

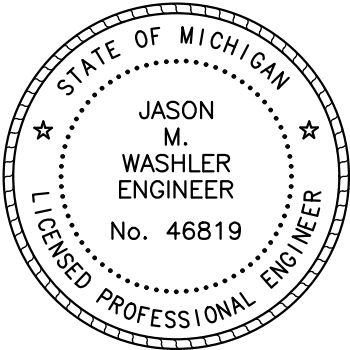
# Preliminary Engineering Report

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## Wastewater System Improvements

Prepared for  
**City of Buchanan**  
**Berrien County, Michigan**

October 2020  
*Revised August 26, 2021*  
2190800



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# 1 INTRODUCTION

This Preliminary Engineering Report (PER) has been prepared for the United States Department of Agriculture Rural Development - Rural Utility Services Program. The City of Buchanan, Michigan is the owner of a wastewater collection and treatment system that consists of gravity sewer, force main, areas of combined storm and sanitary sewer, 7 lift stations, and a wastewater treatment plant (WWTP). In 2018, a Wastewater System Evaluation was performed as part of the Stormwater, Asset Management and Wastewater (SAW) program guided by the Michigan Department of Environment Quality (MDEQ). The Wastewater System Evaluation has been submitted as a supplemental attachment with the application.

The 2018 SAW Wastewater System Evaluation identified several issues with the existing system including sanitary sewer, force main, lift station, and WWTP deficiencies. A series of recommended improvements were outlined in the Wastewater System Evaluation. Those improvements include:

1. Increase Pipe Capacity from WWTP to Red Bud Trail/3<sup>rd</sup> Street
2. Increase Pipe Capacity in Red Bud Trail (3rd Street to Fulton)
3. Increase Pipe Capacity in Days (Chicago to Red Bud Trail / 3rd Street)
4. Remove Existing Utility Obstructions & Penetrations
5. Separate Combined Storm/Sanitary Sewers
6. Inflow and Infiltration Removal
7. Localized Point Repair of Pipes with RoF of 4 or 5
8. Replacement of Pipes with RoF of 4 or 5
9. Glaser Street Lift Station and Force Main Replacement
10. Schirmer Lift Station Force Main Replacement
11. Schirmer Lift Station Improvements
12. Lift Station Miscellaneous Improvements
13. Post and River Shores Lift Stations Improvements
14. WWTP Miscellaneous Improvements

Project completion will significantly improve the capacity, reliability, and performance of the wastewater collection and treatment system.

## **2 PROJECT PLANNING**

### **2.1 Location**

Buchanan is a city located in Berrien County in southwest Michigan, approximately 50 miles southwest of the City of Kalamazoo and approximately 12 miles northwest of South Bend, Indiana. The existing wastewater collection system and service area is shown in Figure 1. This map shows the lift stations, gravity sewer, force main and WWTP. The existing stormwater collection system and service area is shown in Figure 2. Figure 3 contains a USGS quadrangle map showing the predominant natural features, elevation contours, rivers, lakes, and natural dwellings within and around the City limits, as well as the proposed project locations.

### **2.2 Environmental Resources Present**

The City of Buchanan and the service area are primarily developed into residential areas and commercial areas. A separate Environmental Report to address the proposed projects has been prepared and included with the application.

The improvement projects are confined to existing developed rights-of-way and easements and will not impact any known environmental resources. In addition, all disturbed areas will be restored to their pre-construction condition.

### **2.3 Growth Areas and Populations Trends**

The historical and projected population for the City of Buchanan is shown in Table 1. Population projections were made based on data available from the Michigan Department of Transportation (MDOT). The population of Buchanan is projected to decrease by about 1% percent annually from 2020 to 2040. As shown in the table the City's population has been decreasing since 1980. The projected Year 2020 population for the City of Buchanan is 4,278 persons.

### **2.4 Community Engagement**

The City has followed USDA requirements for publishing public notices of the project process. They may also elect to hold a public meeting during a regular council meeting to provide more detail of the projects to interested citizens.

### **3 EXISTING FACILITIES**

#### **3.1 History**

The City of Buchanan wastewater system includes approximately 119,840 lineal feet of gravity sewer pipes ranging from 6 to 18 inches in diameter with 446 manholes, 1,445 lineal feet of combined storm/sanitary pipes and 1,670 lineal feet of sanitary effluent pipe. There are also 7 lift stations (5 City owned and 2 Township owned, but operated and maintained by the City) with 5,672 lineal feet (City owned) and 1,292 lineal feet (Township owned) of force main pipes ranging from 4 to 6 inches in diameter. The WWTP also contains an additional 905 lineal feet of 12-inch force main piping. Additionally, Buchanan Township connects to the City's wastewater system and has 17,306 lineal feet of gravity sewer pipes with 65 manholes.

The City of Buchanan Wastewater Treatment Plant (prior to the oxidation ditch project) is a mechanical plant which generally consists of influent screening, grit removal, activated sludge treatment, secondary and tertiary clarification, and ultraviolet (UV) disinfection prior to discharging final effluent to the St. Joseph River. The effluent discharge was meeting the City's discharge criteria.

The WWTP was originally constructed in 1938 as a primary treatment plant. In 1972 the WWTP was improved to include secondary treatment. In 2009 much of the WWTP equipment was upgraded, and influent flow metering and UV disinfection system were installed. The headworks building was added in 2013, including screening and grit removal. In 2015 a study of the WWTP was prepared by Gosling Czubak which recommended that the majority of the treatment processes be replaced. The city just completed a design-build project to install an oxidation ditch for treatment and a filter press for solids processing. The headworks was the only existing process that will be utilized as originally designed for the new treatment process. Other processes that are to be repurposed include the primary effluent pump station, aeration tanks, and UV Building. The ferrous chloride storage tanks are planned to be relocated for reuse. The remaining existing WWTP assets will either be demolished or abandoned. The discharge location to the St. Joseph River remains the same. The new system is meeting the discharge criteria.

Table 2 is a summary of the City's sanitary system. A map of the existing facilities can be seen in Figure 1.

## **3.2 Condition of Existing Facilities**

The following condition assessments are based on results of the 2018 Wastewater System Evaluation and 2018 Sewer Flow Study. Both reports have been provided as a part of this application. As mentioned in the introduction, there were many projects identified in the reports. Not all of identified projects are addressed in this round of proposed projects, however, the city plans to correct and replace these other infrastructure needs in a future round of projects. An example of a future project not included would be addressing the combined sewers on West Fifth Street between Main and Moccasin. The projects that were considered for this wastewater preliminary engineering report are based on developing a “backbone” of the sanitary system that other identified projects could readily be expanded and constructed based on other infrastructure needs (road, storm, water).

### **3.2.1 Wastewater Interceptor to the WWTP**

The 18-inch reinforced concrete (RCP) interceptor to the WWTP was installed in 1955. This area of sewer could not be assessed via camera due to high flows and difficult access to the manholes. The 2018 Sewer Flow Study shows inadequate capacity of the gravity sewers in the cross-country route to the WWTP.

### **3.2.2 E. Dewey Street Area**

There are 23 storm basins that are directly connected to the sanitary system. To correct this, the construction of separate storm and sanitary lines will be required on Main Street (Dewey to Third), E. Third Street (Main to Red Bud Trail), and W. Fifth Street (Moccasin to Main.) Most of the sewer in this area is clay pipe that was installed in 1935. As expected for clay pipe of this age, there are a number of structural deficiencies, including multiple breaks and cracks.



### **3.2.3 Red Bud Trail**

The 2018 Sewer Flow Study indicates that the 10-inch sanitary sewer on Red Bud Trail from Fulton Street to 4<sup>th</sup> Street lack adequate capacity to convey the anticipated peak flow rates resulting from a 25-year 24-hour storm. The 10-inch clay sanitary sewer on Red Bud Trail from 4<sup>th</sup> Street to Chicago Street was installed in 1939 and could not be assessed via camera due to high flows. This portion of the sanitary sewer from 4<sup>th</sup> to Chicago is planned to remain at this time. The City's plan is to replace this pipe in the next round of projects.

### **3.2.4 Front Street**

The 12-inch clay sanitary sewer on Front Street from Chippewa Street to Red Bud Trail was installed in 1935. This stretch of sewer is showing a number of structural deficiencies as expected for clay pipe of this age, including numerous cracked and fractured pipe. As a result of these structural deficiencies, there are several areas with observable infiltration.

### **3.2.5 Days Avenue**

The 10 to 12-inch clay sanitary sewer on Days Avenue from Front Street to Carroll Street was installed in 1935. The 2018 Sewer Flow Study indicates this stretch of sewer lacks adequate capacity to convey the anticipated peak flow rates resulting from a 25-year 24-hour storm.

### **3.2.6 Oak Street**

The 10 to 12-inch clay sanitary sewer on Oak Street from Alexander Street to W. Fourth Street was installed in 1935. This stretch of sewer is showing a number of structural deficiencies as expected for clay pipe of this age, including numerous broken pipes, cracked and fractured pipe, and pipe intrusions. As a result of these structural deficiencies, there are several areas with observable infiltration.

### **3.2.7 Glaser Lift Station Force Main**

The force main of the Glaser Street Lift Station is cast iron from 1956. The actual condition and risk of pipe breaks is unknown because cost-effective inspection technologies currently do not exist.

### **3.3 Financial Status of Existing Facilities**

#### **3.3.1 Current Rate Schedule**

The current rate schedule for wastewater system users is included in Appendix A.

#### **3.3.2 Annual Operation and Maintenance Costs**

The City's O&M budget for the 2019-2020 fiscal year was approximately \$834,000.

#### **3.3.3 Other Capital Improvement Programs**

The City had a SAW grant that was obtained in 2015 and ended in November of 2018.

#### **3.3.4 Existing Debts and Reserve Accounts**

At the end of the 2019 fiscal year, the City had wastewater system liabilities totaling \$1,364,000, as shown in the June 2019 Balance Sheet, of which \$1,000,000 is related to outstanding bonds.

The City has debt associated with recent improvements to the oxidation ditch with liabilities totaling \$9,185,000.

At the end of the 2019 fiscal year, the City had total reserves/balances of \$5,936,000 for the wastewater fund as shown in the June 2019 Balance Sheet. The June 2019 Balance sheet has been provided as part of this application to accompany the 2019 Financial Statement.

## **4 NEED FOR PROJECT**

### **4.1 Health, Sanitation, and Security**

#### **4.1.1 General Capacity Concerns**

As part of the SAW grant, a sewer flow study was prepared to determine any capacity concerns within the existing infrastructure. The sewer flow study which evaluated the capacity of the wastewater system (collection and lift stations) showed four areas within the sanitary pipe that are undersized for current flows. The four areas that have pipe capacity issues are as follows:

- Days Avenue (Chicago to 3<sup>rd</sup>)
- 3<sup>rd</sup> Street (Short Street to Red Bud Trail)
- Red Bud Trail (Fulton Street to 4<sup>th</sup> Street)
- Portions of the cross-country trunk sewers (Red Bud to the WWTP)

The lack of capacity is partially due to excessive flows associated with inflow and infiltration (I&I). Some of these sewers do not have urgent repair needs; therefore, the capacity of the existing sewers may be partially reclaimed by removing sources of I&I. Ultimately, the sewers identified above lack capacity due to the size of the existing pipe and therefore capacity may be reclaimed by full replacement of the pipe.

