditures at 2% per year. That strategy was successful during the period when inflation was at a relatively modest rate.

With the current rate of inflation this rate study utilizes a larger annual increase in operating expenditures. For FY 23 through FY 27 operating expenses are projected to increase at 3.5% per year. It is recognized based on the recent inflation rates the actual operating expenditures may increase at greater than 3.5% per year in the near term. Inflation rates are expected to decrease and in the latter part of the four year period it is reasonable to assume inflation rates and operating expenditures increases will increase at a rate less than the 3.5% level to allow the City to catch up with any shortfall. The fund balance is adequate to allow this longer term strategy relative to address the current rate of inflation in operating expenditures.

Beyond 2027 operating expenditures are projected to increase at 3% annually. The long term rate of 3% is greater than the historical rate of 2% and recognizes it may be unlikely inflation will return to the low levels experienced over the last several years. .

The administrative transfer is an annual transfer to fund select administrative service of the City that support the overall operations.

The projected total operating expenses and administrative transfer for the last full fiscal year, the current fiscal year and the next five fiscal years is as follows:

Fiscal Year	Operating Expenditures	Administrative Transfer
FY 2022	$3,115,937	$218,000
FY 2023	$3,224,995	$219,925
FY 2024	$3,337,995	$226,523
FY 2025	$3,454,695	$233,319
FY 2026	$3,575,609	$240,319
FY 2027	$3,700,756	$247,529
FY 2028	$3,811,778	$254,955

The debt service on previous capital project continues. The largest component of debt service is the last major upgrade of the treatment facility. That debt service is retired on June 1, 2032. The debt service for the current fiscal year and the next five fiscal years is as follows:

Fiscal Year	Debt Service
FY 2023	$1,033,710
FY 2024	$1,044,970
FY 2025	$1,050,800
FY 2026	$1,062,130
FY 2027	$1,430,310
FY 2028	$1,444,240

The final component of the expenditures is the transfers associated with capital improvement projects. The City has been transferring $200,000 per year to the West Hill Project Reserve Fund since FY 2012. This transfer will continue through FY 2028.

In FY 2019 the City established a debt service reserve transfer associated with the biogas project. The transfer to the debt service reserve is $85,000 per year.

The final expenditure from the Sewer Enterprise Fund is annual transfer to the Plant Replacement Fund. The 2018 rate study indicated the City could not sustain a $700,000 per year annual transfer to the Plant Replacement Fund based on the 3% annual rate increase without depleting the fund balance. To preserve the fund balance, the annual transfer was decreased to $400,000 in FY 23.

The City recently completed a comprehensive evaluation of the Water Pollution Control Plan. That evaluation identified a number of improvements projects that should be undertaken over the next several years. The City evaluated the recommended improvements and prioritized the improvements. The highest priority improvements that need to be constructed first are identified as the Priority 1 improvements. The next highest priority of improvements is identified as Priority 2. Each of the priority groups includes a number of projects. The total cost for each of the Priority 1 projects and Priority 2 project is each approximately $5,000,000.

The City currently does not have sufficient reserve funds to finance this level of capital improvements. It is anticipated the City will need to borrow to fund both Priority 1 and Priority 2 improvements. Based on the current fund balance it is possible the City can finance and fund a portion of the Priority 1 or Priority 2 improvements from fund balances or reserve funds. However, for purposes of the rate study it is assumed the City will borrow $5,000,000 for the Priority 1 improvements and $5,000,000 for the Priority 2 improvements.

For purposes of the rate study it is assumed the City will finance both the Priority 1 improvements and Priority 2 improvements using the State Revolving Fund (SRF) loan program. That program offers 20 year loans at an interest rate that is currently 2% per year. Under the SRF loan program the average annual principal and interest payment on a $5,000,000 borrowing is $306,000 per year.

The 2022 rate study includes new debt service for the Priority 1 and Priority 2 improvements. Under the SRF loan program the first full principal and interest payment is due on June 30 of not more than 12 months following completion of the project. For purposes of the rate study it is assumed the first full principal and interest payment on the SRF loan for the Priority 1 improvements will be due on June 1, 2026, or in FY 26.

It is assumed the first full principal and interest payment on the SRF loan for the Priority 2 improvements will be on June 30, 2029, or FY 29. Debt service for the Priority 2 improvements will be incurred in the first full fiscal year beyond the five year focus of this rate study. Because the project will be in progress during the five year period the longer term projection of this rate study took into account the debt service for the Priority 2 improvements starting in FY 29.

The initial analysis of the Sewer Enterprise Fund was completed based on the continuation of existing expenditures and the addition of the debt service for the Priority 1 and Priority 2 improvements. The analysis was completed based on a continuation of the 3% annual increase in both components of the sewer user charge rate.

In completing the analysis it was recognized the City's current fund balance of approximately $2,500,000 is greater than the City has considered a necessary funding balance. Historically, the City has considered a fund balance in the range of $1,500,000 to $2,000,000 to be adequate. In completing the evaluation it was assumed the fund balance could decrease over the next several years as long as the fund balance remained at a reasonable level. It was recognized that starting in FY 33 the financial position of the Sewer Enterprise Fund changes noticeably with the retirement of the large SRF debt service that decreases debt service expenditures by slightly more than $1,000,000 per year.

Based on the current condition the initial evaluation of the rate model was based on a continuation of the $400,000 per year transfer to the plant replacement fund. It was recognized the City have varied the plant replacement fund transfer from time to time based on the interaction between the fund balance and the objective of a 3% annual rate increase. The initial analysis showed the fund would experience modest losses in FY 23 through FY 25. However, in FY 26 with the debt service on the Priority 1 improvements the annual loss would increase to the range of $300,000 to $400,000 per year and this would result in depleting the fund balance in FY 31. Although the fund balance can decrease over the next several years, it is necessary to maintain a reasonable positive fund balance. To achieve this target it would either be necessary to decrease expenditures or to adjust the sewer user charge rate increase to a level above 3%.

The City will be undertaking the Priority 1 and Priority 2 improvements over the next five to seven years. The financial position of the enterprise fund will also strengthen significantly starting on July 1, 2032. Given these two factors it appeared preferable to decrease the transfer to the plant replacement fund over the next 10 years. The rate model includes both the transfer to the plant replacement fund and an estimated annual $400,000 per year in small capital expenditures. A combination of these two line items provide significant resources for ongoing plant improvements concurrently with the larger Priority 1 and Priority 2 improvements.

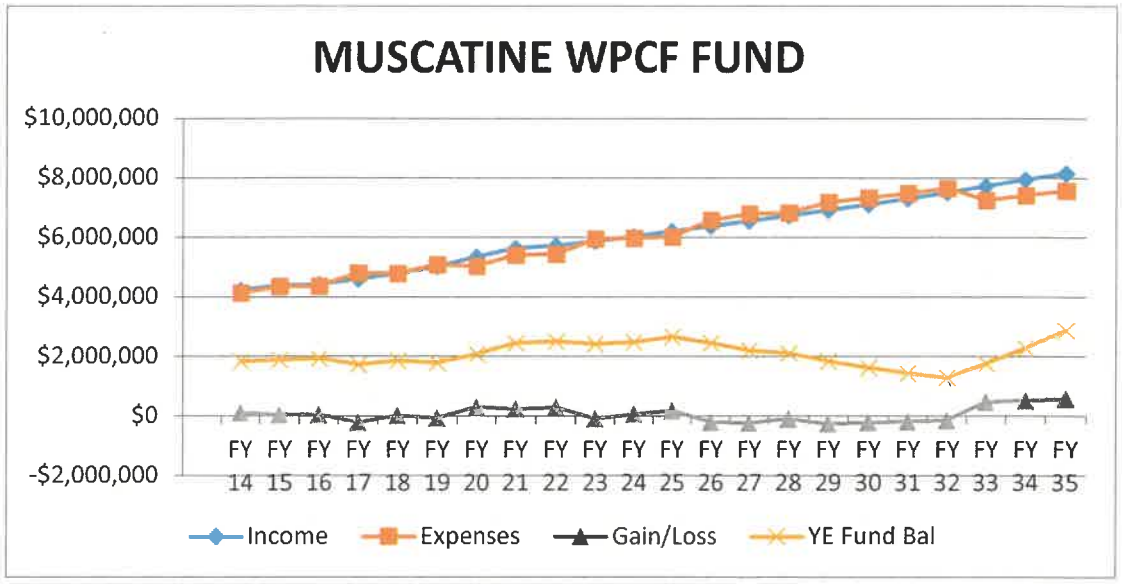
Rather than adjusting the rate increase above the historical 3%, this report recommends decreasing the annual transfer to the plant replacement fund starting in FY 24. The decrease would be from $400,000 to $200,000 per year and that transfer amount is projected to continue through FY 32. This rate study shows the annual transfer to the plant replacement fund to increase to $700,000 per year starting in FY 33. This transfer rate is equal to the transfer rate prior to 2018. The transfer rate increase is beyond FY 28 and can be evaluated as part of the next rate study

This strategy allows the City to slowly decrease the fund balance over the next nine years to a level that is consistent with the City's long term objective and allows the City to maintain the 3% annual rate increase for the next five years and likely beyond. This strategy is consistent with the City's historical practice of adjusting the funds available for capital improvements from time to time as necessary to maintain the desired 3% annual rate increase.