### **4.2 Aging Infrastructure**

Much of the sanitary sewer that is proposed to be replaced was installed in the 1930s, nearly 90 years ago. Along with capacity concerns, the existing piping is showing structural deficiencies.

### **4.3 Reasonable Growth**

Although there is not significant future growth anticipated at this time, the City of Buchanan is looking to maintain buildable properties for potential future growth.

## **5 ALTERNATIVES CONSIDERED**

### **5.1 Design Criteria**

The primary reason for the proposed projects is to address capacity and structural concerns. All the proposed underground projects are to be performed in the same location as, or adjacent to, the existing underground infrastructure. For this reason, no alternatives were considered.

### **5.2 Map**

See Figure 1 for a map of the existing wastewater system. Figure 4 is a map of the proposed sanitary sewer improvements described below as Alternative 1.

### **5.3 Proposed Project (Alternative 1)**

#### **5.3.1 Environmental Impacts**

Because the proposed projects include removing and replacing existing infrastructure, the projects in this alternative will have no permanent significant environmental impacts. An Environmental Report has been prepared as part of this application. All required permits will be obtained, and storm water control best management practices will be implemented to minimize sediment runoff.

The noise and air pollution inherent to the construction process will be minimized by requiring the contractor to keep a strict timetable and use equipment that is within regulatory emission standards for vehicle emissions.

#### **5.3.2 Land Requirements**

Projects to be performed are within the limits of property that is owned by the City.

#### **5.3.3 Potential Construction Problems**

As the improvement projects consist of replacing the sanitary sewer, force main, and storm sewer at or near the existing locations, no construction problems are anticipated.

#### **5.3.4 Sustainability Considerations**

This combination of projects is intended to increase the capacity of the existing sewer to keep up with current and future demands. The proposed project will also replace aged and deteriorated sanitary sewer to prevent contamination of nearby soils and groundwater.

#### **5.3.5 Cost Estimates**

Construction is estimated to cost \$7,478,000 for the proposed improvements, with \$5,823,000 for proposed RD funds. Full costs including engineering, legal, and administrative costs are provided with the application. Operations and maintenance costs are not anticipated to increase from current levels as a result of the proposed project. A full life cycle cost analysis for Alternative 1 is included in Table 3.

### **5.4 Alternative 2: No Action**

#### **5.4.1 Description**

Another alternative is the “No Action” alternative. This alternative consists of no action and would not address any of the issues identified in 2018 Wastewater System Evaluation.

#### **5.4.2 Environmental Impacts**

By not repairing the aging sewer with numerous structural deficiencies, there could potentially be contamination to the nearby soils and groundwater.

#### **5.4.3 Land Requirements**

No additional land or easements would be required for this alternative.

#### **5.4.4 Potential Construction Problems**

No construction problems would be anticipated with this alternative.

#### **5.4.5 Sustainability Considerations**

The City’s wastewater system has areas which are undersized for current flows. By not addressing these issues, the City will continue to see the side effects of the lack of capacity, and the City will not be able to grow and accommodate future flows.

#### **5.4.6 Cost Estimates**

As this alternative consists of no action, there would be no cost for construction. Operations and maintenance costs would not immediately increase. However, as some of the maintenance issues addressed by other alternatives would not be solved, maintenance costs would increase over time.

## **6 SELECTION OF AN ALTERNATIVE**

### **6.1 Life Cycle Cost Analysis**

Life cycle costs for each of the alternatives are shown in Table 3. An analysis period of 20 years was used.

### **6.2 Non-Monetary Factors**

The alternatives were developed to address the main issues presented in the 2018 Wastewater System Evaluation. Those issues represent the safety and dependability of the system.

## **7 PROPOSED PROJECT (RECOMMENDED ALTERNATIVE)**

Alternative 1 is the best alternative to address the issues raised in the 2018 Wastewater System Evaluation.

### **7.1 Preliminary Project Design**

Alternative 1 includes the following projects:

1. Remove and replace 18-inch interceptor sewer pipe with 21-inch from Red Bud Trail to the WWTP.
2. Separate combined sanitary and storm sewer lines within the E. Dewey Street area.
3. Remove and replace sanitary sewer on Red Bud Trail from Chicago Street to Elizabeth Street.
4. Remove and replace sanitary and storm sewer on Front Street from Chippewa Street to Red Bud Trail.
5. Remove and replace sanitary sewer on Days Avenue from Front Street to Carroll Street.

6. Remove and replace sanitary sewer on Oak Street from Alexander Street to W. Fourth Street.
7. Remove and upsize Glaser Lift Station force main.

## 7.2 Project Schedule

The following is a tentative schedule for the progression of the overall project:

<i>Milestone</i>	<i>Estimated Completion Date</i>
Submit Application	10/16/2020
USDA Approval	11/30/2020
Complete Design	01/15/2022
Permit Approval	02/01/2022
Authorization to Bid	03/01/2022
Bid Opening	04/01/2022
Loan Closing	05/01/2022
Contract Award	06/01/2022
Construct Start	07/01/2022
Construction Completion	11/30/2023

## 7.3 Permit Requirements

The following permits will need to be obtained for this project prior to construction:

- EGLE Part 41 Wastewater Construction Permit
- Sediment and Erosion Control Permit from Berrien County Drain Commission
- Road Permit from Road Commission of Berrien County

## 7.4 Total Project Cost Estimate (Engineer's Opinion of Probable Cost)

The total project cost is approximately \$9,545,000, of which \$7,459,000 is anticipated to be funded with RD loans. The remaining \$2,086,000 will be funded by the City of Buchanan. The details, including costs for construction, legal counsel, bond counsel, engineering, and contingencies are provided in the application materials.

## 7.5 Annual Operating Budget

The projected 2022 annual operating budget for the City of Buchanan water system is provided in the application materials. The City's O&M budget for the 2019-2020 fiscal year was approximately \$834,000. The City's operating income for the wastewater system for the 2019-2020 fiscal year was approximately \$1,532,000.

### 7.5.1 Income

A detailed current rate schedule for wastewater users is included in Appendix A. The City has been increasing rates by 8% each year as shown in the table below:

	<b>FY 2018-2019</b>	<b>FY 2019-2020</b>	<b>FY 2020-2021</b>	<b>FY 2021-2022 (Proposed)</b>
<b>City</b>				
Water	\$4.50/1,000 gal.	\$4.86/1,000 gal.	\$5.25/1,000 gal.	\$5.67/1,000 gal.
Sewer	\$7.38/1,000 gal.	\$8.72/1,000 gal.	\$9.42/1,000 gal.	\$10.17/1,000 gal.
RTS (Residential)	\$36.08 Monthly	\$31.21 Monthly	\$33.70 Monthly	\$36.40 Monthly
<b>Township</b>				
Water	\$5.27/1,000 gal.	\$5.70/1,000 gal.	\$6.16/1,000 gal.	\$6.65/1,000 gal.
Sewer	\$9.00/1,000 gal.	\$10.22/1,000 gal.	\$11.04/1,000 gal.	\$11.92/1,000 gal.
RTS (Residential)	\$30.44 Monthly	\$36.45 Monthly	\$39.37 Monthly	\$42.52 Monthly

The projected fiscal year 2023-2024 wastewater fund operating income (\$1,750,000) is derived from the rate increases above.

Available data indicates there are approximately 2,053 connections to the City's wastewater system. The proposed project will not change the number of customers on the system. See Appendix C for a breakdown of connections and flows.



## **7.5.2 Annual Operations and Maintenance Costs**

The annual O&M budget for the existing City of Buchanan wastewater system are approximately \$834,000 for the 2020 fiscal year. Projected O&M expenses for 2024 are \$860,000.

The O&M budgets for 2017-2019 were higher than typical previous years, approximately \$943,000, \$1,160,000, and \$1,025,000, respectively. In 2017 and 2018 there were costs associated with the aforementioned SAW grant. In 2019, there was a large cost associated with a bond for the oxidation ditch at the Wastewater Treatment Plant.

There are not any significant changes to O&M costs anticipated for the system as a result of this project.

## **7.5.3 Debt Repayments**

At the end of the 2019 fiscal year, the City had wastewater system liabilities in the amount of \$1,000,000 under one bond issue which matures April 1, 2030 from a DWRP loan.

The City has a recent wastewater system liability in the amount of \$9,185,000 with a maturity date of April 1, 2040.

It is anticipated that the proposed project will result in a loan from the USDA Rural Development of \$7,459,000 at an interest rate of 1.25-percent amortized over 40 years. The corresponding annual debt service including principal and interest will average approximately \$238,000 over the life of the loan.

## **7.5.4 Reserves**

The reserves that are necessary to ensure that adequate funds are being generated to pay for wastewater system expenses and the proposed project will be assumed as 10-percent of the annual debt payment requirement. Therefore, the debt service reserve used for the proposed project is \$24,000 per year.

The reserves associated with the short-lived assets will be approximately \$53,000. This includes assets associated with the wastewater system that have an expected useful life of 15 years or less. A list of the short-lived assets is provided in Appendix B.

The following is a summary of the annual operation, maintenance, and reserve information:

O&M	\$860,000
RRI	\$53,000
Existing Debt (DWRf)	\$114,000
Existing Debt (Oxidation)	\$550,000
New Debt	\$238,000
Debt Reserve	\$24,000
Total	\$1,839,000

## **7.6 Conclusions and Recommendations**

The City of Buchanan wastewater system is in need of improvements for capacity and structural concerns. Due to the current state of the system, it is recommended that the City improve the quality of the wastewater system as described in this report. This will improve the health and security of the system in addition to providing adequate capacity for future and current wastewater flows.

Therefore, the City of Buchanan is applying for USDA Rural Development funding in the amount of \$7,459,000 for the recommended improvements.

## Tables

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Table 1 – Ultimate Growth Projections

Table 2 – Sewer Summary

Table 3 – Present Worth Analysis

### Ultimate Growth Projections

Year	Population / Projection
1980 <sup>1</sup>	5,142
1990 <sup>1</sup>	4,992
2000 <sup>1</sup>	4,681
2010 <sup>1</sup>	4,458
2015 <sup>2</sup>	4,362
2018 <sup>2</sup>	4,294
2020 <sup>3</sup>	4,278
2025 <sup>3</sup>	4,253
2030 <sup>3</sup>	4,242
2035 <sup>4</sup>	4,231
2040 <sup>4</sup>	4,220

<sup>1</sup> Population through 2010 based on United States Census data.

<sup>2</sup> Population estimate from United States Census data

<sup>3</sup> Population projections based on MDOT

<sup>4</sup> Interpolated from MDOT projections

### Existing Sanitary Sewer Summary

**Community Name:** City of Buchanan  
**NPDES Discharge Permit No:** MI0022489  
**Type:** Gravity & Force Main, Combined Sanitary/Storm

Sewers	Footage	Material	Age	Condition	No. of Manholes	Condition
6-inch	195	RCP	80	Fair	446	Good-Fair
6-inch	1580	Clay	55-85	Poor-Fair		
8-inch	26600	PVC	30	Fair-Good		
8-inch	890	RCP	55	Poor-Fair		
8-inch	4000	Truss	50	Poor-Fair		
8-inch	24800	Clay	50-80	Poor-Fair		
8-inch	640	CIPP Liner	10-20	Good		
8-inch	80	Cast Iron	80	Poor		
10-inch	6500	PVC	10-30	Good		
10-inch	1600	Cast Iron	80	Poor		
10-inch	2800	CIPP Liner	10	Fair		
10-inch	7400	RCP	80	Poor-Fair		
10-inch	2300	Truss	50	Poor		
10-inch	24000	Clay	40-80	Poor-Fair		
12-inch	1900	PVC	20-30	Good		
12-inch	300	Cast Iron	80	Fair		
12-inch	2300	RCP	60	Poor		
12-inch	700	Truss	40	Good		
12-inch	8000	Clay	80	Fair		
15-inch	150	PVC	5	Good		
15-inch	1100	Truss	40	Good		
18-inch	250	Cast Iron	60	Poor		
18-inch	1900	RCP	60	Poor		
<b>Combined Sanitary/Storm</b>						
8-inch	250	Clay	80	Poor		
12-inch	890	Clay	80	Poor		
12-inch	300	RCP	80	Fair		
<b>Forcemain</b>						
4-inch	1400	Cast Iron	30-60	Fair		
4-inch	1200	Ductile Iron	30	Good		
6-inch	1300	Cast Iron	50	Fair		
6-inch	1800	Ductile Iron	10-30	Good		
12-inch	900	Cast Iron	60	Fair		

### Existing Sanitary Sewer Summary

**Lift Stations:**

L.S. Name	Type	Pumping Capacity	Age	Condition
Mill Pond	Submersible	125 gpm	38	Fair
Glaser	Can	300 gpm		Poor-Fair
Post	Submersible	140 gpm	38	Fair
Industrial	Submersible	180 gpm	38	Fair
Rivershores	Submersible	80 gpm	36	Fair
Crescent View	Submersible	80 gpm	25	Fair
Schirmer	WW-Mounted Can	375 gpm	4	Good

**Treatment Type and Description:**

Mechanical plant generally consisting of influent screening, grit removal, activated sludge treatment, secondary and tertiary clarification, and ultraviolet (UV) disinfection

Much of the existing plant is to be replaced in the near future with an oxidation ditch for treatment. The headworks assets will be the only existing process that will be utilized as originally designed.

**Discharge Type/Outfall:** Surface Water - St. Joseph River

**Discharge Frequency:** Continuous

**Discharge Volume:** Design Ave. Day Flow - 0.94 MGD, Actual Ave. Day Flow - 1.05 MGD

**Present Worth Analysis**

**Community Name:** City of Buchanan

**Federal Discount Rate for Water Resources Planning (Interest Rate) i =** 0.04875  
**Number of Years, n =** 20 years

<b>Alt. 1: Proposed Project</b>	<b>Alt. 2: Do Nothing</b>
Initial Capital Costs = \$9,545,000	Initial Capital Costs = \$0
Annual Operations & Maintenance Costs = \$860,000	Annual Operations & Maintenance Costs = \$860,000
Future Salvage Value =	Future Salvage Value =
Present Worth of 20 years of O & M = \$10,832,010	Present Worth of 20 years of O & M = \$10,832,010
$PW = \text{Annual OM} \frac{(1+i)^n - 1}{i(1+i)^n}$	
Present Worth of 20 yr Salvage Value = \$0	Present Worth of 20 yr Salvage Value = \$0
$PW = FSV * \frac{1}{(1+i)^n}$	
<b>Alternate 1</b>	<b>Alternative 2</b>
<b>Total Present Worth = \$20,377,010</b>	<b>Total Present Worth = \$10,832,010</b>

## Figures

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Figure 1 – Existing Wastewater System & Service Area

Figure 2 – Existing Stormwater System

Figure 3 – USGS Quadrangle Map with Proposed Projects

Figure 4 – Proposed Projects



# City of Buchanan

Berrien County, Michigan

## USDA RD Engineering Report Figure 1: Wastewater Collection System

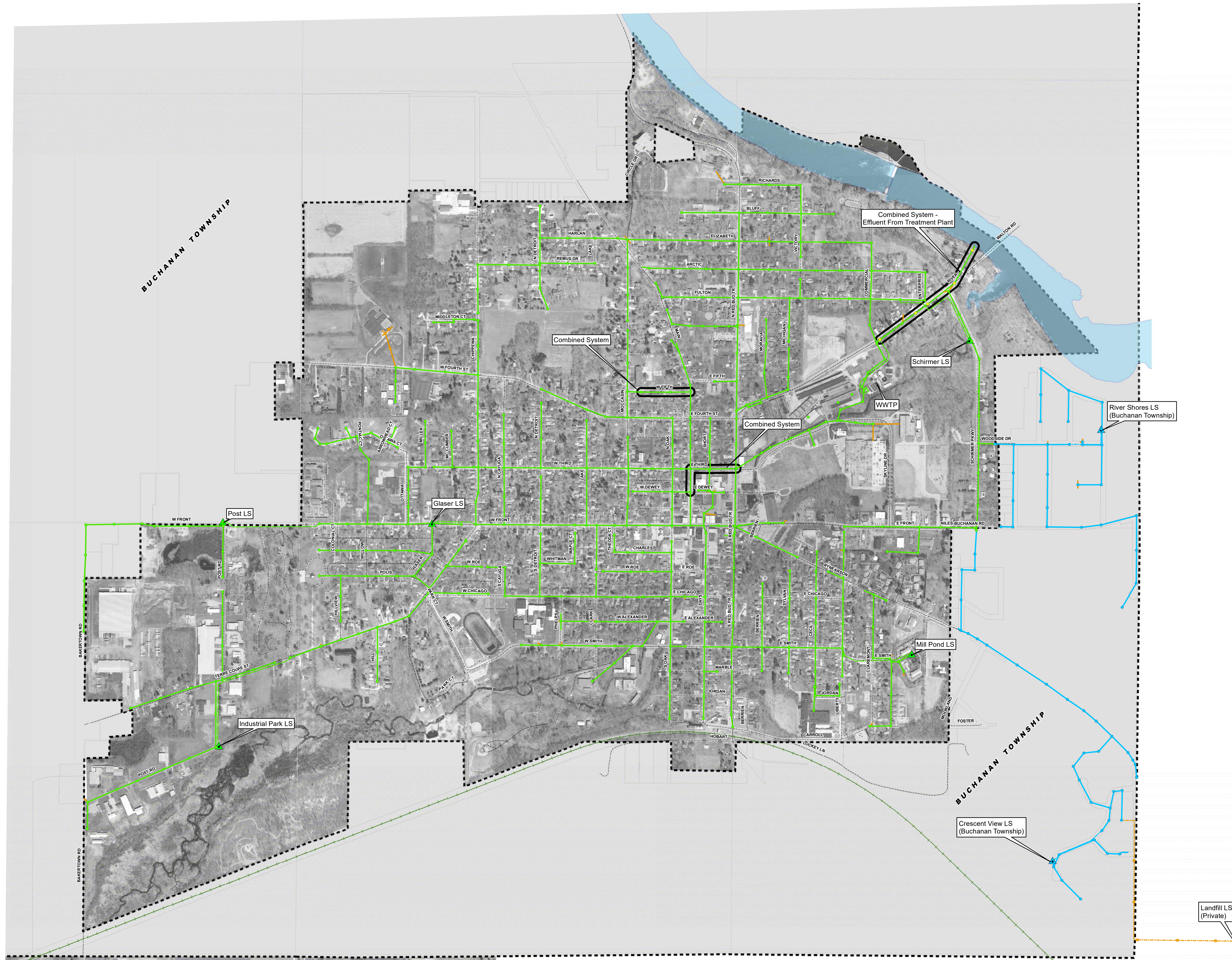
Prein&Newhof

March 2020  
2190800



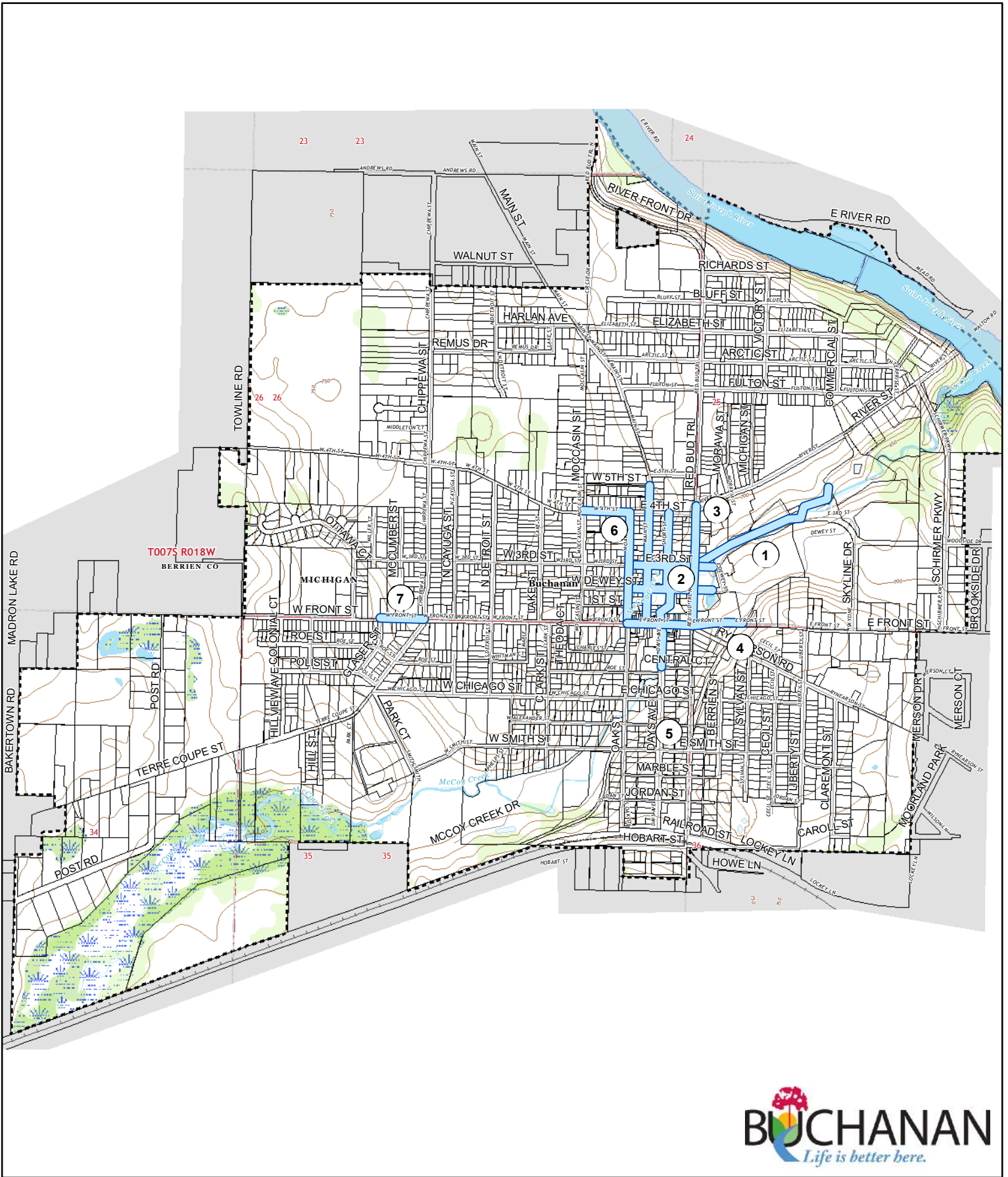
600 300 0 600 Ft

Scale: 1" = 600'