Based on the projection of revenues and expenses the revenues and expenses for FY 2022 through FY 2035 are summarized as follows:

Year	Income	Expenses	Gain/Loss	YE Fund Balance
FY 22	$5,721,185	$5,437,165	$284,020	$2,511,290
FY 23	$5,873,221	$5,960,866	-$87,645	$2,423,645
FY 24	$6,035,275	$5,976,098	$59,177	$2,482,822
FY 25	$6,202,005	$6,022,466	$179,539	$2,662,362
FY 26	$6,373,549	$6,581,262	-$207,713	$2,454,649
FY 27	$6,550,046	$6,796,781	-$246,735	$2,207,914
FY 28	$6,731,642	$6,832,361	-$100,718	$2,107,195
FY 29	$6,918,486	$7,182,675	-$264,189	$1,843,007
FY 30	$7,110,731	$7,334,192	-$223,461	$1,619,546
FY 31	$7,308,535	$7,491,315	-$182,780	$1,436,766
FY 32	$7,512,060	$7,652,130	-$140,070	$1,296,696
FY 33	$7,721,475	$7,256,767	$464,708	$1,761,404
FY 34	$7,936,951	$7,414,560	$522,391	$2,283,795
FY 35	$8,158,665	$7,577,087	$581,579	$2,865,373

The information regarding the long term revenues and expenses is shown in the following chart.



The projection of revenues and expenditures indicates for the period FY 23 through FY 25 the fund balance will experience a gain of approximately $150,000. Starting in FY 26 and continuing through FY 32 the 3% annual rate increase results in an annual loss to the fund ranging from approximately $100,000 per year to approximately $265,000 per year. Over this period the fund balance will decline on an annual basis and reach a projected low point at the end of FY 32 of approximately $1,300,000. In the period FY 30 through FY 32 the fund balance would be at or below the City's target level of $1,500,000.

With the retirement of the debt in FY 32, the financial position of the fund will recover starting in FY 33. Annual gains in the range of $460,000 to $580,000 are projected in FY 33 through FY 35. This gain is above the $500,000 increase in the plant replacement transfer. By the end of FY 35 the fund balance will increase to approximately $2,865,000.

The rate study recognizes through FY 32 the City should continue its annual 3% increase in rates. The long term forecast would project in the timeframe of FY 33 the City may be able to pause the annual rate increases for several years. However, that projection is almost 10 years in the future and many conditions can change prior to that time. In particular, the current rate study only evaluates the Priority 1 and Priority 2 improvements to the treatment facility. The long range capital plan identifies additional improvements than may be required. The magnitude of these capital improvements mitigates the potential for reducing rates starting in FY 33, but may allow for up to a several year pause in the annual rate increases.

Based on this recommendation the Class 1 rates for each of the next five fiscal years would be as follows:

WPCP Rates	Monthly Availability	Commodity Rate
FY 23	$9.21	$3.15
FY 24	$9.49	$3.24
FY 25	$9.77	$3.34
FY 26	$10.06	$3.44
FY 27	$10.37	$3.55
FY 28	$10.68	$3.65

In previous rate studies the City developed a projection of the annual sewer user charge bill based on typical usage of 7.5 CCF. Based on this usage the Class 1 sewer bill for the current fiscal year and the next five fiscal years would be as follows:

Fiscal Year	Typical Class 1 Monthly Bill
FY 23	$32.84
FY 24	$33.82
FY 25	$34.83
FY 26	$35.88
FY 27	$36.96
FY 28	$38.06

Under the recommended five year rate program a typical Class 1 user would see an increase in their sewer user charge rate in the range of approximately $1.04 per month. This would increase the typical bill over the next five years from $32.84 to $38.06.

An average residential bill in the $33 to $38 range would be considered below average to average for communities that have a compliant wastewater treatment plant. There are communities with lower sewer user bills. However, many of those communities will be facing major improvements over the next few years that will necessitate rate increases.

If you have any questions or comments concerning the project, please contact the writer at 800-241-8000, or bveenstra@v-k.net.

VEENSTRA & KIMM, INC.

H. R. Veenstra Jr.

HRVJr:paj
20819
cc: Jon Koch

Sewer Rate Study

Date: April 13, 2023

Presenter: Bob Veenstra Jr. – Veenstra & Kimm, Inc.

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Agenda

1. History of Sewer Rate Approach
2. Overview of Sewer User Rates
3. Overview of Collection and Drainage Rates
4. Questions

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Direction Sought

Strategy: Sewer User Rates

Strategy: Collection and Drainage Rates

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Background

City has 2 separate rates

- Sewer User
- Collection and Drainage

Customers pay both rates

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Sewer User Rates

- Funds WRRF Costs
- Funds lift station costs
- Funds part of West Hill Separation

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Collection and Drainage Rate

- Funds sewer operations
- Funds limited capital projects

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History

In 2001 adopted 5-year rate setting

Based on small annual increases

Predictability to users on costs

Predictability to City on revenue

Kraft-Heinz block rate contract

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Approach

Set rates for 5 years

Manage longer term fund performance

Not driven by annual performance

Stable long term fund balance

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Sewer User Rates

Current Revenue: About $6,000,000 / year

Funds operational and administrative costs

Funds annual small capital costs

Funds debt service on larger projects

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Rate History

3% annual increase

Used for last 15 years

Keep fund in target range fund balance

- $1,500,000 - $2,000,000

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Overview of Sewer Rates

Residential users and many commercial
- Class 1 base

Higher Strength Waste
- Pay proportionally higher rate

Kraft-Heinz
- Contract with same adjustment

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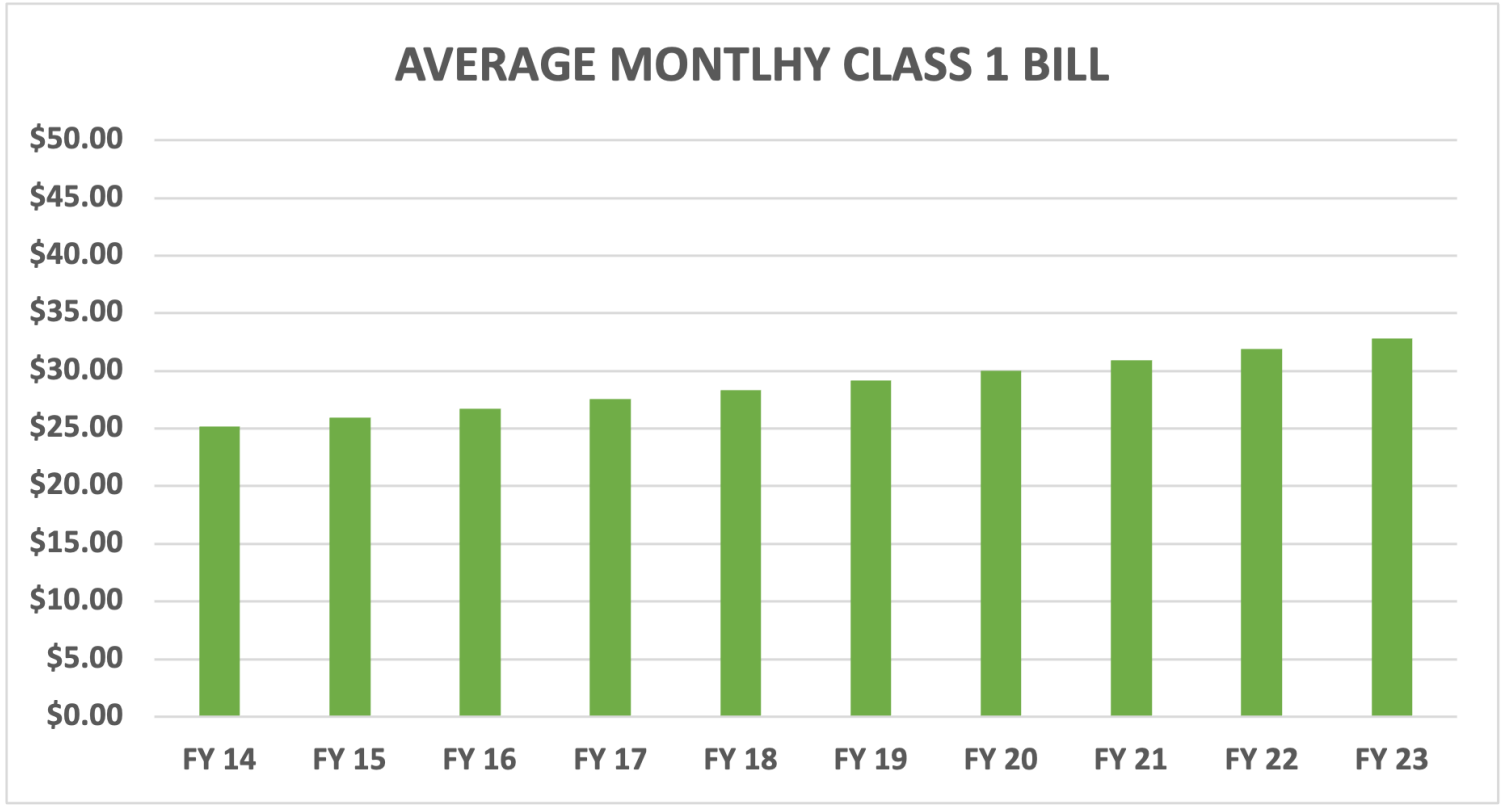
Overview of Sewer Rates