LEGEND	
<b>Gravity Sewer - Ownership</b>	
City of Buchanan	Green line
Buchanan Township	Blue line
Private	Orange line
<b>Manhole - Ownership</b>	
City of Buchanan	Green dot
Buchanan Township	Blue dot
Private	Orange dot
Sanitary Effluent Manhole	Yellow dot
<b>Force Main - Ownership</b>	
City of Buchanan	Green dashed line
Buchanan Township	Blue dashed line
Private	Orange dashed line
<b>Lift Station - Ownership</b>	
City of Buchanan	Green triangle
Buchanan Township	Blue triangle
Private	Orange triangle
City of Buchanan Limits	Dashed black line





J:\GIS\_Client\Berrien-GD\Buchanan-GD\City\_Projects\2190800\_USDA\USDA Sanitary Figure 3\_USGS Map.mxd - jferla - 7/10/2020 9:22:59 AM



CITY OF BUCHANAN  
USDA RD ENGINEERING REPORT

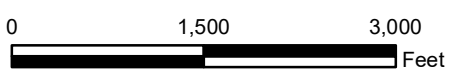
**FIGURE 3: USGS MAP**

JULY 2020  
Prein & Newhof  
2190800

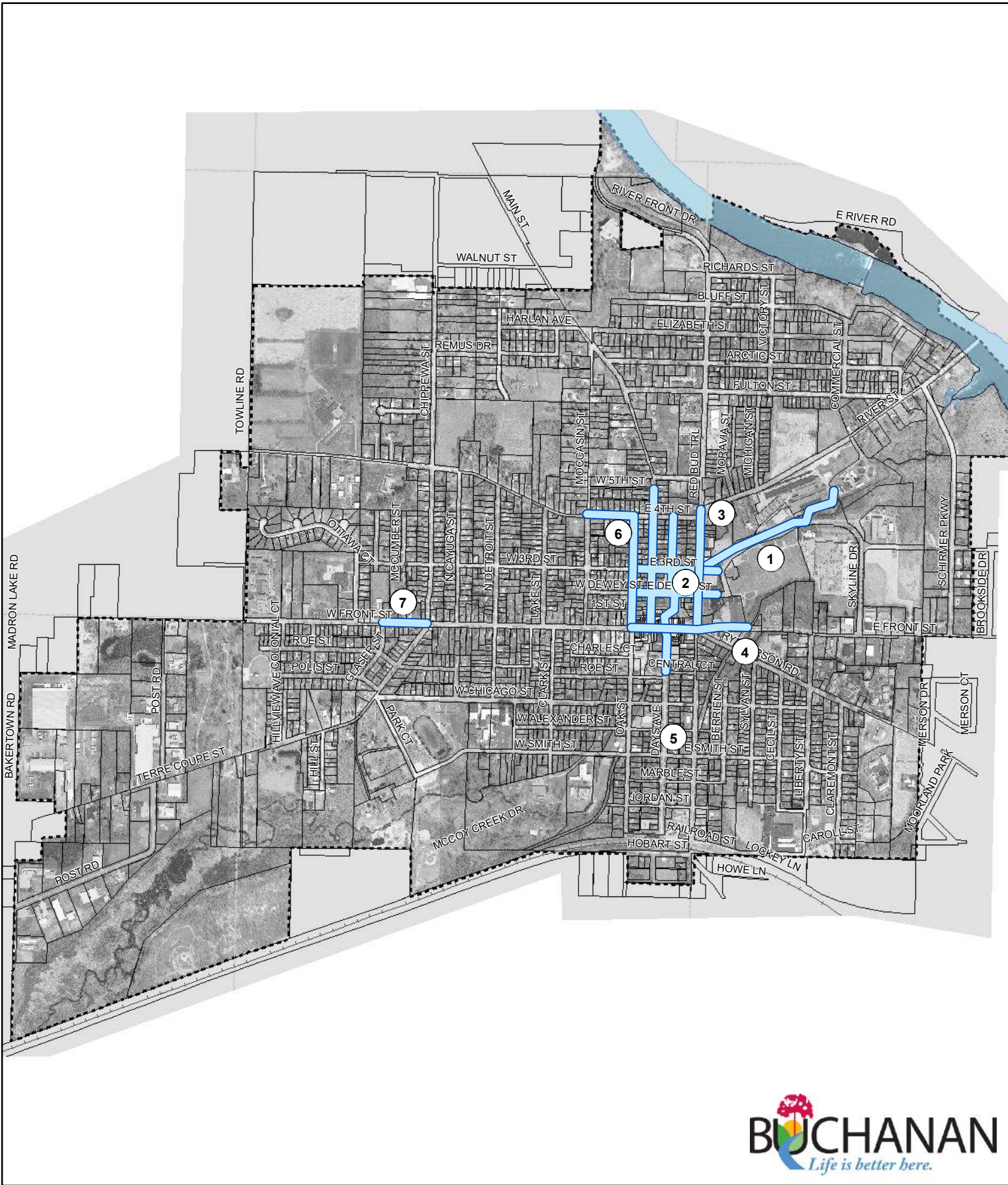


**LEGEND**

Project Area



SCALE: 1" = 1,500'



J:\GIS\_Client\Berrien-GD\Buchanan-GD\City\_Projects\2190800\_USDA\USDA Sanitary\Figure 4\_Proposed Projects.mxd - Jlenia - 7/10/2020 9:24:58 AM



CITY OF BUCHANAN  
USDA RD ENGINEERING REPORT

**FIGURE 4: PROPOSED PROJECTS**

JULY 2020  
Prein & Newhof  
2190800



**LEGEND**

 Project Area

0 1,500 3,000  
Feet

SCALE: 1" = 1,500'

# Appendix A

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## Water and Sewer Customer Rates

Billing Type	Amount of RTS Accts as of 1/6/16	Amount of RTS Accts as of 1/1/17	Amount of RTS Accts as of 1/1/18	Amount of RTS Accts as of 1/1/19	Amount of RTS Accts as of 1/1/2020	RTS Fee as of 7/1/20
City Residential 5/8" (CRS)	1605	1598	1590	1589	1584	\$33.70
City Water Only 5/8" (CWS)	39	37	38	37	37	\$14.09
City Sewer Only 5/8" (CSS)	1	2	2	2	2	\$19.61
City 1.5" (BW2)	16	16	16	16	16	\$168.48
City 2" (BW3)	16	18	17	16	17	\$269.57
City 2" Water Only (BW1)	3	3	3	3	3	\$112.75
City 3" (BW4)	3	3	4	4	4	\$539.15
City 4" (BW5)	2	2	2	2	2	\$842.42
City 6" (BW6)	1	1	1	1	1	\$1,684.84
TWP Residential 5/8" (TRS)	91	95	95	95	95	\$39.37
TWP Water Only 5/8" (TW1)	71	71	70	70	70	\$16.43
TWP Sewer Only 5/8" (TS1)	80	78	78	79	80	\$22.94
TWP 2" (TR4)	2	2	2	3	2	\$314.93
TWP 2" Water Only (TWS)	2	2	2	2	3	\$131.41
<b>TOTAL:</b>	<b>1932</b>	<b>1928</b>	<b>1920</b>	<b>1919</b>	<b>1916</b>	

THERE ARE 6 ACCTS WITH NO METERS THAT ARE FLAT RATES AND HAVE RTS & FP THEY ARE INCLUDED IN THESE TOTALS AND LISTED IN THE RIGHT BOTTOM CORNER

<u>Billing Item #'s</u>	<u>Billing Codes</u>	<u>Account Status</u>
1 – Water	0 – Do Not Bill	0 – Normal/Active
2 – Sewer	1 – Usage Based	1 – First Bil
3 – RTS – water & sewer	3 – Ongoing Flat	2 – No Bill
4 – RTS – water only		3 – Final Bill
5 – RTS – sewer only	<u>Cyle Code</u>	4 – Inactive with Balance
7 – BT – Buchanan Township	1 – All Accounts	5 – Inactive - Paid
8 – FP – future plant		6 – Inactive – No Bill

New Buchanan Township fee (BT): \$4.17 monthly to all Buchanan Township accounts

FP7 has one less than RTS because 16739 Huron has two accounts for the same meter. The Landfill is paying the water and the resident is paying the sewer. Therefore they have two separate RTS on chart, one for water only account and one for sewer only account. They only have one FP because we charge that per meter.

AS OF JANUARY 1, 2020	
Types of Accounts	Number of Accounts
Water & Sewer	1721
Water Only	113
Sewer Only	82
Sprinkler	201
<b>Total</b>	<b>2117</b>
Total Accts minus Sprinklers = <b>RTS Accts Billed (2117-201=1916)</b> (We do not bill RTS/FP on Sprinkler Accts)	
1916	

Future Plant	
CRS, CWS, CSS (1628)	FP1: \$.00
BW2 (16)	FP2: \$.00
BW3, BW1 (19)	FP3: \$.00
BW4 (4)	FP4: \$.00
BW5 (2)	FP5: \$.00
BW6 (1)	FP6: \$.00
TRS, TW1, TS1 (244)	FP7: \$.00
TR4, TWS (5)	FP8: \$.00

RATE CODES AND PRICES							
City or Township and Meter Equiv.	Type of Service	Rate Code	July 1 2016	July 1 2017	July 1 2018	July 1 2019	July 1 2020
City	Water	WC1	\$3.94	\$4.10	\$4.50	\$4.86	\$5.25
City	Sewer	SC1	\$7.10	\$7.38	\$7.68	\$8.72	\$9.42
Township	Water	WT1	\$4.59	\$4.77	\$5.27	\$5.70	\$6.16
Township	Sewer	ST1	\$8.32	\$8.65	\$9.00	\$10.22	\$11.04
City (1)	RTS 5/8",3/4", 1"	CRS	\$20.34	\$21.16	\$26.08	\$31.21	\$33.70
City (1)	RTS Water Only	CWS	\$9.41	\$9.79	\$12.08	\$13.05	\$14.09
City (1)	RTS Sewer Only	CSS	\$10.93	\$11.37	\$14.00	\$18.16	\$19.61
City (5)	RTS 1.5"	BW2	\$101.76	\$105.83	\$130.18	\$168.48	\$168.48
City (8)	RTS 2"	BW3	\$162.79	\$169.30	\$208.25	\$269.57	\$269.57
City (8)	RTS 2" Water Only	BW1	\$75.22	\$78.23	\$96.52	\$112.75	\$112.75
City (16)	RTS 3"	BW4	\$325.59	\$338.61	\$416.50	\$539.15	\$539.15
City (25)	RTS 4"	BW5	\$508.75	\$529.10	\$650.80	\$842.42	\$842.42
City (50)	RTS 6"	BW6	\$1,017.50	\$1,058.20	\$1,301.60	\$1,684.84	\$1,684.84
City (115)	RTS 10"	BW7	\$2,339.10	\$2,433.40	\$2,999.00	\$3,875.50	\$3,875.50
Township (5)	RTS 1.5"	TR2	\$118.95	\$123.70	\$152.20	\$196.85	\$196.85
Township (25)	RTS 4"	TR3	\$594.75	\$618.50	\$761.00	\$984.25	\$984.25
Township (1)	RTS 5/8",3/4", 1"	TRS	\$23.79	\$24.74	\$30.44	\$39.37	\$39.37
Township (1)	RTS Water Only	TW1	\$11.00	\$11.44	\$14.08	\$16.43	\$16.43
Township (1)	RTS Sewer Only	TS1	\$12.79	\$13.30	\$16.37	\$22.94	\$22.94
Township (8)	RTS 2"	TR4	\$190.34	\$197.95	\$243.52	\$314.93	\$314.93
Township (8)	RTS 2" Water Only	TWS	\$87.99	\$91.51	\$112.64	\$131.41	\$131.41