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Issues

Higher inflation cost increases

Priority 1 and 2 projects - $10,000,000

- Will be debt financed

Increases in debt service

- FY 26 for Priority 1
- FY 29 for Priority 2

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Longer Term Impacts

In 2032 debt source returned

- Reduces cost $1,000,000 per year

Delay lower priority capitals

- Can be funded in 2032

Potential for rate pause in 2032

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Recommendation

Increase rates 3% each year
- 2023-2027

Planned annual losses
- FY 26 – FY 29

Reduce fund balance until FY 32
- Alignment with FY32 payoff

Continuation of historical measure

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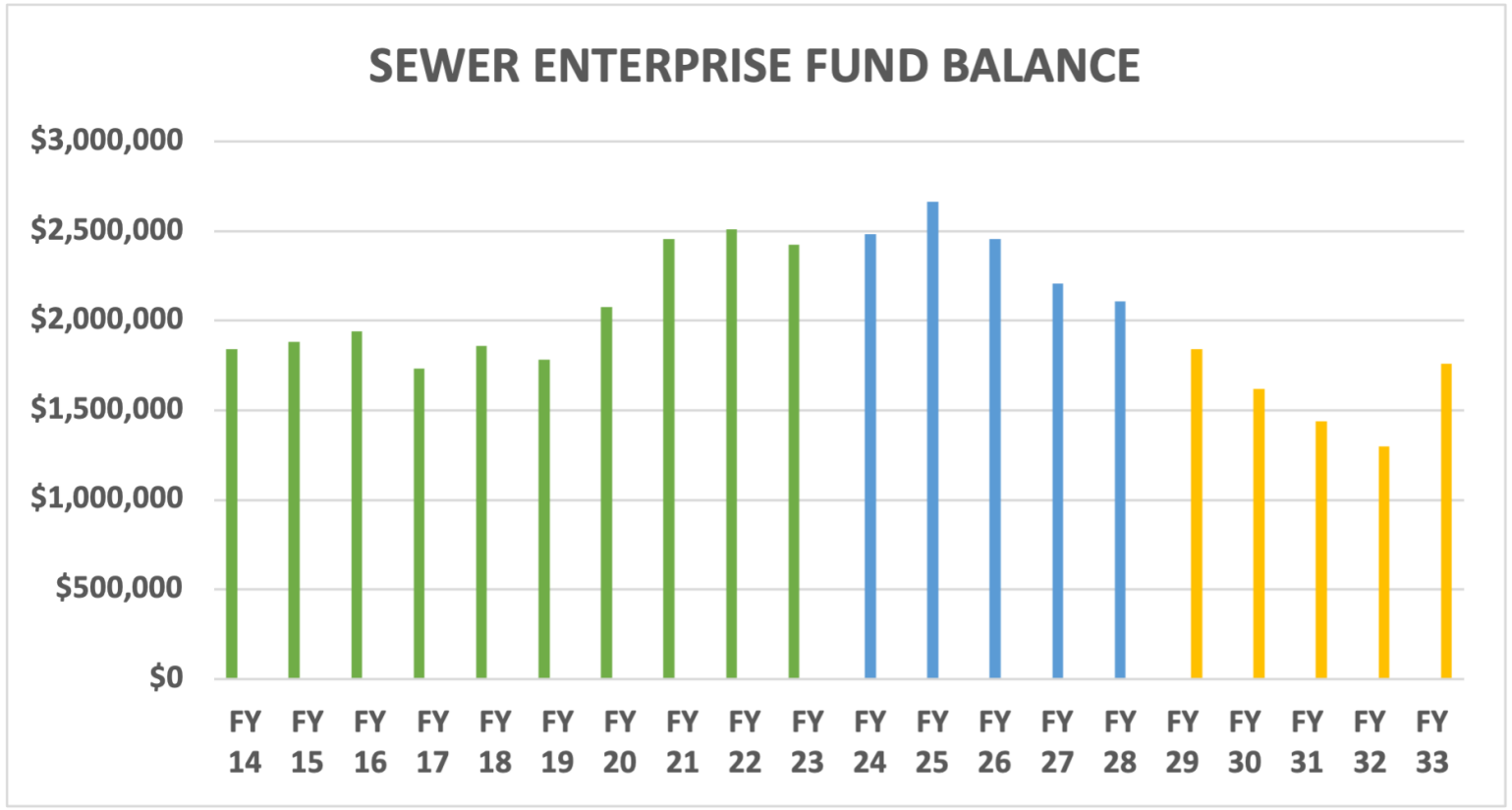
Sewer Rate Fund Balance



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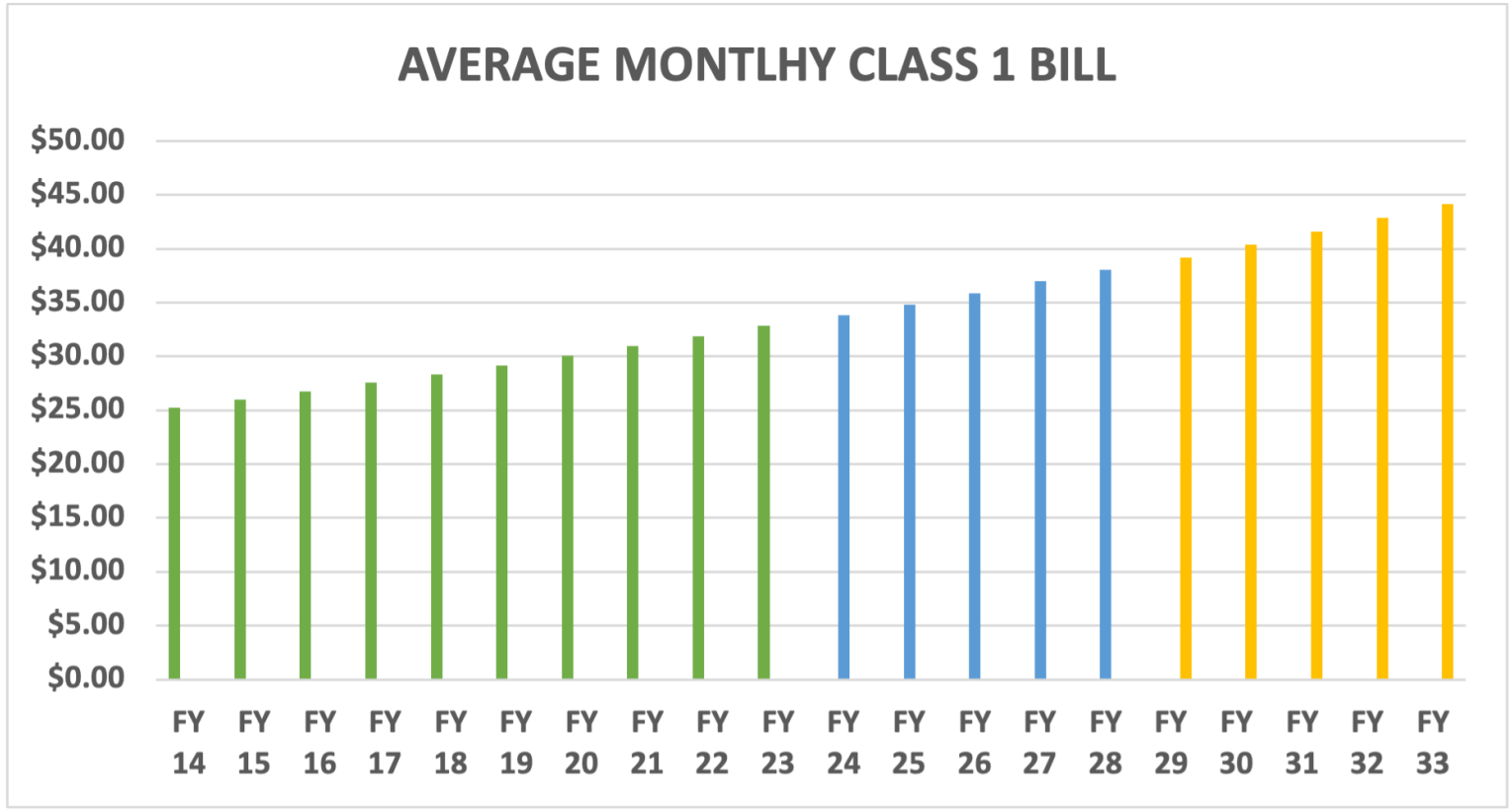
Sewer Rate: Average Monthly Bill



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Collection and Drainage

Funds Sewer operations / administration

Funds select capital costs

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Rate History

Fixed Cost for every year

2% increase per year

- Last 15 years

Based on breakeven

Limited change year to year

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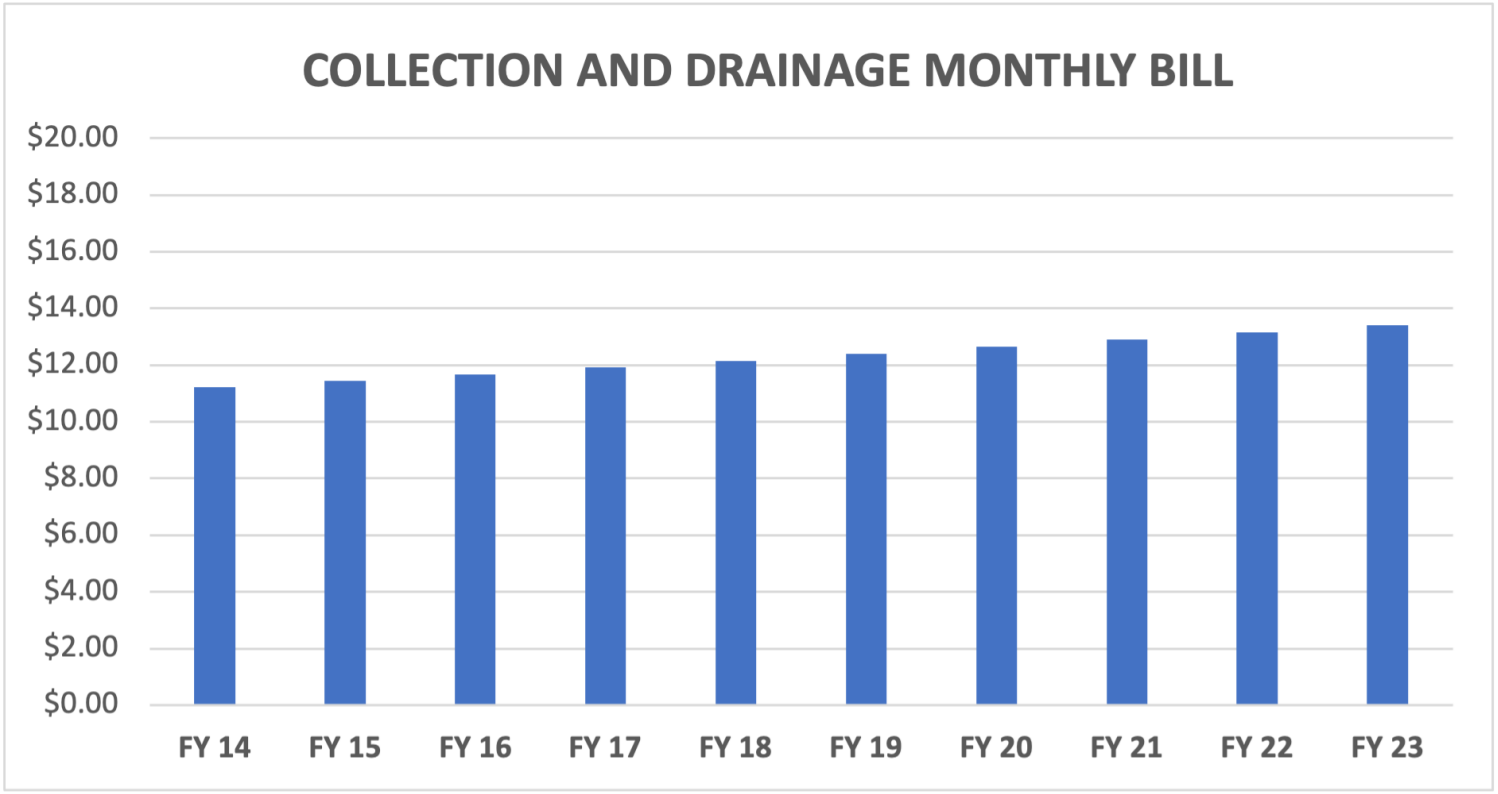
Collection and Drainage: Monthly Bill



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Issues

Inflationary cost increases

Need to fund lift station redundant lines

- City is committed to project
- No current mechanism to fund
- Fund from collection and drainage

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Current Rate Structure

- Unable to fund redundant lines
- Larger increases to fund projects

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Recommendation

Increase 5% per year for 4 years

Then 3% per year

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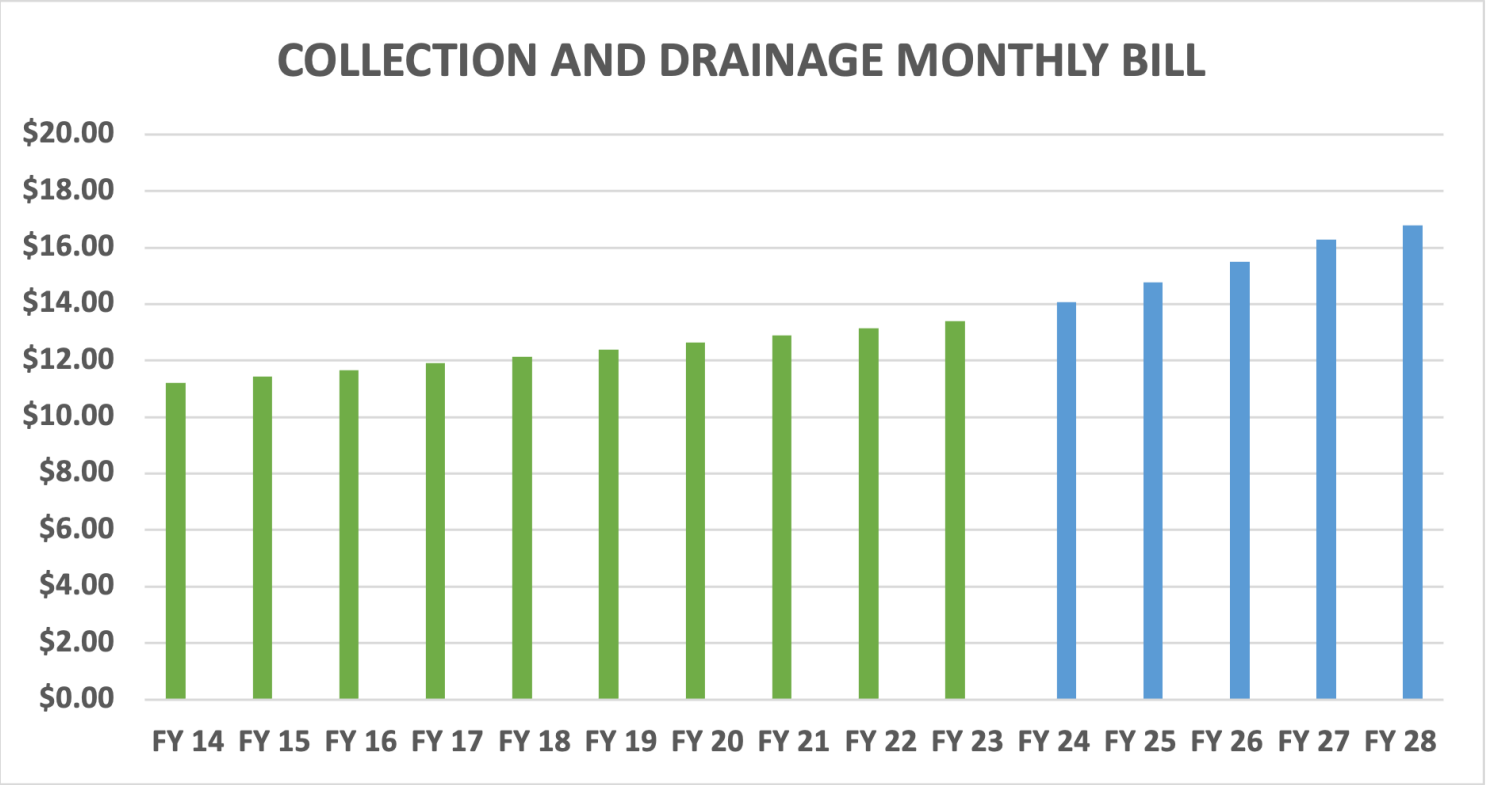
Collection and Drainage: Monthly Bill