**FLAT RATES:**

BACK-4779-01	Sewer Only	9 units	TS1 (RTS)	FP7 (FP)
BACK-4801-01	Sewer Only	9 units	TS1 (RTS)	FP7 (FP)
FROW-1031-01	Sewer Only	6 units	CSS (RTS)	FP1 (FP)
MEAD-15845-01	Sewer Only	9 units	TS1 (RTS)	FP7 (FP)
RIVS-16030-02	Sewer Only	9 units	TS1 (RTS)	FP7 (FP)
TULI-4711-01	Sewer Only	4 units	TS1 (RTS)	FP7 (FP)

# Appendix B

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## Engineer's Opinion of Probable Costs

Description	2019 Construction	2023 Construction Costs			
	Costs	Total	Sanitary	Water Main	Road/General
Project #100 - Interceptor to WWTP	\$1,259,000	\$1,417,000	\$1,417,000	\$0	\$0
Project #110 - E Dewey Street Area (Main Street, Short Street, E Third	\$3,626,000	\$4,082,000	\$1,799,000	\$1,247,000	\$1,036,000
Project #120 - Red Bud Trail (From Chicago to Elizabeth)	\$1,622,000	\$1,826,000	\$854,000	\$675,000	\$297,000
Project #130 - Front Street (From Chippewa to East of Red Bud)	\$1,575,000	\$1,773,000	\$770,000	\$681,000	\$322,000
Project #140 - Days Avenue (From Front to Carroll)	\$0	\$0	\$0	\$0	\$0
Project #150 - Oak Street (From Alexander to W Fourth St)	\$1,499,000	\$1,687,000	\$837,000	\$850,000	\$0
Forcemain	\$130,000	\$146,000	\$146,000	\$0	\$0
Well No 3 and Iron Removal WTP	\$4,409,000	\$4,962,000	\$0	\$4,962,000	\$0
<b>Total</b>	\$14,120,000	\$15,893,000	\$5,823,000	\$8,415,000	\$1,655,000



Owner:

City of Buchanan

Project Title:

Project #100 - Interceptor to WWTP

Date:

July 2020

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
<b><u>Sanitary Sewer</u></b>					
1	Remove Sanitary Structures	11	EA	\$500.00	\$5,500.00
2	Abandon Sanitary Sewer	1,960	LF	\$12.00	\$23,500.00
3	5' Sanitary Manhole	13	EA	\$6,000.00	\$78,000.00
4	Sanitary Sewer, 24 inch	2,100	LF	\$175.00	\$367,500.00
5	Connect to headworks	1	LS	\$10,000.00	\$10,000.00
6	Connect Adjacent Sewers	2	EA	\$10,000.00	\$20,000.00
7	Creek Crossing	2	EA	\$20,000.00	\$40,000.00
8	Permanent Dewatering System	1,900	LF	\$30.00	\$57,000.00
9	Bypass Pumping	21	Days	\$3,500.00	\$73,500.00
<b>Sanitary Subtotal</b>					<b>\$675,000.00</b>
<b><u>Misc. / Restoration</u></b>					
10	Mobilization / General Conditions (5%)	1	LS	\$60,000.00	\$60,000.00
11	Remove Concrete Sidewalk	100	SYD	\$7.00	\$700.00
12	Remove Concrete Curb and Gutter	3,400	LF	\$7.00	\$23,800.00
13	Remove HMA Pavement	6,178	SY	\$4.00	\$24,700.00
14	Subgrade Undercutting	200	CY	\$20.00	\$4,000.00
15	Subbase, CIP	2,059	CY	\$12.00	\$24,700.00
16	Machine Grading Modified	18	STA	\$3,000.00	\$52,800.00
17	6" HMA (Primary Streets)	2,243	TON	\$90.00	\$201,800.00
18	8" Aggregate Base, Modified	6,178	SYD	\$12.00	\$74,100.00
19	Concrete Curb & Gutter	3,460	LF	\$15.00	\$51,900.00
20	Pavement Striping	1	LS	\$3,520.00	\$3,500.00

Owner:

City of Buchanan

Project Title:

Project #100 - Interceptor to WWTP

Date:

July 2020

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
21	Concrete Sidewalk	900	SF	\$6.00	\$5,400.00
22	ADA Plates	50	SF	\$40.00	\$2,000.00
23	Restoration (topsoil, seed, mulch)	20	STA	\$750.00	\$15,000.00
24	SESC	1	LS	\$5,000.00	\$5,000.00
25	Tree Removal	500	LF	\$40.00	\$20,000.00
26	Traffic Control	1	LS	\$15,000.00	\$15,000.00
	<b>Restoration Subtotal</b>				<b>\$584,400.00</b>
<b>Subtotal</b>					<b>\$1,259,400.00</b>
<b>Project Total</b>					<b>\$1,259,400.00</b>
Project Costs by Funding Source					
Percentage of Restoration Allocated to Funding Source					
100.00%				Sanitary Water Road/General	\$1,259,400.00

Owner:

City of Buchanan

Project Title:

Project #110 - E Dewey Street Area (Main Street, Short Street, E Third Street)

Date:

July 2020

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
<b><u>Sanitary Sewer</u></b>					
1	Remove Sanitary Structures	16	EA	\$500.00	\$8,000.00
2	Abandon Sanitary Sewer	3,139	LF	\$12.00	\$37,700.00
3	4' Sanitary Manhole	16	EA	\$5,000.00	\$80,000.00
4	Sanitary Sewer, 10 inch	1,123	LF	\$90.00	\$101,100.00
5	Sanitary Sewer, 12 inch	920	LF	\$115.00	\$105,800.00
6	Sanitary Sewer, 18 inch	1,096	LF	\$125.00	\$137,000.00
7	Sanitary Lateral	40	EA	\$2,750.00	\$110,000.00
8	Creek Crossing	1	LS	\$30,000.00	\$30,000.00
9	Connect Adjacent Sewers	2	EA	\$10,000.00	\$20,000.00
10	Permanent Dewatering System	2,721	LF	\$30.00	\$81,600.00
11	Bypass Pumping	20	Days	\$3,500.00	\$70,000.00
<b>Sanitary Subtotal</b>					<b>\$781,200.00</b>
<b><u>Storm</u></b>					
12	Remove Storm Structures	40	EA	\$500.00	\$20,000.00
13	Abandon Storm Sewer	4,235	LF	\$12.00	\$50,800.00
14	2' Dia. Storm Sewer Inlet	31	EA	\$2,000.00	\$62,000.00
15	4' Dia. Storm Sewer Catch Basin	5	EA	\$3,000.00	\$15,000.00
16	6' Dia. Storm Sewer Catch Basin	4	EA	\$4,000.00	\$16,000.00
17	12" Storm Sewer	1,674	LF	\$45.00	\$75,300.00
18	15" Storm Sewer	988	LF	\$55.00	\$54,300.00
19	18" Storm Sewer	796	LF	\$75.00	\$59,700.00
20	24" Storm Sewer	552	LF	\$115.00	\$63,500.00

Owner:

City of Buchanan

Project Title:

Project #110 - E Dewey Street Area (Main Street, Short Street, E Third Street)

Date:

July 2020

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
21	42" Storm Sewer	225	LF	\$150.00	\$33,800.00
	<b>Storm Subtotal</b>				<b>\$450,400.00</b>
	<b><u>Water Main</u></b>				
22	Remove Hydrants	8	EA	\$500.00	\$4,000.00
23	Abandon Water Main	3,025	LF	\$12.00	\$36,300.00
24	8" DI Water Main	3,025	EA	\$90.00	\$272,300.00
25	8" Valve and Box	20	EA	\$2,000.00	\$40,000.00
26	5" Hydrant, Complete	8	LF	\$4,000.00	\$32,000.00
27	Water Services	45	EA	\$2,500.00	\$112,500.00
28	Creek Crossing	1	EA	\$20,000.00	\$20,000.00
29	Connections to Existing Main	10	EA	\$2,500.00	\$25,000.00
	<b>Water Main Subtotal</b>				<b>\$542,100.00</b>
	<b><u>Misc. / Restoration</u></b>				
30	Mobilization / General Conditions (5%)	1	LS	\$173,000.00	\$173,000.00
31	Remove Concrete Sidewalk	5,667	SY	\$7.00	\$39,700.00
32	Remove Concrete Curb and Gutter	10,200	LF	\$7.00	\$71,400.00
33	Remove HMA Pavement	17,000	SY	\$4.00	\$68,000.00
34	Subbase, CIP	5,667	CY	\$12.00	\$68,000.00
35	Subgrade Undercutting	550	CY	\$20.00	\$11,000.00
36	Machine Grading Modified	51	STA	\$3,000.00	\$153,000.00
37	4" HMA (Local Streets)	4,114	TON	\$90.00	\$370,300.00
38	8" Aggregate Base Modified	17,000	SY	\$12.00	\$204,000.00
39	Concrete Curb & Gutter	10,200	LF	\$15.00	\$153,000.00
40	Pavement Striping	1	LS	\$10,200.00	\$10,200.00
41	Concrete Sidewalk	51,000	SF	\$6.00	\$306,000.00

## Estimate of Probable Cost

Owner:

City of Buchanan

Project Title:

Project #110 - E Dewey Street Area (Main Street, Short Street, E Third Street)

Date:

July 2020

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
42	ADA Plates	320	SF	\$40.00	\$12,800.00
43	Driveway	28	EA	\$1,500.00	\$42,000.00
44	Restoration (topsoil, seed, mulch)	51	STA	\$750.00	\$38,300.00
45	SESC	1	LS	\$13,000.00	\$13,000.00
46	Traffic Control	1	LS	\$30,000.00	\$30,000.00
47	Decorative Sidewalk Premium	3,000	SF	\$3.00	\$9,000.00
48	Streetscape (Main St.) Allowance	200	FT	\$400.00	\$80,000.00
	<b>Restoration Subtotal</b>				<b>\$1,852,700.00</b>
Subtotal					\$3,626,400.00
<b>Project Total</b>					<b>\$3,626,400.00</b>
Project Costs by Funding Source					
Percentage of Restoration Allocated to Funding Source					
		44%	Sanitary		\$1,597,200.00
		31%	Water		\$1,108,300.00
		25%	Road/General		\$920,900.00

## Estimate of Probable Cost

Owner:

City of Buchanan

Project Title:

Project #120 - Red Bud Trail (From Chicago to Elizabeth)

Date:

July 2020

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount	First Phase	Second Phase
<b><u>Sanitary Sewer</u></b>							
1	Remove Sanitary Structures	14	EA	\$500.00	\$7,000.00	\$2,500.00	\$4,500.00
2	Abandon Sanitary Sewer	3,645	LF	\$12.00	\$43,700.00	\$15,800.00	\$27,900.00
3	4' Sanitary Manhole	14	EA	\$5,000.00	\$70,000.00	\$25,300.00	\$44,700.00
4	Sanitary Sewer, 10 inch	3,645	LF	\$90.00	\$328,100.00	\$118,500.00	\$209,600.00
5	Sanitary Lateral	52	EA	\$2,750.00	\$143,000.00	\$51,600.00	\$91,400.00
6	Connect Adjacent Sewers	10	EA	\$10,000.00	\$100,000.00	\$36,100.00	\$63,900.00
7	Creek Crossing	1	EA	\$30,000.00	\$30,000.00	\$10,800.00	\$19,200.00
8	Permanent Dewatering System	1,345	LF	\$30.00	\$40,400.00	\$14,600.00	\$25,800.00
9	Bypass Pumping	19	Days	\$3,500.00	\$66,500.00	\$24,000.00	\$42,500.00
<b>Sanitary Subtotal</b>					<b>\$828,700.00</b>	<b>\$299,200.00</b>	<b>\$529,500.00</b>
<b><u>Storm</u></b>							
10	Remove Storm Structures	58	EA	\$500.00	\$29,000.00	\$10,500.00	\$18,500.00
11	Abandon Storm Sewer	5,000	LF	\$12.00	\$60,000.00	\$21,700.00	\$38,300.00
12	2' Dia. Storm Sewer Inlet	34	EA	\$2,000.00	\$68,000.00	\$24,600.00	\$43,400.00
13	4' Dia. Storm Sewer Catch Basin	18	EA	\$3,000.00	\$54,000.00	\$19,500.00	\$34,500.00
14	6' Dia. Storm Sewer Catch Basin	6	EA	\$4,000.00	\$24,000.00	\$24,000.00	
15	12" Storm Sewer	1,184	LF	\$45.00	\$53,300.00	\$19,200.00	\$34,100.00
16	15" Storm Sewer	1,097	LF	\$55.00	\$60,300.00		\$60,300.00
17	18" Storm Sewer	498	LF	\$75.00	\$37,400.00		\$37,400.00
18	21" Storm Sewer	1,171	LF	\$100.00	\$117,100.00	\$19,500.00	\$97,600.00
19	24" Storm Sewer	669	LF	\$115.00	\$76,900.00	\$76,900.00	
20	30" Storm Sewer	358	LF	\$125.00	\$44,800.00	\$44,800.00	
21	42" Storm Sewer	22	LF	\$150.00	\$3,300.00	\$3,300.00	
<b>Storm Subtotal</b>					<b>\$628,100.00</b>	<b>\$264,000.00</b>	<b>\$364,100.00</b>
<b><u>Water Main</u></b>							
22	Remove Hydrants	8	EA	\$500.00	\$4,000.00	\$1,400.00	\$2,600.00
23	Abandon Water Main	3,510	LF	\$12.00	\$42,100.00	\$15,200.00	\$26,900.00
24	8" DI Water Main	3,510	EA	\$90.00	\$315,900.00	\$114,100.00	\$201,800.00
25	8" Valve and Box	25	EA	\$2,000.00	\$50,000.00	\$18,100.00	\$31,900.00
26	5" Hydrant, Complete	8	LF	\$4,000.00	\$32,000.00	\$11,600.00	\$20,400.00
27	Water Services	52	EA	\$2,500.00	\$130,000.00	\$46,900.00	\$83,100.00
28	Creek Crossing	1	EA	\$20,000.00	\$20,000.00	\$7,200.00	\$12,800.00

## Estimate of Probable Cost

Owner:

City of Buchanan

Project Title:

Project #120 - Red Bud Trail (From Chicago to Elizabeth)

Date:

July 2020

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount	First Phase	Second Phase
29	Connections to Existing Main	10	EA	\$2,500.00	\$25,000.00	\$9,000.00	\$16,000.00
	<b>Water Main Subtotal</b>				<b>\$619,000.00</b>	<b>\$223,500.00</b>	<b>\$395,500.00</b>
	<b><u>Misc. / Restoration</u></b>						
30	Mobilization / General Conditions (5%)	1	LS	\$195,000.00	\$195,000.00	\$70,400.00	\$124,600.00
31	Remove Concrete Sidewalk	4,050	SY	\$7.00	\$28,400.00	\$10,300.00	\$18,100.00
32	Remove Concrete Curb and Gutter	7,290	LF	\$7.00	\$51,000.00	\$18,400.00	\$32,600.00
33	Remove HMA Pavement	17,820	SY	\$4.00	\$71,300.00	\$25,700.00	\$45,600.00
34	Subbase, CIP	5,940	CY	\$12.00	\$71,300.00	\$25,700.00	\$45,600.00
35	Subgrade Undercutting	600	CY	\$20.00	\$12,000.00	\$4,300.00	\$7,700.00
36	Machine Grading Modified	36	STA	\$3,000.00	\$109,400.00	\$39,500.00	\$69,900.00
37	6" HMA (Primary Streets)	6,469	TON	\$90.00	\$582,200.00	\$210,200.00	\$372,000.00
38	8" Aggregate Base Modified	17,820	SY	\$12.00	\$213,800.00	\$77,200.00	\$136,600.00
39	Concrete Curb & Gutter	7,290	LF	\$15.00	\$109,400.00	\$39,500.00	\$69,900.00
40	Pavement Striping	1	LS	\$7,290.00	\$7,300.00	\$2,600.00	\$4,700.00
41	Concrete Sidewalk	36,450	SF	\$6.00	\$218,700.00	\$79,000.00	\$139,700.00
42	ADA Plates	560	SF	\$40.00	\$22,400.00	\$8,100.00	\$14,300.00
43	Driveway	52	EA	\$1,500.00	\$78,000.00	\$28,200.00	\$49,800.00
44	Restoration (topsoil, seed, mulch)	36	STA	\$750.00	\$27,300.00	\$9,900.00	\$17,400.00
45	SESC	1	LS	\$10,000.00	\$10,000.00	\$3,600.00	\$6,400.00
46	Traffic Control	1	LS	\$30,000.00	\$30,000.00	\$10,800.00	\$19,200.00
47	Decorative Sidewalk Premium	4,000	SF	\$3.00	\$12,000.00	\$12,000.00	
48	Streetscape Allowance	400	FT	\$400.00	\$160,000.00	\$160,000.00	
	<b>Restoration Subtotal</b>				<b>\$2,009,500.00</b>	<b>\$835,400.00</b>	<b>\$1,174,100.00</b>
	<b>Subtotal</b>				<b>\$4,085,300.00</b>	<b>\$1,622,100.00</b>	<b>\$2,463,200.00</b>
	<b>Project Total</b>				<b>\$4,085,300.00</b>	<b>\$1,622,100.00</b>	<b>\$2,463,200.00</b>
	Project Costs by Funding Source						
	Percentage of Restoration Allocated to Funding Source						
		55%	Sanitary		\$1,933,900.00	\$758,700.00	\$1,175,300.00
		45%	Water		\$1,523,300.00	\$599,400.00	\$923,800.00
			Road/General		\$628,100.00	\$264,000.00	\$364,100.00

## Estimate of Probable Cost

Owner:

City of Buchanan

Project Title:

Project #130 - Front Street (From Chippewa to East of Red Bud)

Date:

July 2020

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount	First Phase	Second Phase
<b><u>Sanitary Sewer</u></b>							
1	Remove Sanitary Structures	14	EA	\$500.00	\$7,000.00	\$1,800.00	\$5,300.00
2	Abandon Sanitary Sewer	3,114	LF	\$12.00	\$37,400.00	\$9,400.00	\$28,100.00
3	4' Sanitary Manhole	14	EA	\$5,000.00	\$70,000.00	\$17,500.00	\$52,500.00
4	Sanitary Sewer, 8 inch	310	LF	\$80.00	\$24,800.00	\$6,200.00	\$18,600.00
5	Sanitary Sewer, 12 inch	2,804	LF	\$115.00	\$322,500.00	\$80,600.00	\$241,900.00
6	Sanitary Lateral	69	EA	\$2,750.00	\$189,800.00	\$47,500.00	\$142,400.00
7	Connect Adjacent Sewers	8	EA	\$10,000.00	\$80,000.00	\$20,000.00	\$60,000.00
8	Permanent Dewatering System	980	LF	\$30.00	\$29,400.00	\$7,400.00	\$22,100.00
9	Bypass Pumping	16	Days	\$3,500.00	\$56,000.00	\$14,000.00	\$42,000.00
<b>Sanitary Subtotal</b>					<b>\$816,900.00</b>	<b>\$204,400.00</b>	<b>\$612,900.00</b>
<b><u>Storm</u></b>							
10	Remove Storm Structures	51	EA	\$500.00	\$25,500.00	\$9,400.00	\$16,100.00
11	Abandon Storm Sewer	5,237	LF	\$12.00	\$62,800.00	\$23,100.00	\$39,700.00
12	2' Dia. Storm Sewer Inlet	34	EA	\$2,000.00	\$68,000.00	\$12,500.00	\$55,500.00
13	4' Dia. Storm Sewer Catch Basin	13	EA	\$3,000.00	\$39,000.00	\$7,200.00	\$31,800.00
14	6' Dia. Storm Sewer Catch Basin	4	EA	\$4,000.00	\$16,000.00	\$16,000.00	
15	12" Storm Sewer	1,306	LF	\$45.00	\$58,800.00	\$7,700.00	\$51,100.00
16	15" Storm Sewer	997	LF	\$55.00	\$54,800.00		\$54,800.00
17	18" Storm Sewer	100	LF	\$75.00	\$7,500.00		\$7,500.00
18	24" Storm Sewer	2,189	LF	\$115.00	\$251,700.00	\$125,900.00	\$125,900.00
19	36" Storm Sewer	645	LF	\$130.00	\$83,900.00	\$83,900.00	
<b>Storm Subtotal</b>					<b>\$668,000.00</b>	<b>\$285,700.00</b>	<b>\$382,400.00</b>
<b><u>Water Main</u></b>							
20	Remove Hydrants	6	EA	\$500.00	\$3,000.00	\$800.00	\$2,300.00
21	Abandon Water Main	3,200	LF	\$12.00	\$38,400.00	\$9,600.00	\$28,800.00
22	8" DI Water Main	3,200	EA	\$90.00	\$288,000.00	\$72,000.00	\$216,000.00
23	8" Valve and Box	17	EA	\$2,000.00	\$34,000.00	\$8,500.00	\$25,500.00
24	5" Hydrant, Complete	10	LF	\$4,000.00	\$40,000.00	\$10,000.00	\$30,000.00
25	Water Services	69	EA	\$2,500.00	\$172,500.00	\$43,100.00	\$129,400.00
26	Creek Crossing	3	EA	\$20,000.00	\$60,000.00	\$60,000.00	
27	Connections to Existing Main	14	EA	\$2,500.00	\$35,000.00	\$8,800.00	\$26,300.00
<b>Water Main Subtotal</b>					<b>\$670,900.00</b>	<b>\$212,800.00</b>	<b>\$458,300.00</b>
<b><u>Misc. / Restoration</u></b>							
28	Mobilization / General Conditions (5%)	1	LS	\$212,000.00	\$212,000.00	\$53,000.00	\$159,000.00
29	Remove Concrete Sidewalk	5,211	SY	\$7.00	\$36,500.00	\$9,100.00	\$27,400.00