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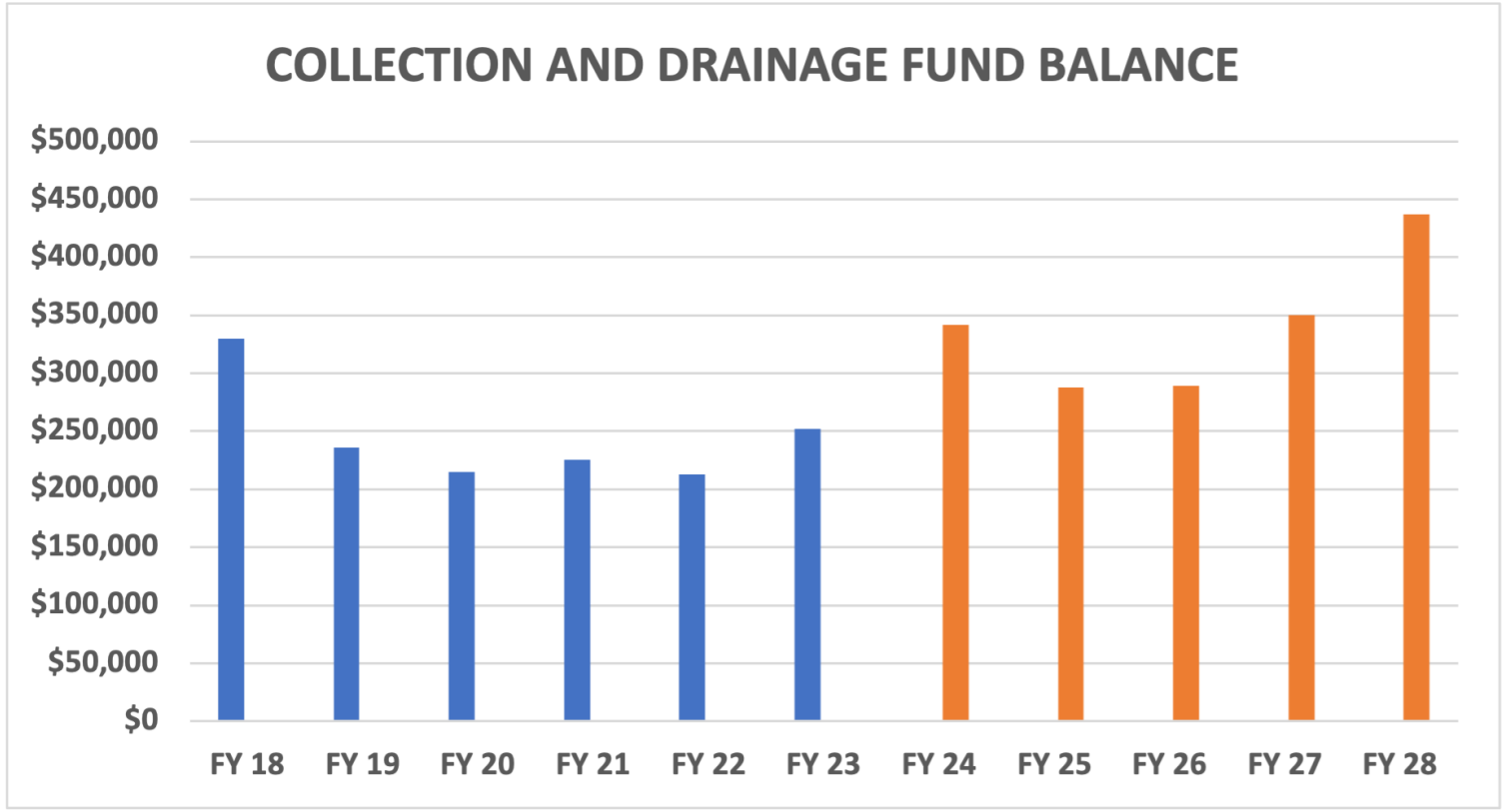
Collection and Drainage: Fund Balance



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Next Steps

1. Adopt ordinance to adjust rates
   - Sewer User
   - Collection and Drainage
2. Contract amendment with Kraft-Heinz

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Direction Sought

Strategy: Sewer User Rates

Strategy: Collection and Drainage Rates

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March 8, 2023

Nancy Lueck
City of Muscatine
215 Sycamore
Muscatine, Iowa 52761-3840

MUSCATINE, IOWA
SEWER RATE STUDY – 2022
COLLECTION AND DRAINAGE FUND
OVERVIEW AND RECOMMENDATIONS

This letter is to present an overview of the results of the Sewer Rate Study - 2022 relating to the Collection and Drainage Fund. This letter sets forth the recommendation for the Collection and Drainage Fund rate for the next five fiscal years from FY 23-24 (FY 24) through FY 27-28 (FY 28).

The Collection and Drainage Fund was last evaluated during the 2018 Sewer Rate Study. The 2018 Sewer Rate Study recommended the City increase the Collection and Drainage Fee 2% per year for the five fiscal years through FY 23. The City Council subsequently adopted the recommendation and implemented the five year rate program. The current rate program will expire at the end of FY 23.

The first part of the rate study compared the revenue and expense projections for the collection drainage fund in the 2018 rate study with the actual revenue and expenses through FY 22.

The following table shows a comparison of the projected revenues and expenses from the 2018 rate study with the actual revenue and expenses.

Category	Total Revenue	Total Expenditures
FY 19		
Projection	$1,455,600.00	$1,469,900.00
Actual	$1,408,516.22	$1,502,257.09
FY 20		
Projection	$1,423,100.00	$1,440,900.00
Actual	$1,495,159.36	$1,516,760.80
FY 21		
Projection	$1,451,150.00	$1,465,365.81
Actual	$1,456,903.26	$1,446,178.30
FY 22		
Projection	$1,479,761.00	$1,490,937.78
Actual	$1,482,654.89	$1,495,490.68

The projected year revenues and expenses at the end of the current fiscal year on June 30, 2023 is as follows:

Total Revenues: $1,508,944.22
Total Expenditures: $1,599,636.99

Over the four year period FY 19 through FY 22 the revenues have been relatively close to the revenue projections in the 2018 rate study. The actual revenue of $5,843,233.73 over the four years exceeded the projected revenue of $5,809,611 by 0.58%. Only a small deviation in revenue is expected as the revenue is derived by the number of customers billed monthly. The customer count in Muscatine is relatively stable.

During the five year period ending on June 30, 2022 the variation between the projected expenditures and the actual expenditures was only slightly greater than the deviation in revenue. The actual expenditures of $5,791,768.78 over the four years were lower than the projected expenditures of $5,867,103.09 by 1.28%.

The collection and drainage revenue is primarily used to fund operational expenditures and transfers to reserves and capital improvements.

In the previous rate studies the operational expenditures have been projected to increase at 3% per year. This annual adjustment percentage is being used in this rate study.

Since 2012 the City has transferred $200,000 per year from the Collection and Drainage Fund to the West Hill Reserve. This $200,000 per year transfer is projected to continue for at least the next five to six years.

Prior to FY 2018 the City was transferring $180,000 per year from collection and drainage to the Sewer Extension and Improvement Reserve. This transfer increased to $350,000 per year starting in FY 19. This transfer rate is projected to continue at this level.

For the last 15 years the City has targeted increasing the Collection and Drainage Fee at a rate of 2% per year. To keep the rate increase at that level the prior rate studies focused on managing total expenditures to stay within the projected revenue generated by the Collection and Drainage Fee. In the 2018 rate study the transfer rate to the Sewer Extension and Improvement Reserve was increased. To fund the additional transfer rate no other capital improvements were shown to be funded from collection and drainage for the five year period through FY 23. Although there were transfers out of the fund for capital related projects during the five year period. Since 2018, the total transfers for capital projects was significantly lower than in prior years. The minimal capital expenditures have been consistent with the intent of the last rate study. The budgetary allocation for sewer repair and maintenance in the operations of the system was set at $120,000. Starting in FY 20 this repair line item was $60,000 per year.

In prior rate studies the City considered funding additional capital improvements from the Collection and Drainage Fee. However, the decision was made to forego funding any capital improvements in preference to maintaining the 2% rate increase.