**Estimate of Probable Cost**

Owner:

City of Buchanan

Project Title:

Project #130 - Front Street (From Chippewa to East of Red Bud)

Date:

July 2020

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount	First Phase	Second Phase
30	Remove Concrete Curb and Gutter	7,580	LF	\$7.00	\$53,100.00	\$13,300.00	\$39,800.00
31	Remove HMA Pavement	16,462	SY	\$4.00	\$65,800.00	\$16,500.00	\$49,400.00
32	Subbase, CIP	5,487	CY	\$12.00	\$65,800.00	\$16,500.00	\$49,400.00
33	Subgrade Undercutting	550	CY	\$20.00	\$11,000.00	\$2,800.00	\$8,300.00
34	Machine Grading Modified	38	STA	\$3,000.00	\$113,700.00	\$28,400.00	\$85,300.00
35	6" HMA (Primary Streets)	5,976	TON	\$90.00	\$537,800.00	\$134,500.00	\$403,400.00
36	8" Aggregate Base Modified	16,462	SY	\$12.00	\$197,500.00	\$49,400.00	\$148,100.00
37	Concrete Curb & Gutter	7,580	LF	\$15.00	\$113,700.00	\$28,400.00	\$85,300.00
38	Pavement Striping	1	LS	\$7,580.00	\$7,600.00	\$1,900.00	\$5,700.00
39	Concrete Sidewalk	46,900	SF	\$6.00	\$281,400.00	\$70,400.00	\$211,100.00
40	ADA Plates	540	SF	\$40.00	\$21,600.00	\$5,400.00	\$16,200.00
41	Driveway	48	EA	\$1,500.00	\$72,000.00	\$18,000.00	\$54,000.00
42	Restoration (topsoil, seed, mulch)	38	STA	\$750.00	\$28,400.00	\$7,100.00	\$21,300.00
43	SESC	1	LS	\$10,000.00	\$10,000.00	\$2,500.00	\$7,500.00
44	Traffic Control	1	LS	\$30,000.00	\$30,000.00	\$7,500.00	\$22,500.00
45	Decorative Sidewalk Premium	10,000	SF	\$3.00	\$30,000.00	\$7,500.00	\$22,500.00
46	Streetscape Allowance (Front St.)	1,000	FT	\$400.00	\$400,000.00	\$400,000.00	
<b>Restoration Subtotal</b>					<b>\$2,287,900.00</b>	<b>\$872,200.00</b>	<b>\$1,416,200.00</b>
<b>Subtotal</b>					<b>\$4,443,700.00</b>	<b>\$1,575,100.00</b>	<b>\$2,869,800.00</b>
<b>Project Total</b>					<b>\$4,443,700.00</b>	<b>\$1,575,100.00</b>	<b>\$2,869,800.00</b>
Project Costs by Funding Source							
Percentage of Restoration Allocated to Funding Source							
	55.00%		Sanitary	\$2,075,245.00	\$684,100.00	\$1,391,800.00	
	45.00%		Water	\$1,700,455.00	\$605,300.00	\$1,095,600.00	
			Road/General	\$668,000.00	\$285,700.00	\$382,400.00	

Owner:

City of Buchanan

Project Title:

Project #140 - Days Avenue (From Front to Carroll)

Date:

July 2020

Project #:

M19094

Item

No.	Description	Quantity	Unit	Unit Price	Total Amount
<b><u>Sanitary Sewer</u></b>					
1	Remove Sanitary Structures	9	EA	\$500.00	\$4,500.00
2	Abandon Sanitary Sewer	2,545	LF	\$12.00	\$30,500.00
3	4' Sanitary Manhole	9	EA	\$5,000.00	\$45,000.00
4	Sanitary Sewer, 8 inch	165	LF	\$80.00	\$13,200.00
5	Sanitary Sewer, 10 inch	880	LF	\$90.00	\$79,200.00
6	Sanitary Sewer, 12 inch	1,500	LF	\$115.00	\$172,500.00
7	Sanitary Lateral	52	EA	\$2,750.00	\$143,000.00
8	Connect Adjacent Sewers	3	EA	\$10,000.00	\$30,000.00
9	Permanent Dewatering System	880	LF	\$30.00	\$26,400.00
10	Bypass Pumping	13	Days	\$3,500.00	\$45,500.00
<b>Sanitary Subtotal</b>					<b>\$589,800.00</b>
<b><u>Storm</u></b>					
11	Remove Storm Structures	1	EA	\$500.00	\$500.00
12	Abandon Storm Sewer	400	LF	\$12.00	\$4,800.00
13	4' Dia. Storm Sewer Catch Basin	1	EA	\$3,000.00	\$3,000.00
14	24" Storm Sewer	400	LF	\$115.00	\$46,000.00
<b>Storm Subtotal</b>					<b>\$54,300.00</b>
<b><u>Misc. / Restoration</u></b>					
15	Mobilization / General Conditions (5%)	1	LS	\$76,000.00	\$76,000.00
16	Remove Concrete Sidewalk	707	SY	\$7.00	\$4,900.00
17	Remove Concrete Curb and Gutter	5,770	LF	\$7.00	\$40,400.00

Owner:

City of Buchanan

Project Title:

Project #140 - Days Avenue (From Front to Carroll)

Date:

July 2020

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
18	Remove HMA Pavement	8,259	SY	\$4.00	\$33,000.00
19	Subbase, CIP	2,753	CY	\$12.00	\$33,000.00
20	Subgrade Undercutting	250	CY	\$20.00	\$5,000.00
21	Machine Grading Modified	29	STA	\$3,000.00	\$86,600.00
22	4" HMA (Local Streets)	1,999	TON	\$90.00	\$179,900.00
23	8" Aggregate Base Modified	8,259	SY	\$12.00	\$99,100.00
24	Concrete Curb & Gutter	5,770	LF	\$15.00	\$86,600.00
25	Pavement Striping	1	LS	\$5,770.00	\$5,800.00
26	Concrete Sidewalk	6,363	SF	\$6.00	\$38,200.00
27	ADA Plates	220	SF	\$40.00	\$8,800.00
28	Driveway	52	EA	\$1,500.00	\$78,000.00
29	Restoration (topsoil, seed, mulch)	29	STA	\$750.00	\$21,600.00
30	SESC	1	LS	\$8,000.00	\$8,000.00
31	Traffic Control	1	LS	\$15,000.00	\$15,000.00
32	Decorative Sidewalk Premium	1,000	SF	\$3.00	\$3,000.00
33	Streetscape Allowance (Front St.)	300	FT	\$400.00	\$120,000.00
	<b>Restoration Subtotal</b>				<b>\$942,900.00</b>
<b>Subtotal</b>					<b>\$1,587,000.00</b>
<b>Project Total</b>					<b>\$1,587,000.00</b>
Project Costs by Funding Source					
Percentage of Restoration Allocated to Funding Source					
100%				Sanitary	\$1,532,700.00
				Water	
				Road/General	\$54,300.00

## Estimate of Probable Cost

Owner:

City of Buchanan

Project Title:

Project #150 - Oak Street (From Alexander to W Fourth St)

Date:

October 2019

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount	First Phase	Second Phase
<b><u>Sanitary Sewer</u></b>							
1	Remove Sanitary Structures	10	EA	\$500.00	\$5,000.00	\$3,100.00	\$1,900.00
2	Abandon Sanitary Sewer	2,865	LF	\$12.00	\$34,400.00	\$21,500.00	\$12,900.00
3	4' Sanitary Manhole	10	EA	\$5,000.00	\$50,000.00	\$31,300.00	\$18,800.00
4	Sanitary Sewer, 10 inch	2,450	LF	\$90.00	\$220,500.00	\$137,800.00	\$82,700.00
5	Sanitary Sewer, 12 inch	415	LF	\$115.00	\$47,700.00	\$29,800.00	\$17,900.00
6	Sanitary Lateral	42	EA	\$2,750.00	\$115,500.00	\$72,200.00	\$43,300.00
7	Connect Adjacent Sewers	4	EA	\$10,000.00	\$40,000.00	\$25,000.00	\$15,000.00
8	Creek Crossing	1	EA	\$20,000.00	\$20,000.00		\$20,000.00
9	Permanent Dewatering System	1,685	LF	\$30.00	\$50,600.00	\$31,600.00	\$19,000.00
10	Bypass Pumping	15	Days	\$3,500.00	\$52,500.00	\$32,800.00	\$19,700.00
<b>Sanitary Subtotal</b>					<b>\$636,200.00</b>	<b>\$385,100.00</b>	<b>\$251,200.00</b>
<b><u>Water Main</u></b>							
11	Remove Hydrants	6	EA	\$500.00	\$3,000.00	\$1,900.00	\$1,100.00
12	Abandon Water Main	3,100	LF	\$12.00	\$37,200.00	\$23,300.00	\$14,000.00
13	12" DI Water Main	3,100	EA	\$115.00	\$356,500.00	\$222,800.00	\$133,700.00
14	12" Valve and Box	16	LF	\$3,500.00	\$56,000.00	\$35,000.00	\$21,000.00
15	5" Hydrant, Complete	10	LF	\$4,000.00	\$40,000.00	\$25,000.00	\$15,000.00
16	Water Services	42	EA	\$2,500.00	\$105,000.00	\$65,600.00	\$39,400.00
17	Creek Crossing	1	EA	\$20,000.00	\$20,000.00		\$20,000.00
18	Connections to Existing Main	15	EA	\$2,500.00	\$37,500.00	\$23,400.00	\$14,100.00
<b>Water Main Subtotal</b>					<b>\$655,200.00</b>	<b>\$397,000.00</b>	<b>\$258,300.00</b>
<b><u>Storm</u></b>							
19	Remove Storm Structures	12	EA	\$500.00	\$6,000.00		\$6,000.00
20	Abandon Storm Sewer	690	LF	\$12.00	\$8,300.00		\$8,300.00
21	2' Dia. Storm Sewer Inlet	7	EA	\$2,000.00	\$14,000.00		\$14,000.00
22	4' Dia. Storm Sewer Catch Basin	6	EA	\$3,000.00	\$18,000.00		\$18,000.00
23	12" Storm Sewer	580	LF	\$45.00	\$26,100.00		\$26,100.00
24	18" Storm Sewer	110	LF	\$75.00	\$8,300.00		\$8,300.00
<b>Storm Subtotal</b>					<b>\$80,700.00</b>		<b>\$80,700.00</b>
<b><u>Misc. / Restoration</u></b>							
25	Mobilization / General Conditions (5%)	1	LS	\$120,000.00	\$120,000.00	\$75,000.00	\$45,000.00
26	Remove Concrete Sidewalk	3,567	SY	\$7.00	\$25,000.00	\$15,600.00	\$9,400.00
27	Remove Concrete Curb and Gutter	6,420	LF	\$7.00	\$44,900.00	\$28,100.00	\$16,800.00
28	Remove HMA Pavement	10,127	SY	\$4.00	\$40,500.00	\$25,300.00	\$15,200.00
29	Subbase, CIP	3,376	CY	\$12.00	\$40,500.00	\$25,300.00	\$15,200.00

**Estimate of Probable Cost**

Owner:

City of Buchanan

Project Title:

Project #150 - Oak Street (From Alexander to W Fourth St)

Date:

October 2019

Project #:

M19094

Item No.	Description	Quantity	Unit	Unit Price	Total Amount	First Phase	Second Phase
30	Subgrade Undercutting	300	CY	\$20.00	\$6,000.00	\$3,800.00	\$2,300.00
31	Machine Grading Modified	32	STA	\$3,000.00	\$96,300.00	\$60,200.00	\$36,100.00
32	4" HMA (Local Streets)	2,451	TON	\$90.00	\$220,600.00	\$137,900.00	\$82,700.00
33	8" Aggregate Base Modified	10,127	SY	\$12.00	\$121,500.00	\$75,900.00	\$45,600.00
34	Concrete Curb & Gutter	6,420	LF	\$15.00	\$96,300.00	\$60,200.00	\$36,100.00
35	Pavement Striping	1	LS	\$6,420.00	\$6,400.00	\$4,000.00	\$2,400.00
36	Concrete Sidewalk	32,100	SF	\$6.00	\$192,600.00	\$120,400.00	\$72,200.00
37	ADA Plates	640	SF	\$40.00	\$25,600.00	\$16,000.00	\$9,600.00
38	Driveway	42	EA	\$1,500.00	\$63,000.00	\$39,400.00	\$23,600.00
39	Restoration (topsoil, seed, mulch)	32	STA	\$750.00	\$24,100.00	\$15,100.00	\$9,000.00
40	SESC	1	LS	\$9,000.00	\$9,000.00	\$5,600.00	\$3,400.00
41	Traffic Control	1	LS	\$15,000.00	\$15,000.00	\$9,400.00	\$5,600.00
<b>Restoration Subtotal</b>					<b>\$1,147,300.00</b>	<b>\$717,200.00</b>	<b>\$430,200.00</b>
<b>Subtotal</b>					<b>\$2,519,400.00</b>	<b>\$1,499,300.00</b>	<b>\$1,020,400.00</b>
<b>Project Total</b>					<b>\$2,519,400.00</b>	<b>\$1,499,300.00</b>	<b>\$1,020,400.00</b>
Project Costs by Funding Source							
Percentage of Restoration Allocated to Funding Source							
		50%	Sanitary		\$1,209,900.00	\$743,700.00	\$466,300.00
		50%	Water		\$1,228,900.00	\$755,600.00	\$473,400.00
			Road/General		\$80,700.00		\$80,700.00

## Estimate of Probable Cost

Owner:

City of Buchanan

Project Title:

PROJECT #350: Glaser - Forcemain Replacement Project

Date:

July 2020

Project #:

2130386

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
1	Mobilization / General Conditions (5%)	1	LS	\$6,000.00	\$6,000.00
2	Forcemain, 8-inch	545	LF	\$85.00	\$46,325.00
3	Remove HMA Pavement	100	SY	\$4.00	\$400.00
4	HMA patch, 4-inch	100	SY	\$40.00	\$4,000.00
5	Gravel patch, 6-inch	100	SY	\$12.00	\$1,200.00
6	Driveway Replacement	4	EA	\$1,500.00	\$6,000.00
7	Restoration (Topsoil, seed and mulch)	5.45	STA	\$750.00	\$4,087.50
8	Remove Concrete Curb and Gutter	40	LF	\$7.00	\$280.00
9	Concrete curb and gutter	40	LF	\$15.00	\$600.00
10	Remove Concrete Sidewalk	250	SY	\$7.00	\$1,750.00
11	Concrete Sidewalk	2,600	SF	\$6.00	\$15,600.00
12	ADA Plates	20	SF	\$40.00	\$800.00
13	Traffic Control	1	LS	\$5,000.00	\$5,000.00
14	Soil Erosion Control	1	LS	\$2,500.00	\$2,500.00
15	Bypass - Pumping (300 gpm)	4	Day	\$3,500.00	\$14,000.00
16	FM Abandonment	545	LF	\$12.00	\$6,540.00
17	FM - reconnection at LS	1	LS	\$10,000.00	\$10,000.00
18	FM - reconnection at discharge MH	1	LS	\$5,000.00	\$5,000.00
<b>Subtotal</b>					<b>\$130,100.00</b>
<b>Project Total</b>					<b>\$130,100.00</b>

All work quantities and costs are estimated for preliminary planning purposes only.

Costs estimated in 2019 Dollars

## Estimate of Probable Cost

Owner:

City of Buchanan

Project Title:

Water Treatment Plant and Wellhouse

Date:

September 10, 2020

Project #:

2190800

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
1	General Requirements (prime contractor mark up, bonds,mobilization, etc.	1.0	Isum	\$300,000.00	\$300,000.00
2	Site Work/onsite piping	1.0	Isum	\$600,000.00	\$600,000.00
3	Water Treatment, Process	1.0	Isum	\$1,600,000.00	\$1,600,000.00
4	Foundations/Concrete Work	1.0	Isum	\$170,000.00	\$170,000.00
5	Structural Steel, Misc. Metals, FRP	1.0	Isum	\$50,000.00	\$50,000.00
6	Architectural (40 x 60 ' block building with 14' to ceiling)	1.0	Isum	\$460,000.00	\$460,000.00
7	Plumbing	1.0	Isum	\$80,000.00	\$80,000.00
8	HVAC	1.0	Isum	\$70,000.00	\$70,000.00
9	Electrical	1.0	Isum	\$300,000.00	\$300,000.00
10	Site work/fill and mitigation/fencing	1.0	Isum	\$100,000.00	\$100,000.00
11	Backwash tank and pumping	1.0	Isum	\$150,000.00	\$150,000.00
<b>Construction Total</b>					<b>\$3,880,000.00</b>
Allowance for contingencies (10%)					\$390,000.00
<b>Total</b>					<b>\$4,270,000.00</b>

## Estimate of Probable Cost

Owner:

City of Buchanan

Project Title:

New Well and Wellhouse

Date:

September 4, 2020

Project #:

2190800

Item No.	Description	Quantity	Unit	Unit Price	Total Amount
<b>I. Phase I - Soil Borings</b>					
1	Phase I Mobilization	1.0	lsum	\$2,000.00	\$2,000.00
2	Drilling and Sampling in Unconsolidated Soils from 0 to 300 feet- Soil Boring Including Abandonment	600.0	v.f.	\$25.00	\$15,000.00
3	Sieve Analysis	30.0	each	\$25.00	\$750.00
<b>Phase I Subtotal</b>					<b>\$17,750.00</b>
<b>II. Phase II - Observation Wells</b>					
4	Phase II Mobilization	1.0	lsum	\$4,000.00	\$4,000.00
5	Drilling and Sampling in Unconsolidated Soils - Observation Wells	600.0	v.f.	\$25.00	\$15,000.00
6	Sieve Analysis	30.0	each	\$25.00	\$750.00
7	Furnishing and Installing 6" (min.) Dia. Casing including Cement Grout (2 wells)	600.0	v.f.	\$60.00	\$36,000.00
8	Furnishing and Placing 6" (min.) Screens (2 wells)	40.0	v.f.	\$200.00	\$8,000.00
9	Developing 6" Observation Well (per well)	2.0	each	\$2,000.00	\$4,000.00
10	Disinfection and Bacteriological Testing	2.0	each	\$1,000.00	\$2,000.00
11	Furnishing, Installing and Removing Test Pump and Disc	1.0	each	\$3,000.00	\$3,000.00
12	Preliminary Test Pumping - Well #1	4.0	hrs.	\$200.00	\$800.00
13	Water Quality Testing	1.0	lsum	\$1,500.00	\$1,500.00
14	Furnishing and Installing Locking Protective Covers	2.0	each	\$800.00	\$1,600.00
<b>Phase II Subtotal</b>					<b>\$76,650.00</b>
<b>III. Phase III- Test/Production Well</b>					
15	Phase III Mobilization	1.0	lsum	\$4,000.00	\$4,000.00
16	Drilling and Sampling in Unconsolidated Soils - 12" Test/Production Well	300.0	v.f.	\$50.00	\$15,000.00
17	Furnishing and Placing 12" Diameter Casing including Cement Grout	300.0	v.f.	\$100.00	\$30,000.00
18	Furnishing and Installing Screen, Including Gravel Pack	50.0	v.f.	\$300.00	\$15,000.00
19	Well Alignment and Plumbness Testing	1.0	each	\$2,000.00	\$2,000.00
20	Developing Test/Production Well	50.0	hrs.	\$200.00	\$10,000.00
21	Well Disinfection	2.0	each	\$1,000.00	\$2,000.00
22	Bacteriological Testing	1.0	lsum	\$500.00	\$500.00
23	Furnishing, Installing, and Removing Test Equipment and Temporary Discharge Piping	1.0	each	\$4,500.00	\$4,500.00
24	Step-drawdown Test	6.0	hrs.	\$200.00	\$1,200.00
25	Aquifer Performance Test (Pumping Phase)	72.0	hrs.	\$200.00	\$14,400.00
26	Aquifer Performance Test (Recovery Phase)	24.0	hrs.	\$50.00	\$1,200.00





**City of Buchanan**

Wastewater Preliminary Engineering Report

## Short-Lived Assets

Item	Quantity	Unit Cost	Total Cost	useful life	cost/year
LS Pumps (>300 gpm)	4	\$50,000	\$200,000	15	\$13,333
LS Pumps (<300 gpm)	10	\$25,000	\$250,000	15	\$16,667
LS Controls	7	\$20,000	\$140,000	15	\$9,333
WWTP Short Lived Assets	1	\$200,000	\$200,000	15	\$13,333
<b>TOTAL</b>			<b>\$790,000</b>		<b>\$52,667</b>

# Appendix C

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## Wastewater Connections

<b>Summary of Customer Data</b>		
<b>WASTEWATER</b>		
	<b>#</b>	<b>Flow/Year</b>
Total Number of Sewer System Connections	<b>2053</b>	<b>87,918,000</b>
Total Number of Sewer System Connections - City	<b>1905</b>	<b>80,983,000</b>
Total Number of Sewer System Connections - Township	<b>148</b>	<b>6,935,000</b>
Buchanan Township	<b>148</b>	<b>6,935,000</b>
City - Single Family Connections	<b>1677</b>	<b>71,816,000</b>
City - Other Connections	<b>228</b>	<b>9,167,000</b>
<b>Total</b>	<b>1905</b>	<b>80,983,000</b>
Buchanan Township - Single Family Connections	<b>137</b>	<b>6,785,000</b>
Buchanan Township - Other Connections	<b>11</b>	<b>150,000</b>
<b>Total</b>	<b>148</b>	<b>6,935,000</b>
City - Single Family Connections	<b>1677</b>	<b>71,816,000</b>
Buchanan Township - Single Family Connections	<b>137</b>	<b>6,785,000</b>
<b>Total</b>	<b>1814</b>	<b>78,601,000</b>
City - Other Connections	<b>228</b>	<b>9,167,000</b>
Buchanan Township - Other Connections	<b>11</b>	<b>150,000</b>
<b>Total</b>	<b>239</b>	<b>9,317,000</b>