The City is currently under a Consent Order to complete the Papoose Redundant Line. The estimated cost for that project is $3,200,000. The City has identified the Progress Park Redundant Line as a desirable project. Although that project is not required under a Consent Order, the City has determined a redundant line should be constructed to improve the reliability of the collection system. The estimated cost for that project is approximately $1,800,000.

To date the City has not identified a funding source for either the Papoose Redundant Line or the Progress Park Redundant Line. The estimated total project cost of $5,000,000 for these two improvements is large enough the City will need to borrow funds and determine a source for funding the debt service.

Both projects are part of the Collection and Drainage system. As such, funding the debt service for these two projects from Collection and Drainage revenue would be appropriate. Funding of these two projects is similar to the funding of a portion of the West Hill Sewer Separation project and the Sewer Extension and Improvement projects that have been funded from Collection and Drainage revenue.

This rate study recommends the City plan to fund the debt service for these two projects from Collection and Drainage revenue. It is anticipated both projects will be funded through the State Revolving Fund (SRF) loan program. That program provides 20 year loans at the current interest rate of 2%.

For purposes of the rate study the projected debt service on the Papoose Redundant Line is $196,000 and would be incurred as early as FY 25. The debt service on the Progress Park Redundant Line is estimated to be $115,000. That debt service is projected to be incurred in FY 29. Although the debt service for the Progress Park Redundant Line will not be incurred until just beyond the five year period of this rate study, the project will likely be in progress during the five year period. As a result it is necessary to consider the debt service in projecting rates as part of this rate study.

The addition of these two larger capital projects will not allow the City to continue the historical trend of a 2% annual rate increase in the Collection and Drainage Fee.

To fund these two larger projects this rate study recommends the City phase in a larger rate increase strategy over the next four fiscal years and then return to a more modest rate increase in line with historical inflationary cost increases. For the last 20 years the companion sewer rates have increased at 3% per year and that strategy has proven successful in aligning revenues and expenditures. Historically, the City's 2% increase in the Collection and Drainage Fee has resulted in the City needing to scale back capital improvements funded from Collection and Drainage. The rate structure is to a point where the City cannot continue to fund operations and basic transfers beyond the phased in increase to fund the two projects. This rate study recommends the City's long term strategy adjust from a 2% increase to a 3% increase that would align with the historical practice for the sewer rates.

To fund the two capital projects the following rate increases are anticipated for the next five fiscal years.

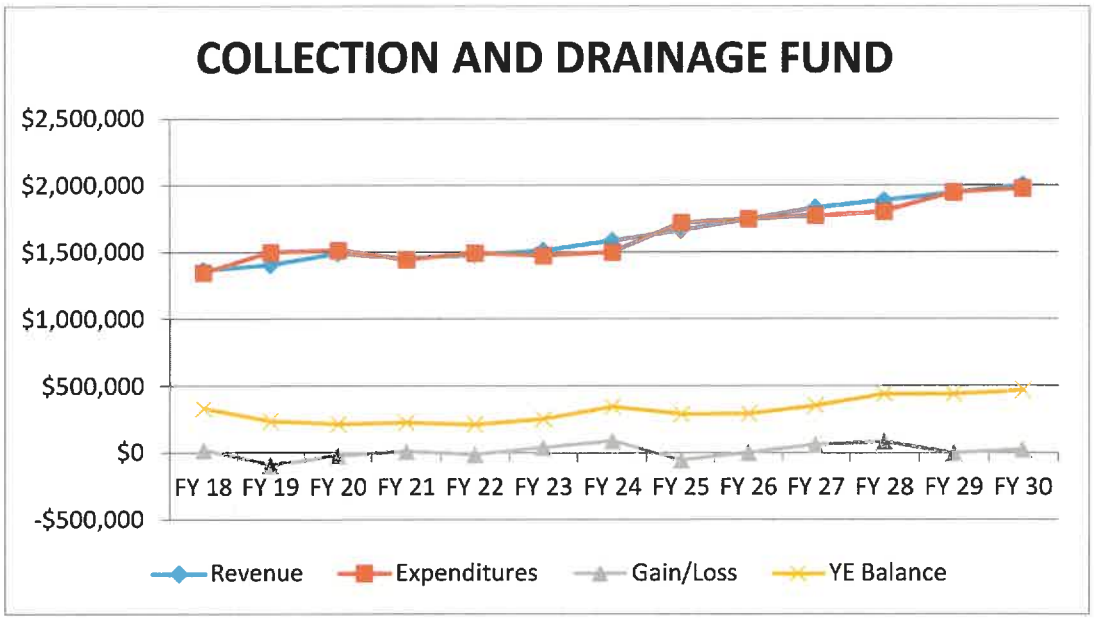
FY 24	5%
FY 25	5%
FY 26	5%
FY 27	5%
FY 28	3%

It is anticipated starting in FY 29 there will be 3% annual increases. Those increases will be established in the next rate study to be completed during FY 28.

With these adjustments the projected revenues and expenses of the collection and drainage fund is as follows:

	Actual 2021-2022	2022-2023	2023-2024	2024-2025	2025-2026	2026-2027	2027-2028
Total Revenue	$1,482,654.89	$1,516,387.96	$1,591,177.35	$1,669,706.22	$1,752,161.53	$1,838,739.61	$1,893,283.80
Total Expenditures	$1,495,490.68	$1,476,598.47	$1,501,827.42	$1,723,798.24	$1,750,533.19	$1,778,055.19	$1,806,387.84
Annual Gain/Loss	-$12,835.79	$39,789.49	$89,349.93	-$54,092.02	$1,628.34	$60,684.42	$86,895.95
Beginning Balance	$225,378.46	$212,542.67	$252,332.16	$341,682.09	$287,590.06	$289,218.41	$349,902.83
Ending Balance	$212,542.67	$252,332.16	$341,682.09	$287,590.06	$289,218.41	$349,902.83	$436,798.78

The following chart shows graphically the revenues, expenses, gain/loss and year-end balance of the fund over the period FY 18 through FY 30.



The rate study shows there will be an approximately $200,000 gain in the fund balance over the next five fiscal years. The average gain over the next five fiscal years would be about $40,000 per year, or about 3% of the projected annual expenditures of the fund. Looking beyond the end of the five year period, the City will incur the additional debt service for the Progress Park Redundant Line starting in FY 29. That additional debt service will result in a break even position in the following two fiscal years. When the following two fiscal years are taken into account, the annual gain over seven years is projected to be slightly less than 2% of revenue.

The City's experience with the Collection and Drainage Fund has shown there are always minor variations in revenues and slightly larger variations in expenditures. To account for these variations prudent planning for long term rate projections targets an annual gain of 2% to 5% per year. The City's projected gain averaging 2% per year over the next seven fiscal years would be considered sound rate setting practice.

Based on the recommendations in this rate study the Collection and Drainage Fee on a per bill basis for the current fiscal year and the next five fiscal years would be as follows:

Year	Monthly Fee	Monthly Increase
FY 23 (Current)	$13.40	
FY 24	$14.07	$0.67
FY 25	$14.77	$0.70
FY 26	$15.51	$0.74
FY 27	$16.29	$0.78
FY 28	$16.78	$0.49

If you have any questions or comments concerning the project, please contact the writer at 800-241-8000, or bveenstra@v-k.net.

VEENSTRA & KIMM, INC.

H. R. Veenstra Jr.

HRVJr:paj
20819
cc: Brian Stineman

City of Muscatine

ITEM NUMBER 2023-968

IN-DEPTH ITEM - CITY COUNCIL

DATE: 4/13/2023

STAFF

Andrew Fangman, Assistant Community Development Director

SUBJECT FOR DISCUSSION

Presentation on the Impact of a Change in State Law on the City's Home Occupation Regulations

EXECUTIVE SUMMARY

Home occupations are regulated by Section 4, Chapter 20 of Title 10 of City Code. The existing home occupation regulations that are contained within Section 10-20-4 of City Code were adopted in 2018. In June 2022, legislation restricting the manner in which cities in Iowa can regulate home occupations was approved. A number of the currently adopted provisions of the home occupation regulations contained within City Code have been identified by the City Attorney as noncompliant with state law.

GENERAL DIRECTION SOUGHT AND SPECIFIC QUESTIONS TO BE ANSWERED

Does the City Council desire for staff to bring forward an ordinance that would remove the provisions of the home occupation regulations that are no longer compliant with State law?

BACKGROUND/DISCUSSION

Home occupations are regulated by Section 4, Chapter 20 of Title 10 of City Code. "Home occupations" as defined by City Code are, "an occupation or business activity which results in a product or service and is conducted in whole or in part in a dwelling unit, and is subordinate to the residential use of the dwelling unit". The intent of these regulations is to allow for home-based business activities that are not otherwise permitted in residentially zoned districts, but which are clearly subordinate and compatible with the surrounding residential land uses and which will not negatively impact the character of the residential area.

Home occupations can be very beneficial to the community when governed by zoning regulations, which permit as broad of an array of home occupations as possible without negatively impacting the surrounding neighborhood. Home occupations are an important part of any local economy and a critical component of allowing the local economy to grow through the entrepreneurial activities of its residents. These regulations foster the establishment of new businesses by eliminating the need for some small businesses to rent commercial space, a

factor which could make all the difference to a new business. Allowing for work at home can save commuting and child care costs, and can give those who might be unable to work outside of the home, including single parents, the elderly and the disabled, an opportunity to earn a living. However, any benefits of home occupations must be balanced with neighbors' rights not to be disturbed by excessive noise, odors, traffic and other nuisances that are not characteristic of a residential area.

Existing home occupation regulations that are contained within Section 10-20-4 of City Code were adopted in 2018. This code change was a shift from a very restrictive approach towards regulating home occupations, to one that is based on performance-based standards. This approach keeps the burdens on home occupations as light as possible by focusing only on activities that may disrupt neighbors. Performance standards can prevent harm to neighbors by prohibiting excessive noise, odors, traffic and other nuisances that are unwelcome in residential neighborhoods. This approach also better protects neighbors and preserves the residential character of residentially zoned areas by creating very specific and easy to enforce regulations on potentially disruptive activities. Current regulations are divided into eight topical subsections which address the following:

- Regulations that establish a home occupation as an accessory use only
- A list of prohibited activities, equipment, and materials
- Regulations, which as much as possible, prohibit any visible exterior evidence of home occupation
- Regulations regarding vehicles, parking, and traffic
- Regulations regarding on-site customers, clients, or patrons
- Regulations regarding delivery or pick-up of items
- Regulations regarding employees
- Regulations regarding hours of operation

In June 2022, legislation restricting the manner in which cities in Iowa can regulate home occupations was approved. The intent of the legislation was similar to the City's 2018 change to home occupation regulations, to remove the regulatory burden from home occupations that are not impacting their neighbors. However, this state legislation went further than the City's code change, in removing regulations and restrictions on home occupancy. As a result, a number of provisions of the City's home occupation regulations are no longer compliant with state law, and are not enforceable.

The following currently adopted provisions of the home occupation regulations contained within City Code have been identified by the City Attorney as noncompliant with state law.

- The requirement that not more than 500 square feet or 25 percent of the dwelling unit floor area, whichever is greater, be used to conduct the home occupation. *10-20-4(B)(1)(b)*
- The prohibition of tattooing and body piercing as a home occupation. *10-20-4(B)(2)(j)*

- The prohibition of kenneling or other forms of boarding animals for compensation as a home occupation. *10-20-4(B)(2)(k)*
- The requirement that a home occupation be conducted entirely within the main dwelling. *10-20-4(B)(3)(a)*
- The rule that not more than two vehicles, externally identifiable as being associated with the home occupation, are allowed to be parked in a manner that is visible from off the property at any one time. *10-20-4(B)(4)(b)*
- The restriction on the number of customers that may visit a home occupation in a 24 hour period. Currently, the limit is 5 clients or customers in the dwelling unit or on the premises during any period of 60 consecutive minutes or more than 12 in any given 24-hour period. *10-20-4(B)(5)*
- A Restriction on delivery or pick-up of items. Currently the shipment and delivery of products, merchandise or supplies shall be limited to between 7:00 a.m. and 7:00 p.m. and shall regularly occur only in single rear axle straight trucks or smaller vehicles normally used to serve residential neighborhoods. *10-20-4(B)(6)*
- The prohibition of individuals, other than residents of the household, being employed in the home occupation at the home. *10-20-4(B)(7)*
- The restriction on hours of operation of a home occupation to between the hours of 7:00 PM and 7:00 AM unless said occupation is contained entirely within the principal building and will not require any on-street parking facilities. *10-20-4(B)(8)*

To bring the City's home occupation regulations back into compliance with state law, an ordinance removing the regulatory provisions identified above will need to be adopted.

ATTACHMENTS

City of Muscatine

ITEM NUMBER 2023-974

DATE: 4/13/2023

IN-DEPTH ITEM - CITY COUNCIL

STAFF

Andrew Fangman, Assistant Community Development Director

SUBJECT FOR DISCUSSION

Potential update to nuisance appeal process

EXECUTIVE SUMMARY

This item responds to feedback provided by City Council at its December 8, 2022, In-depth session regarding potential improvements to the process by which nuisances are regulated and abated. Staff proposed additional enumerated nuisances, potential changes to administrative fees relating to the abatement of nuisances, and alternative methods for hearing appeals relating to nuisances. City Council directed staff to make additional adjustments to the proposal, including providing more information on various options for the nuisance appeal process. In response to that direction, staff is presenting an option to utilize a hearing officer for nuisance appeals.

GENERAL DIRECTION SOUGHT AND SPECIFIC QUESTIONS TO BE ANSWERED

- Does the City Council support adoption of an ordinance establishing a hearing officer to hear and decide upon nuisance related appeals, with the decisions of the hearing officer appealable to the City Council?

- Does City Council desire further discussion and consideration of using a hearing officer for other types of appeals that currently go directly to City Council; if so, which types of appeals?

BACKGROUND/DISCUSSION

Nuisances are defined by City and State Code as “Whatever is injurious to health, indecent, or unreasonably offensive to the senses, or an obstruction to the free use of property, so as essentially to interfere unreasonably with the comfortable enjoyment of life or property, is a nuisance, and a civil action by ordinary proceedings may be brought to enjoin and abate the

nuisance and to recover damages sustained on account of the nuisance."

City Code gives anyone receiving an order to abate a nuisance 10 days from the date of the order to file an appeal of the determination that nuisance exists. The appeal is then heard and decided upon by City Council.

State law does not require that City Council be the entity to decide on such appeals. A number of alternate methods for hearing nuisance appeals are used in other Iowa communities.

On December 8, 2022, City Council heard a presentation on potential improvements to the way that nuisances are regulated and abated. This presentation covered proposed additional enumerated nuisances; potential changes to administrative fees relating to the abetment of nuisances; and alternative methods for hearing appeals relating to nuisances. City Council came to a consensus on and gave staff direction regarding adding additional enumerated nuisances and on changes to administrative fees. Council also directed that staff bring back more information on an appeal process in which an appeal would first go to a hearing officer; and that any appeal of a decision of the hearing officer would first go to City Council before it can be filed in district court.

This appeal process is used in the City of West Des Moines for appeals relating to nuisance abatement, and, as such, is a model of how such an approach could be implemented in Muscatine. This appeal process works as follows.

- Order to abate a nuisance is issued.
- The order starts a defined period of time in which the determination of a nuisance can be appealed to a hearing officer.
- An appeal must be made in writing, state what is being appealed, and also state the basis for the appeal.
- The hearing officer then sets a date and time for the hearing.
- The appellant is then provided a notice of the time and date of the hearing.
- This hearing is open to the public.
- At the hearing, an opportunity is given to all parties to respond and present evidence and argument on all issues involved.
- At the conclusion of the hearing, the hearing officer renders a decision on the appeal.
- The hearing officer may affirm, modify, or reverse any action, interpretation, notice or order which has been issued in connection with the order to abate a nuisance. This includes granting an extension to the compliance deadline.
- All parties are notified of the decision of the hearing officer.
- Any appeal of this decision by the hearing officer goes to City Council.
- An appeal can only go to district court after it has first been heard by City Council.

The full text of the portion of the West Des Moines City Code covering the nuisance abatement

appeal process is attached to this memo. If City Council adopts a similar process, similar language will need to be added to the City Code.

An appeal process that begins with a hearing officer, would allow for appeals to be heard in a timely manner. An appeal to City Council can only be heard at a regular meeting of City Council, which only occurs on the first or third Thursday of a month. As a result, due to notification requirements and agenda deadlines, some appeals can take several weeks to get before City Council.

The use of a hearing officer gives more flexibility in the scheduling of appeal hearings. Flexibility results from appeals no longer having to be heard on predetermined fixed meeting dates. The only constraint in scheduling a hearing before a hearing officer is the requirement to notify the appellant of the hearing date in a timely manner. This flexibility would allow for there to be less time elapsed between when an appeal is filed and when it is heard and decided upon.

The community as a whole would benefit from quicker resolution of nuisance appeals. The abatement of a nuisance is put on hold while an appeal is being resolved, potentially prolonging the existence of undesirable and/or harmful conditions.

Improvements to the nuisance appeal process would result from using a hearing officer, due to the quasi-judicial nature of a hearing officer. The City Council is a legislative body. A legislative body performing a quasi-judicial task, such as hearing an appeal, has the potential to create issues, particularly in regards to ex-parte communication.

Ex-parte communications are communications between a Council member and an interested party or member of the public outside of the public hearing where a quasi-judicial matter will be decided. The City's ethics policy states the following on ex-parte communication. *In any such quasi-judicial matter (e.g. personnel decisions, condemnation proceedings, zoning rules, matters involving the issuance of a permit or approval) or the award of a contract before the Council, Board, Commission or Committee, a public councilor, board member or officer sitting on such Council, Board, Commission or Committee, shall not, outside of that Council, Board, Commission or Committee, communicate with or accept a communication from a person for which there are reasonable grounds for believing to be a party to the matter being considered, if such communication is designed to influence the councilor's, board member's or officer's action on that matter. If such communication should occur, the councilor, board member or officer shall disclose it at an open meeting of the Council, Board, Commission or Committee prior to its consideration of the matter.*

Ex-parte contacts can deny due process and be unfair to supporters or opponents of a quasi-judicial matter because the information communicated is not part of the record and one side is not present to hear, consider, and rebut statements being made to such Council member. Having appeals heard by a hearing officer would remove the potential for ex-parte communication regarding nuisance appeals.

The individual appointed by City Council to serve as a hearing officer would most likely be compensated, with the intent of compensation being per hearing. A paid officer would ensure that the position is filled by a person with appropriate expertise, experience, and availability to expertly perform the duties of a hearing officer in a timely manner. To fund the compensation of the hearing officer, it would be designed to be revenue neutral through the use of nuisance abatement administrative fees and potentially a fee to file an appeal. Council would be asked to set any fee to file an appeal at a future meeting by resolution adjusting the fee schedule. Should a future council wish to set these fees at zero, it would retain the ability to do so by simple resolution and without the need to amend the City Code by ordnance.

Does the City Council desire for staff to bring forward an ordinance establishing a hearing officer to hear and decide upon nuisance related appeals, with the decisions of the hearing officer appealable to City Council?

Besides appeals relating to nuisance abatement, City Code identifies Council as the entity hearing appeals relating to a wide variety of topics. The following is a list of City Code sections which contain a provision for actions taken under the section to be appealed to City Council.

- Rental Housing Code - 16-4-2(H)
- Orders to Demolish Dangerous or Derelict Buildings – 16-3-3(A)(2)(e)
- Property Maintenance Regulations – 16-3-1
- Building Code – Title 8
- Fire Code – 15-2-5
- Parade Permits - 3-3-10
- Business Licensing - 5-1-8
- Alarm Licensing - 6-2-14
- Dangerous Animals – 6-8-13(D)

Does City Council desire to have further discussion and give consideration to using a hearing officer for other types of appeals that currently go directly to City Council; if so, which types of appeals?

Based on the directive given at this meeting of City Council, and directives given by Council at the December in-depth meeting, staff will prepare an ordinance that will make the directed changes to City Code. This ordinance will add enumerated nuisances; change administrative fees relating to the abatement of nuisances; and, if so,directed at this meeting, establish a hearing officer-based system for nuisance related appeals. Prior to any City Council action on such an ordinance, a public hearing on the matter will need to be held. For this reason, the next step that City Council will be asked to take is to adopt a resolution setting such a public hearing.

ATTACHMENTS

1. Portion of West Des Moines City Code Dealing With Nuisance Appeals

West Des Moines
4-4-10: MUNICIPAL CODE HEARING OFFICER:

A. Purpose: A hearing officer, designated by the mayor and subject to city council approval, shall hold administrative hearings concerning abatement of nuisances in the administrative process.

B. Procedures: All proceedings shall be in accordance with the requirements of this section.

C. Hearing On Actions, Interpretations, Notices And Orders:

1. Any person affected by any action, interpretation, notice or order which has been issued by a compliance specialist in connection with the enforcement of this chapter, through the administrative abatement process, may request, and shall be granted, a hearing on the matter before the municipal code hearing officer; provided, that, such a request for a hearing must be in a form of a written petition and must be filed with the city clerk within the following time periods: a) where a notice or order was served or mailed pursuant to this chapter, written petition must be filed with the city clerk within seven (7) calendar days; b) where notice or order was published as provided in this chapter, written petition must be filed with the city clerk within seven (7) calendar days after date of last publication; c) where a notice or order was served by posting in a conspicuous place on the property or building deemed a nuisance, a written petition must be filed with the clerk within seven (7) calendar days of the posting of the notice. Any petition so filed shall state the particular section of the ordinance involved and a brief statement of grounds upon which such appeal is taken. Failure to request a hearing and filing a timely petition as prescribed herein shall constitute a waiver of the right to a hearing, and the notice or order shall become a final determination and order.

2. Upon receipt of a timely filed petition, the hearing officer shall set a time and place for such hearing and shall give written notification thereof. Notification shall be given either through personal service or by certified mail, return receipt requested. The notice shall include a statement of the time, place and nature of the hearing.

3. If the petitioner fails to appear at such hearing, the hearing officer may proceed with the hearing and make a decision in the absence of the party.

D. Time For Commencement Of Hearing: The hearing shall be commenced not later than twenty (20) days after the date on which the petition was filed; however, this time may be extended for a reasonable period by the presiding officer.

E. Hearing Procedure:

1. The hearing shall be open to the public and shall be recorded either by mechanical means or by manual means. Opportunity shall be afforded all parties to respond and present evidence and argument on all issues involved. Parties may represent themselves or may be represented by legal counsel.

2. Irrelevant, immaterial or unduly repetitious evidence shall be excluded. A finding shall be based upon the kind of evidence on which reasonably prudent persons are accustomed to rely for the conduct of their serious affairs, and may be based upon such

evidence even if it would be inadmissible in a court of law. The hearing officer shall give effect to the rules of privilege recognized by law. Objections to evidentiary offers may be made and shall be noted in the record. Subject to these requirements, when a hearing will be expedited and the interests of the parties will not be prejudiced substantially, any part of the evidence may be required to be submitted in verified written form.

3. Documentary evidence may be received in the form of copies or excerpts, if the original is not readily available. Upon request, parties shall be given an opportunity to compare the copy with the original, if available.

4. Witnesses at the hearing, or available persons whose testimony has been submitted in written form, shall be subject to cross examination by any party as necessary for a full and true disclosure of the facts.

5. The hearing officer's experience, technical competence, and specialized knowledge may be utilized in the evaluation of the evidence.

6. The hearing officer shall conduct the hearing and have power to administer oaths. The hearing officer may cause subpoenas to be issued for such a witnesses and the production of such books and papers as either party may designate. The subpoenas may be signed by the hearing officer.

7. An appeal pursuant to this chapter shall not stay the effect of a notice or order under the emergency provisions of this chapter unless so ordered by the hearing officer.

F. Decision Of Hearing Officer After Hearing: Upon submission of all evidence and at the conclusion of the hearing, the hearing officer shall render a decision based upon the record. This decision may be made immediately after the conclusion of the hearing or within a reasonable time thereafter. The hearing officer may affirm, modify or reverse any action, interpretation, notice or order which has been issued in connection with the enforcement of an ordinance. A decision shall include findings of fact and conclusions of law separately stated. Following the decision of the hearing officer, all parties shall be notified of the decision by personal service or by certified mail, return receipt requested. Any party to the hearing, including the city, may seek judicial review by filing a petition in the county district court within twenty (20) days after the issuance of the decision by the hearing officer. Before filing a petition for judicial review in the district court, the affected party may appeal the decision of the hearing officer to the city council. This appeal shall be filed within forty eight (48) hours of the decision being rendered and notice of such appeal shall be filed with the city clerk. The city council shall review the proceedings based upon the record made before the hearing officer and may, with city council's consent, grant to each affected party an opportunity to appear and present arguments to the city council on the relief sought. The city council may affirm, modify or reverse the hearing officer's decision. Judicial review by the county district court shall be filed within twenty (20) days from the date of the city council decision.

G. Emergency Orders: Notwithstanding any provision stated in this chapter, whenever in the judgment of the municipal officer, agent or employee, an emergency exists creating a dangerous and imminent health or safety hazard to persons, property or the general public which requires immediate action, he/she shall order such action as

may be necessary to meet the emergency. Any orders issued pursuant to this section shall be effective immediately or in the time and manner prescribed in the order itself.

H. Authority Of City To Perform Work Upon Failure Of Property Owner: Should any property owner affected by any notice or order issued pursuant to this chapter fail to perform an action required by said notice or order, the city, where otherwise allowed by law, may perform the required action and assess the costs against the property involved. (Ord. 1542, 9-2-2003; amd. Ord. 2405, 2-17-2020)